

## DOCKETED

<b>Docket Number:</b>	15-IEPR-09
<b>Project Title:</b>	Natural Gas Market Assessment
<b>TN #:</b>	215375
<b>Document Title:</b>	Transcript of 09/21/15 Workshop
<b>Description:</b>	*** THIS DOCUMENT WAS ERRONEOUSLY FILED IN 15-IEPR-03; TN 206221 *** - Workshop on the Draft AB 1257 Natural Gas Act Report and the Revised Natural Gas Modeling Results and Outlook
<b>Filer:</b>	Patty Paul
<b>Organization:</b>	California Energy Commission
<b>Submitter Role:</b>	Commission Staff
<b>Submission Date:</b>	1/13/2017 3:48:27 PM
<b>Docketed Date:</b>	1/13/2017

## DOCKETED

<b>Docket Number:</b>	15-IEPR-03
<b>Project Title:</b>	Electricity and Natural Gas Demand Forecast
<b>TN #:</b>	206221
<b>Document Title:</b>	Transcript of 09/21/15 Workshop
<b>Description:</b>	Workshop on the Draft AB 1257 Natural Gas Act Report and the Revised Natural Gas Modeling Results and Outlook
<b>Filer:</b>	Cody Goldthrite
<b>Organization:</b>	California Energy Commission
<b>Submitter Role:</b>	Commission Staff
<b>Submission Date:</b>	9/28/2015 4:14:44 PM
<b>Docketed Date:</b>	9/28/2015

CALIFORNIA ENERGY COMMISSION  
IEPR COMMISSIONER WORKSHOP

In the Matter of: ) Docket No. 15-IEPR-03  
Workshop on the Draft AB 1257 ) and 15-IEPR-04  
Natural Gas Act Report and the )  
Revised Natural Gas Modeling )  
Results and Outlook )  
\_\_\_\_\_ )

CALIFORNIA ENERGY COMMISSION  
1516 NINTH STREET  
SACRAMENTO, CALIFORNIA

MONDAY, SEPTEMBER 21, 2015

10:00 A.M.

Reported by:  
Kent O'Dell

APPEARANCES

COMMISSIONERS PRESENT

Robert Weisenmiller, Chair, California Energy Commission,  
Ex Officio Member

Andrew McAllister, Lead Commissioner, IEPR Committee

CEC STAFF PRESENT

Heather Raitt

Catherine Elder

Rachel MacDonald

Ivin Rhyne

PRESENTERS

Rachel MacDonald, California Energy Commission, Energy  
Assessments Division, Supply Analysis Office

Anthony Dixon, California Energy Commission, Supply Analysis  
Office

Leon Brathwaite, California Energy Commission, Natural Gas  
Unit, Supply Analysis Office

PUBLIC COMMENT

Julia Levon, Bioenergy Association of California

Alison Smith, Southern California Gas Company

Ryan Kenny, Clean Energy

Scott Wilder, Southern California Gas Company

Tim Carmichael, California Natural Gas Vehicle Coalition

Tim Tutt, Sacramento Municipal Utility District

INDEX

PAGE

AGENDA ITEM

Introductions	1
Commissioner Comments	1
Overview of AB 1257 Natural Gas Act Report	5
Public Comments	33
Revised Natural Gas Modeling Results	47
Natural Gas Outlook	43
Public Comments	71
Commissioner's Remarks	76
Adjourn	76

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

P R O C E E D I N G S

10:07 A.M.

SACRAMENTO, CALIFORNIA, MONDAY, SEPTEMBER 21, 2015

(The meeting commenced at 10:07 a.m.)

COMMISSIONER MCALLISTER: All right. Well, thanks for being with us today. Sparse crowd, but very knowledgeable.

And my name is Andrew McAllister, Lead Commissioner on this year's IEPR, and happy to be getting the latest update on the natural gas modeling for the forecast, and also the AB 1257 update which is sort of an added task for this round. And looking forward to sort of how that's coming -- understanding how that's coming along. I'm sure there will be some ideas throughout the day for how we can package that in a way that makes the most sense.

Happy to share the dais with Chair Weisenmiller, so with that -- who is the lead on Natural Gas. And with that I'll pass it -- the microphone to him.

CHAIR WEISENMILLER: Yeah. I wanted to thank everyone for being here today, and for the kickoff on the Natural Gas Workshop. You know, I want to, of course, remind everyone that at this point natural gas is our marginal fuel, particular in the power sector. It provides a lot of flexibility as we go through droughts or

1 potentially El Nino next year. But we still have the  
2 fundamental issues of trying to make sure -- really  
3 threshold issues, A, the safety of the natural gas pipeline  
4 system has been resolved, and B, that we really have put in  
5 place sort of a tight system to deal with leakage from the  
6 natural gas system. The Board is doing those evaluations  
7 and we'll do those regulations hopefully by the end of the  
8 year. But anyway, both of those are real thresholds.

9           And as we go through our research and this  
10 activity, again trying to understand how to make sure  
11 particularly that the system is safe with that, let's kick  
12 off the workshop.

13           COMMISSIONER MCALLISTER: I want to -- I want to  
14 bring up one more issue, and I guess this is something that  
15 I'm struggling with. And I feel like the discussion sort of  
16 needs to move a little bit more apace with respect to the  
17 longer term; right? So we're faced with making investments  
18 in various infrastructures, electric and natural gas over  
19 the near term, that actually will have some long-term  
20 implications as well. I'm thinking more on the -- well,  
21 really on the -- on the bulk generation side, as well as on  
22 the retail side. I tend to think more on the retail side,  
23 but really both are important.

24           And so as we look to 2030, as we look beyond 2030  
25 and we start to count the carbon molecules, you know,

1 natural gas certainly is, you know, in terms of fossil is  
2 low carbon. But if we're really looking at 80 percent below  
3 1990 by 2050, the ability to utilize fossil at all,  
4 including natural gas, either in bulk power -- well, really  
5 both bulk power and -- and end uses, we have to be much more  
6 judicious about that and some of the investments that get  
7 made. In the near term, you know, we may be around by 2050.

8 Certainly as we -- on the retail side we have a little more  
9 time because those devices tend to be not quite as long  
10 lived as a power plant. But still we need to do the  
11 technology development for creating options that are low  
12 carbon, either with biogas, retail biogas, or, you know,  
13 shift toward electrification. And I think the -- the jury  
14 is really out on what the pathway is going to look like in  
15 terms of cost-effective technologies that people can  
16 actually implement.

17 So natural gas, you know, there's much -- we sort  
18 of still think of, I think as a transition fuel, in a way,  
19 toward a low-carbon future. But I think increasingly that  
20 looks a little bit reductive, and so we need to sort of  
21 unpack that and figure out what the means in specific terms.

22 And so this is not necessarily to load this workshop with  
23 solving that problem. But I do think we need to get that on  
24 the table for a longer-term discussion, really across  
25 agencies and at the policy level, as well. But there's a

1 lot of technology that's involved in getting there, so I  
2 kind of wanted to just bring that up and make sure it was on  
3 the table.

4 So with that I'll pass it back to Heather so we  
5 can get going.

6 MS. RAITT: All right. Good morning. I'll just  
7 briefly go over the housekeeping items.

8 If there's an emergency and we need to evacuate  
9 the building, please follow Staff to Roosevelt Park which is  
10 across the street diagonal to the building.

11 Our workshop is being broadcast through our WebEx  
12 conferencing system, and parties should be aware that you're  
13 being recorded. We'll post an audio recording on the Energy  
14 Commission's website in a few days, and a written transcript  
15 in about a month.

16 Today we have three presentations from Energy  
17 Commission staff. There will be an opportunity for public  
18 comment after Rachel McDonald's presentation on the AB --  
19 Draft AB 1257 Natural Gas Act Report.

20 Then we have a slight change in the agenda. We'll  
21 have Anthony Dixon present on the natural gas outlook before  
22 Leon Brathwaite's presentation on modeling results. And  
23 there will be an opportunity for -- a second opportunity for  
24 public comments after Leon's presentation.

25 We're asking parties to limit comments to three

1 minutes. If you're in the room and want to make a comment,  
2 please go ahead and fill out a blue card and give it to me.  
3 For those who are on -- the WebEx participants, please use  
4 the chat function to tell our WebEx coordinator that you'd  
5 like to make a comment during the public comment period, and  
6 we'll either relay your comment or open the line at the  
7 appropriate time. For phone-in only participants, we'll  
8 open your lines at the end.

9           Materials for the meeting are available at the  
10 entrance to the hearing. And written comments are welcome  
11 and due on October 1st. And the instructions for submitting  
12 comments are in the notice for the workshop.

13           And with that, if we're ready we can just go ahead  
14 and hear from Rachel.

15           MS. MACDONALD: Thank you, Heather. Okay.

16           Good morning, Chair Weisenmiller, Commissioner  
17 McAllister. My name is Rachel McDonald. I'm with the  
18 Supply Analysis Office in the Energy Assessments Division.  
19 And today I'm going to give an overview of the Draft AB 1257  
20 Natural Gas Act Report. Comments are welcome, as Heather  
21 had indicated, at the end of the presentation, as well as  
22 written comments that are due October 1st. And this report  
23 is in reference to Assembly Bill 1257 that requires the  
24 Energy Commission to identify strategies to maximize the  
25 benefits of natural gas an energy source.

1           And I'll caveat this with the fact that it was a  
2 multi-division collaboration between the Efficiency  
3 Division, the Electricity Analysis Division, Transportation,  
4 Research and Development, as well as coordinating with  
5 stakeholders from past workshops as -- and other agencies  
6 like the ARB. And present in the audience are quite a few  
7 of the chapter authors. So we'll -- if we have questions  
8 we'll certainly be referring to technical experts.

9           So for Chapter 1, it's an Introduction. It's to  
10 the things that were addressed in the report. We have the  
11 infrastructure, pipeline safety, natural gas generation,  
12 combined heat and power CHP, transportation, efficiency as  
13 far as heating and cooling, water heating, and appliances,  
14 leading into ZNE, the zero net energy buildings, and then  
15 biogas and biomethane, and last but not least, fugitive  
16 emissions, methane leakage from infrastructure.

17           So going into Chapter 2, primarily Pipeline Safety  
18 and Natural Gas Infrastructure. There's quite a bit of  
19 legislation addressing pipeline safety underway with the  
20 CPUC and the utilities. The Energy Commission does support  
21 this with research and development. And there's quite a bit  
22 of activity as far as plans that the IOUs had to submit as  
23 far as pipeline safety and infrastructure changes that  
24 they're making as far as replacement and inspection  
25 programs.

1 Another infrastructure issue is the southern  
2 system minimum. That has to do with the flow requirements  
3 through the southern region of California's SoCalGas area,  
4 as well as it serves part of San Diego Gas and Electric as  
5 well. The issue is that it's a very constrained area. It's  
6 isolated. It has limited interconnection and not -- it  
7 doesn't have gas storage.

8 And so the challenges that are occurring have to  
9 do with meeting demand. And it didn't help having San  
10 Onofre going offline as well. That increased the  
11 curtailment issues. And as a result, SoCalGas was allowed  
12 to make a purchase or make -- make-up gas purchases so where  
13 they could buy in frequent small amounts. This was meant to  
14 be something temporary, except that what occurred was  
15 quite -- quite a few purchases, I believe over 80 purchases  
16 in a year -- a year's time.

17 This actually is just a graphic showing the red  
18 circle, that southern area there with the border of Mexico.

19 And as a result of those make-up purchases, So Cal  
20 put forward an application with the CPUC for the North-South  
21 Pipeline. That's 60 miles of pipeline capacity that they're  
22 proposing to help address the limitations in that area. As  
23 well, there have been other projects put forward by  
24 Transwestern, TransCanada, and Kinder Morgan that are  
25 arguing alternatives, possibly lower costs, possibly faster.

1 These hearings were heard at the CPUC. And the CPUC is  
2 expected to issue a decision by the end of this year.

3 So one of -- the key takeaway from pipeline safety  
4 and natural gas infrastructure was that we need greater  
5 transparency and data exchanges between the utilities and  
6 all of the state agencies and research bodies that are doing  
7 research. It needs to be quite a bit more open and have  
8 access to utility data.

9 We need additional analysis, for example, some  
10 repeat conditions. I think the focus is primarily on  
11 winter. We need to look at summer peak conditions and  
12 curtailments that are occurring during these times, as well.  
13 And then lastly, as far as pipeline safety goes we need  
14 continued public outreach regarding natural gas safety and  
15 infrastructure. And I'll say that, for example, is for  
16 diggings, calling the 811. That's one of the most common  
17 causes of actual pipeline failure is individuals on private  
18 property digging into the ground and causing leaks.

19 For Chapter 3, going into Natural Gas Generation,  
20 the discussion of natural gas generation in California,  
21 roughly 40 percent of California's natural gas is from -- is  
22 used for generation. Statewide versus national, we  
23 obviously have high policy expectations as we move towards  
24 renewables. But on a federal level they are looking to  
25 reduce the national dependence on coal. And that would be

1 under the Mercury and Air Toxics Standards, as well as the  
2 Clean Power Plan. And what that is expected to do is put  
3 pressure on natural gas demand in California, even though it  
4 primarily effects out-of-state generation. So we need to  
5 ensure adequate gas delivery of California natural gas in  
6 high-load conditions.

7           This leads to the reliance and the interaction of  
8 natural gas generation and renewables with our goals that we  
9 have in California. In 2013, about 21 percent of retail  
10 electricity sales were from renewables. Our renewables  
11 primarily being wind and solar which is an intermittent  
12 resource, and it can vary hour by hour, minute by minute.  
13 We've certainly heard from utilities as far as cloud  
14 coverage goes and the issues with intermittency and power  
15 quality.

16           Our California Independent System Operator, they  
17 have to have enough dispatchable natural gas resources to  
18 address the variation from renewables, because we use  
19 natural gas primarily to meet reliability needs and  
20 ancillary services.

21           So one of the things that natural -- the operators  
22 do of natural gas infrastructure is to meet the conditions  
23 as they kind of hedge their actions with either line  
24 packing, which is packing the gas in to hold in more gas,  
25 the molecules closer together to not exceed the maximum

1 allowable operating pressure. And then the opposite of that  
2 is drafting where there's not enough gas in there and it  
3 pulls forward to where the demand goes when they need it.  
4 The downside of drafting is you can have loss of pressure.  
5 But those are two things that system operators do to try to  
6 deal with intermittent issues and daily operations. We need  
7 to understand these general practices better.

8           Going into Chapter 4 with Combined Heat and Power  
9 in Natural Gas, there's quite a bit of policy direction in  
10 regards to CHP and the actual goals that we have for the  
11 state. We have roughly 8,500 to 9,000 megawatts currently  
12 installed, I believe. We have goals for 4,000 megawatts of  
13 installed CHP by 2020. The Governor's Clean Job Plan called  
14 for another 6,500 megawatts by 2030. And then there is a  
15 CPUC settlement that ordered the IOUs to procure 3,000  
16 megawatts of CHP.

17           But we still, despite all this policy, we still  
18 have quite a bit of lack of movement in the area of new  
19 installed CHP. And that is due to economic barriers like  
20 non-bypassable charges, standby charges. Grid  
21 interconnection is always challenging. And a culmination of  
22 these challenges leads to contract difficulties.

23           Research is needed to better understand the cost  
24 benefits, the overall infrastructure costs and operations,  
25 and then the regulatory market framework that will help

1 derive the true value of CHP because, as you can see from  
2 the slides before, we have quite a bit of policy for it.  
3 But I believe at this time there's very little movement as  
4 far as CHP projects and the pipeline and moving forward to  
5 meeting those goals.

6 Chapter 5, Natural Gas and Transportation.  
7 Transportation accounts for about 36 percent of the state's  
8 overall greenhouse gas emissions. There obviously are  
9 natural gas vehicles on the market with low-NOx engines that  
10 use natural gas or biomethane. Most of these vehicles that  
11 we're familiar with are in fleet services in the medium- and  
12 heavy-duty sector, like busses you see going down the  
13 street. I know UPS, for example, has quite a bit of CNG  
14 vehicles. A challenge to natural gas transportation is the  
15 lack of fueling infrastructure. It's obviously a barrier to  
16 greater overall market deployment.

17 Research; the Energy Commission does have  
18 research, a very active Transportation Research Group. And  
19 we will continue to support the ARB's low-carbon fuel  
20 standard intensity values.

21 Expand -- one of the things we're looking at is  
22 expanding natural gas and biomethane fueling infrastructure  
23 challenges, understanding the methane leakage that comes  
24 from infrastructure, which we'll also talk about later in  
25 Chapter 9 as far as overall infrastructure and methane

1 leakage, and developing and demonstrating functionality of  
2 new technologies with larger natural gas engines, better  
3 understanding and quantification of the impacts of natural  
4 gas vehicles on the environment.

5           Going into Chapter 6, this is Natural Gas and  
6 Efficiency Applications, this leads itself, I believe, into  
7 the ZNE policy which is the next chapter. Here at the  
8 Energy Commission, right now we have a strong movement under  
9 AB 758. This is our energy efficiency in regards to  
10 existing residential and non-residential buildings. We just  
11 finalized our action plan, and that includes prioritizing  
12 the strategies and approaches to double the rate of  
13 efficiency savings in buildings by 2030. And part of that  
14 was recognizing the importance and movement to better  
15 understanding natural gas efficiency.

16           So California's households and small businesses  
17 make up about one-third of overall natural gas usage for  
18 residential applications. This is primarily used for space  
19 and water heating. It looks like about 49 percent of that  
20 is for water heating. Of that, 95 percent is water  
21 storage -- storage tanks, hot water heaters.

22           And then for space heating, about 70 percent  
23 overall of California homes are heated with natural gas.  
24 And of that, homes that actually have natural gas hookup, 90  
25 percent of those homes use gas for heating. The other

1 portion is gas in commercial process loads, like water  
2 heating for cooking, for industrial processes.

3           And then there's the industrial sector that's  
4 about another 25 percent. And the industrial sector  
5 definitely has a lot of opportunities for improvement as far  
6 as efficiency opportunities.

7           Research in the efficiency area is needed to  
8 understand cost effectiveness as far as switching  
9 technologies. For example, a natural gas water heater  
10 versus switching out -- you know, electrifying to use solar  
11 thermal. We need to understand life cycle and longevity  
12 infrastructure and developed methodologies to better value  
13 the natural gas versus the electrification and the cost  
14 associated with that. Developing technologies, smart  
15 appliances that are more efficient, and while we reduce the  
16 equipment costs as far as -- and, as well, lowering  
17 emissions. And again, improving space heating and cooling  
18 technologies and improving efficiency overall.

19           Chapter 7, Natural Gas Applications for Zero Net  
20 Energy Buildings. Moving into the subject of ZNE is one  
21 that we believe ZNE buildings, industry-wide there's quite a  
22 bit of difference of opinion on what ZNE is. And our  
23 understanding and our explanation of it was that ZNE  
24 buildings have high levels of energy efficiency for both the  
25 structure and appliances. And that's combined with clean

1 renewable power generation, in most cases for applications  
2 that would be solar.

3           So one of the main challenges for ZNE is the  
4 uncertainty and lack of clarity regarding the overall  
5 definition and/or application of a ZNE building. That's  
6 something that we need to continue to explore and better  
7 understand the end use natural gas applications as we move  
8 toward -- to electrifying our homes and businesses  
9 throughout the state.

10           Chapter 8, Biogas and Biomethane. Biogas in  
11 itself is raw untreated gas that's produced during the  
12 anaerobic decomposition of biomass, and it's composed mostly  
13 of methane and carbon dioxide. And biomethane is the actual  
14 treated product of biogas, where that carbon dioxide and  
15 other contaminants are removed. So some good examples of  
16 biogas would be dairies, landfills, wastewater treatment  
17 facilities. Also there's a few chicken/poultry farms, I  
18 understand, that qualify.

19           There is policy and legislation applying to  
20 allowing this biomethane to be injected into the natural gas  
21 infrastructure. That's something that's currently underway  
22 with the proceeding, as well, at the CPUC. However,  
23 challenges to actual deployment and usage of that resource  
24 of biogas is limited or has constraints. And that biogas  
25 does contain -- before it's -- it's biomethane you have to

1 remove the contaminants which are -- might be, for example,  
2 ammonia, mercury, hydrogen.

3           There's regulatory uncertainty as far as --  
4 similar to CHP where they have, due to some of the  
5 challenges with interconnection and locational constraints,  
6 then there's challenges securing long-term contracts. And  
7 then locationally, obviously like dairies, for example, a  
8 lot of these projects, ideal projects where the biogas or  
9 the resources present is not, other than being load serving,  
10 it would be more difficult to interconnect due to the  
11 isolated areas. And then some locations, because of those  
12 areas, might not have enough gas regionally to allow that  
13 blending. So as a result a lot of times economically it's  
14 not feasible to interconnect the -- and utilize that  
15 biomethane because it ends up penciling out that natural gas  
16 is more affordable.

17           Moving into Chapter 9, Greenhouse Gas Emissions,  
18 this is primarily methane emissions. The primary source of  
19 Co2 emission in California is from combustion, from power  
20 plants, appliances, industrial processes, and vehicles. We  
21 do recognize that natural gas is necessary for these  
22 applications here in California. And we see that it's  
23 certainly a better option and a shift away from higher GHG,  
24 fuels like coal or gasoline or diesel.

25           Methane, which is primarily what natural gas is

1 made of, is highly potent, short lived GHG. It's the second  
2 most prevalent GHG emitted in California, Co2 being primary.

3           The -- about 95 percent of the natural gas  
4 production that we import is located out of state. And we  
5 have -- as a result of all that infrastructure, we are aware  
6 of unintentional releases known as fugitive emissions that  
7 are coming from multiple sources within the natural gas  
8 infrastructure. Those sources might be leaking pipelines,  
9 flange seals, compressors, abandoned wells, or just poor  
10 operation with inefficient combustion.

11           At a federal level we have several policies  
12 looking to improve our emissions. We have President Obama's  
13 Climate Action Plan. In California we have significant and  
14 specific policy to address the short-lived climate  
15 pollutants, SLCs they're called. We have Senate Bill 1371,  
16 that's the CPUC and the ARB are developing rules to reduce  
17 emissions from gas transmission and distribution pipeline,  
18 infrastructure primarily, as well as Senate Bill 605, that's  
19 with the ARB Developing Strategies. By the end of this year  
20 this year that will -- looking to further reduce fugitive  
21 emissions -- short-lived climate pollutant emissions, excuse  
22 me.

23           Challenges that we have in this area primarily  
24 have to do with measurement and sampling bias. Quantifying  
25 super emitters; those are actually locations that have

1 extremely high emissions or leakage. And attributing  
2 emissions' values between oil and gas sectors.

3           Research to reduce the uncertainty of estimating  
4 methane emissions, there's quite a bit of research in this  
5 area, and in this report. Overall, a theme being that there  
6 was a bit of uncertainty, certainly a great need for  
7 additional research, and as well as our continued  
8 collaboration with our sister agencies, like the ARB. We  
9 need to bring convergence between the methodologies in which  
10 we do this analysis. There's differences between one  
11 approach being top down, bottom up, and great differences in  
12 the results. Improving the allocation methods of oil and  
13 gas emissions. Improving the overall data and the methods  
14 that we have as far as our research studies.

15           And then there's opportunity, and this actually is  
16 being used in pipeline safety, as well, but there's  
17 application for early detection as far as infrastructure  
18 leakage goes. So it's double -- double use in pipeline  
19 safety and leakage in general for emissions. And that is  
20 the use of technologies like Picarro, which is the vehicle  
21 mounted sensor system that PG&E is deploying, and Pathfinder  
22 which is a tool that evaluates and does analysis on aging  
23 infrastructure. And overall we need to better understand  
24 the technologies so that we can understand the cost benefit  
25 of -- of known emission sources and what is out there

1 leaking and how to quantify it.

2           So I encourage everyone to -- that was just kind  
3 of a takeaway from the chapters. The report is obviously  
4 much more detailed. I encourage everyone to please read the  
5 report. Contact me with questions. This is a draft. We're  
6 certainly taking comments and working with stakeholders.  
7 And there's the link here to the documents. You can submit  
8 comments in writing. You can also submit them via email.  
9 And if you have any questions, this presentation is posted  
10 online. My contact information is on there, as well. I  
11 encourage any questions or any comments or anything you want  
12 to talk about, you certainly can contact me and I'll do my  
13 best to help.

14           So with that, I thank you for listening. And I  
15 open the floor to any comments.

16           CHAIR WEISENMILLER: Yeah. Great. Let me start  
17 with a couple questions or comments.

18           The first one is, do we have -- we had an earlier  
19 presentation from EDF on their family of studies. Do you  
20 have a sense of when their research is going to be  
21 completed? Obviously, it's -- it's a little bit slower than  
22 I think we had hoped.

23           MS. MACDONALD: Yes, Chair. The EDF study is  
24 actually cited that were in the report, that we're awaiting  
25 the results. I believe they were due as of recent. And

1 they're supposed to be due -- it's supposed to be out any  
2 day. They were supposed to be out -- I believe the study  
3 was supposed to be completed over the summer. And then  
4 they've delayed it to the fall, and it's expected to be  
5 published soon is what I keep reading and hearing, end of  
6 the year.

7 CHAIR WEISENMILLER: Yeah. Anyway, no, we've  
8 obviously been hoping for the 1257 report to get to the  
9 results of the EDF study to build into that.

10 I was also going to note something where the staff  
11 should pin down more of the facts. But yesterday at 11:53  
12 in SDG&E a generator tripped offline that caused the  
13 transmission lines to start becoming overloaded. And at  
14 1:00 some of the lines were shut down and power interrupted.  
15 That was about 150 megawatts of power interrupted at SDG&E.  
16 And basically load returned fully at 2:59 p.m. So -- and  
17 obviously this was a high-load time there. Under the ISO  
18 tariffs my understanding is they can't disclose the  
19 operation of specific power plants, so I guess we're left  
20 guessing which plant tripped offline. But anyway, it would  
21 be good to build that in, that, you know, there are  
22 consequences.

23 I think one of the things I wanted to, as we dig  
24 into, get a better understanding of sort of the research  
25 needs area. Then I think we need to get a lot more

1 specific. I would note that California has the distinction  
2 of having the first terrorist attack on a power  
3 infrastructure at Metcalf. There may have been a second one  
4 since then. And obviously gas facilities are a lot easier  
5 to identify. And so my understanding from the utilities is  
6 there are efforts to harden the gas system. But I think as  
7 we get into the information flows we have to be sensitive  
8 too. We're in a different world now.

9 I think the other question -- so basically as we  
10 dive into that I think I sort of want to understand between  
11 the utilities and the researchers exactly what we're talking  
12 about in terms of data and that -- make sure we're not  
13 getting into whatever.

14 I think on CHP the one area I would like to see  
15 more investigation on is sort of cleaner combinations of  
16 CHP. I think the Germans are doing grant programs now for  
17 CHP with fuel cells. And you mentioned solar thermal. And  
18 again, certainly UC Merced has done a lot of great research  
19 on high temperature solar thermal. But the reality is we  
20 have sites that have both high electric and high thermal  
21 needs. The electricity can come from PV. But if you do PV  
22 with an old boiler it's not going to be particularly great  
23 from an air quality or greenhouse gas emission site.

24 So, you know, that gets you back to -- that's the  
25 reason why originally we were doing more gas-fired CHP. But

1 it would be good to understand some of the cleaner  
2 technology options there, too, along -- along with the gas-  
3 fired.

4 I would note, peaker gen gas-fired CHP projects  
5 which have lower emissions than fuel cells. You know, in  
6 fact there's one -- we've funded those, and there's one in  
7 operation at the South Coast right now. So in terms of just  
8 trying to understand what people need for particular  
9 industrial sites.

10 My last comment was I would note on this whole  
11 biogas side, PG&E got out of the gathering system business  
12 in the '80s for a variety of reasons. It's pretty hard to  
13 imagine they want to get back into that. I don't know if  
14 anyone ever really picked up that opportunity. But --  
15 Katy's nodding her head, no, remembering the same thing. It  
16 was definitely one of those get out of Dodge, and not a  
17 great business to be in. So anyway, that's sort of a new  
18 opportunity for business lines, but certainly it's not a  
19 particularly great business line.

20 Anyway, Commissioner McAllister?

21 MS. MACDONALD: Yeah. Just a couple things.

22 On that last comment, I mean, so does that mean we  
23 go electrification. And, you know, the biogas, I guess it  
24 seems like an opportunity we've got to revisit given that  
25 the policy landscape and kind of the -- the imperatives have

1 changed since back then. And hopefully -- I mean,  
2 obviously, the utility kind of leading the pack by necessity  
3 is So Cal and the Semper Utilities. But, you know,  
4 obviously very relevant for PG&E as well. And again, I  
5 mean, that's -- we have to figure out what the potential  
6 scale of that is and see if we can technologies in that make  
7 it doable at a relatively low cost. And then we've got this  
8 sunk infrastructure. You know, the best option would be to  
9 take advantage of it.

10 I guess so on the CHP, I really just have a  
11 question, and maybe it's more for the Chair, I'm not sure.  
12 But you know, there -- so there are great technologies  
13 coming up. We can move over to renewables. I guess what  
14 are the remaining barriers, you know, to getting those  
15 projects on the ground? I mean, we're not seeing a huge  
16 amount of ramping up of CHP. And the legacy ones are kind  
17 of winding down a bit. So you know, what's the sort of  
18 market play to really try to --

19 CHAIR WEISENMILLER: It's probably a --

20 COMMISSIONER MCALLISTER: -- chart a path through  
21 them?

22 CHAIR WEISENMILLER: -- two-by-four to the utility  
23 foreheads. They -- they have sort of a genetic inclination  
24 that, you know, if they can go home and kill a co-gen  
25 project they can put -- chalk it up as a success.

1 COMMISSIONER MCALLISTER: Uh-huh.

2 CHAIR WEISENMILLER: Yeah.

3 COMMISSIONER MCALLISTER: And so it's -- that's  
4 interconnection, that's, you know --

5 CHAIR WEISENMILLER: Interconnect.

6 COMMISSIONER MCALLISTER: -- some other  
7 concerns --

8 CHAIR WEISENMILLER: That's offsets.

9 COMMISSIONER MCALLISTER: -- that's --

10 CHAIR WEISENMILLER: That's contracts.

11 COMMISSIONER MCALLISTER: You know, so --

12 CHAIR WEISENMILLER: That's the whole nine yards.  
13 Yeah.

14 COMMISSIONER MCALLISTER: Yeah. Yeah. So I mean,  
15 I think as we've got all this great technology potential  
16 there's a big wedge of clean energy that we could put in  
17 place that's kind of not being realized. So you know, maybe  
18 it becomes a political question as well. I mean, the  
19 governor obviously has elevated it to the highest level.

20 CHAIR WEISENMILLER: The governor has elevated it.  
21 I mean, in Brown 1 it took literally penalties to the  
22 shareholders at PG&E and Edison for them to get off the  
23 dime.

24 COMMISSIONER MCALLISTER: Uh-huh.

25 CHAIR WEISENMILLER: We may be back at that same

1 point.

2 COMMISSIONER MCALLISTER: So let's -- let's try to  
3 make sure that that -- at least this discussion is fully  
4 fleshed out in the -- in the report and in the IEPR, for  
5 sure.

6 So -- and then I guess it really is a question of  
7 the sort of potential. You know, being more of an electric  
8 person, I mean, I'm a novice on natural gas, obviously. But  
9 I guess I'm wondering about the parallels of packing and  
10 drafting.

11 And maybe this is for Katy, but, you know, how  
12 much flexibility do the utilities have? You know, in their  
13 electric side we think of voltage. You know, there's --  
14 there's a fairly wide range of voltage. You can do  
15 conservation voltage reduction. You can things like that.  
16 And I guess I'm wondering what the -- how much flexibility  
17 it actually gives the utilities for playing with that  
18 infrastructure in terms of the service quality that they  
19 have to maintain.

20 CHAIR WEISENMILLER: Well, I'd like Katy to chime  
21 in.

22 But I would note, one of the other issues that's  
23 really been in place the last year or two is the safety  
24 tests on the pipelines. You know, and basically what you do  
25 is flush them, you clean them, and then you do the water

1 testing. And so one of the issues we were running into this  
2 summer is there's a major line in So Cal which is going to  
3 be -- which has been out for months, which, you know, once  
4 you start the safety test it's not like you can say, oh, by  
5 the way, there's a peak today, can you start flowing gas in  
6 it again? So as we're going through this piece by piece  
7 through the system on the safety checks, that's certainly  
8 influenced -- there's been operational implications.

9 COMMISSIONER MCALLISTER: So where -- where, I  
10 guess, where do the failures tend to come? Are they on the  
11 sort of demand side or on they on the transmission side? I  
12 mean, you know, if you really want to pack and you get that  
13 pressure up, you know, what -- what's your -- what's you're  
14 most specific highest vulnerability, I guess is the  
15 question?

16 CHAIR WEISENMILLER: Yeah. Why don't you come up,  
17 Katy.

18 I mean, but obviously I would -- I would note that  
19 an issue on San Bruno was they did pack.

20 COMMISSIONER MCALLISTER: Uh-huh.

21 CHAIR WEISENMILLER: You know, so you -- when you  
22 do take the pressure up you need to make sure you're not --

23 COMMISSIONER MCALLISTER: You're not --

24 CHAIR WEISENMILLER: -- yeah --

25 COMMISSIONER MCALLISTER: -- overstressing the

1 system.

2 CHAIR WEISENMILLER: -- you're not overstressing  
3 or not taking any parts of it up above its rated level.

4 COMMISSIONER MCALLISTER: Yeah. I mean, it's --  
5 all it takes is that one -- that one weak link; right?

6 MS. ELDER: So I actually have given Chair  
7 Weisenmiller's note about what happened yesterday in San  
8 Diego. I was pulling up the operational numbers for both  
9 Sempra and PG&E to see if everything looked okay. It does  
10 look like tomorrow Sempra is projecting demand of its system  
11 of -- of over 3 BCF per day, which gets you back to that  
12 really high level that we saw early in the year with the  
13 curtailments.

14 Today it looks okay. It's about -- it's about 2.9  
15 BCF.

16 But one of the things that the -- that PG&E posts,  
17 Sempra doesn't post if yet, is the inventory level, which  
18 goes to the pack and draft question. And so on the PG&E  
19 system it's about 10 percent, about 400 MMCF per day,  
20 swaying morning to evening that they can tolerate in the  
21 system.

22 What's less than clear and what we've not really  
23 been able to get really precise about in terms of analysis  
24 is what does that mean for an individual power project. And  
25 that's where you get into needing to be able to do that

1 hydraulic analysis at the pipeline/power plant level. And  
2 we don't have the data. We, as staff, and public entities  
3 don't have the data to do that. Only the utilities do.

4 COMMISSIONER MCALLISTER: So I mean, we were  
5 talking -- well, you know, there are analog -- all of these  
6 big infrastructures are either electricity, water or natural  
7 gas. You know, they've got specific characteristics.  
8 And -- that are -- but there are some parallels; right?

9 So in terms of monitoring and control, you know,  
10 you can envision some analogs with the electric system where  
11 you do have, you know, voltage regulation at specific  
12 points. Well, you can have those sorts of, you know,  
13 automated controls, you know, shut off valves and --

14 MS. ELDER: Right.

15 COMMISSIONER MCALLISTER: -- for safety purposes.  
16 Just like you have loss reduction in electric utility, you  
17 know, you have sort of that -- that fairly robust and quick  
18 response kind of control of a natural gas utilities. And  
19 I'm wondering sort of are there projects to bring the level  
20 of that, sort of not just monitoring? I know that -- I know  
21 that they monitor. Actually, I mean, PG&E has got the great  
22 new facility there to really look hard at their natural gas  
23 system in specific details.

24 But, you know, bringing it up to snuff in terms of  
25 quick response to system failures at -- at distribution

1 transmission, various levels, I guess what -- what's the  
2 status of that project at the utilities?

3 MS. ELDER: I haven't heard of projects like that.

4  
5 One of the things that we've noodled with or toyed  
6 with is say if you had a power project that was really  
7 critical, could you build some sort of above-ground gas  
8 storage facility that could give you a few hours or even a  
9 day's worth of gas? It would be expensive probably, and  
10 that's why it's never been done before. But if you think  
11 back to the old gas holders that we used to have on the  
12 distribution system that we took -- we got rid of because we  
13 didn't think we needed them anymore, maybe something like  
14 that could make sense.

15 On the other hand, it could be that with all the  
16 other things that we can do with demand response on the  
17 electricity side, it's really more of an electricity issue,  
18 will electricity storage help us solve this problem? I keep  
19 hoping it's an electricity-system solution, not a gas-system  
20 solution, because I know how expensive it is --

21 COMMISSIONER MCALLISTER: Yeah.

22 MS. ELDER: -- to do the gas system. And I know  
23 how slowly gas moves. I mean, that's sort of the critical  
24 thing. Gas on a good day moves at about 30 miles an hour.

25 COMMISSIONER MCALLISTER: Uh-huh. I guess I'm

1 thinking sort of, you know, if you had a relatively new line  
2 that's serving a particular area, well, you could pack  
3 that --

4 MS. ELDER: Yeah.

5 COMMISSIONER MCALLISTER: -- even if you didn't  
6 want to pack the transmission pipeline that was older that  
7 fed it. And so to do that you'd need, you know, you'd need  
8 specific -- you know, you'd need pressurization stations  
9 that were more localized and distributed --

10 MS. ELDER: Right.

11 COMMISSIONER MCALLISTER: -- and things like that.  
12 So there are some in analogs, but I'm probably limited in my  
13 thinking by those because, you know, I'm kind of thinking in  
14 parallels with the electric system.

15 CHAIR WEISENMILLER: Well, I think, again another  
16 thing -- another type of parallel is there are different --  
17 well, obviously, the gas system, you have the high pressure  
18 lines, and then you go down to lower pressure.

19 COMMISSIONER MCALLISTER: Right.

20 CHAIR WEISENMILLER: And I assume the higher  
21 pressure, you've got more swing, and the lower pressure,  
22 again, is sort of older, less understood, and probably a  
23 little nervous, more nervous about running high pressures on  
24 some of that.

25 MS. ELDER: And so one of the things, if you think

1 about how you would study this in a hydraulic model, you'd  
2 be looking at not only where your high -- high pressure  
3 transmission lines are, but then the distribution feeder  
4 mains that come off that, and this -- all the different end  
5 uses that are fed off that line are going to affect the  
6 pressure in the line going to that power plant. And that's  
7 why it gets so complex is that the level of granularity  
8 needed to measure those pressure flows is incredibly  
9 complex. And that's one of the reasons why only the  
10 utilities have that data.

11 COMMISSIONER MCALLISTER: Yeah. Okay.

12 CHAIR WEISENMILLER: Yeah. My footnote was I  
13 remember back in the old original Mojave days that they  
14 hired Purvin & Gertz. And Purvin & Gertz used the -- the  
15 data, pipeline data that's filed at FERC to do studies of  
16 the flow capacity --

17 MS. ELDER: Yeah.

18 CHAIR WEISENMILLER: -- of the California system.  
19 So I'm assuming somewhere the data lives, and the  
20 question is access.

21 MS. ELDER: Yeah. Yeah. And, in fact, I have  
22 noticed that if you file an application for a pipeline at  
23 FERC, you have to provide the -- the hydraulic data along  
24 with that pipeline application. It's not clear that FERC  
25 will release that to anyone. So it will be interesting to

1 recall how Purvin & Gertz got the data.

2 CHAIR WEISENMILLER: I suspect that -- well, I  
3 know that PG&E and SoCalGas intervened in their pipeline  
4 case at FERC. And I would anticipate that SCAD (phonetic)  
5 and ARPS (phonetic) --

6 MS. ELDER: Yeah.

7 CHAIR WEISENMILLER: -- would have been very  
8 happy --

9 MS. ELDER: Yeah.

10 CHAIR WEISENMILLER: -- to do a data request for  
11 it from them.

12 MS. ELDER: Yeah. Yeah.

13 COMMISSIONER MCALLISTER: Okay. Thanks a lot. I  
14 appreciate it, Katy. Yeah.

15 I guess really just a comment on the biogas front.  
16 It really seems like the -- we've got to do more to flesh  
17 out that opportunity to see how much carbon we can -- we can  
18 displace with biogas. So just trying to keep that on the  
19 table for some kind of a long-term project.

20 I mean, do we -- do -- we have contemplated doing,  
21 you know, sort of a biogas action plan?

22 CHAIR WEISENMILLER: Oh, god, there was one  
23 already, a Bioenergy Action Plan --

24 COMMISSIONER MCALLISTER: Oh, all right.

25 CHAIR WEISENMILLER: -- that was done.

1           COMMISSIONER MCALLISTER: Okay. That was -- that  
2 was a little while back. I mean, in the -- in the pathway  
3 study we did look at bioenergy. Unfortunately, that was one  
4 of the weaker elements where we had an industry study which,  
5 everyone admitted, it was over the top of potential, and we  
6 used that.

7           COMMISSIONER MCALLISTER: Yeah. The 40 percent,  
8 that's kind of hanging out there. I guess I still am  
9 waiting for details about how that might actually take place  
10 and, you know, what -- where those -- where those molecules  
11 would actually come from in terms of the physical, you know,  
12 the agricultural sector or whatever. But that's seems like  
13 a high number. But if it's there, then that would be great.  
14 Okay. Great.

15           Thanks, Rachel.

16           MS. MACDONALD: Thank you.

17           Are there comments in the audience at all?

18           Or, is that you? Sorry, Heather.

19           MS. RAITT: That's okay. Thanks, Rachel.

20           I think we have a few blue cards that the  
21 Commissioners have.

22           COMMISSIONER MCALLISTER: Did you want to go to  
23 public comment, as the agenda says, sort of morning public  
24 comment?

25           MS. RAITT: Well, that was the way we had set it

1 up. But you are --

2 COMMISSIONER MCALLISTER: Yeah. That would be  
3 fine.

4 MS. RAITT: -- welcome to change it, if you'd  
5 like.

6 COMMISSIONER MCALLISTER: I think that would be  
7 fine. There are three public comments. Let me just call  
8 them here.

9 CHAIR WEISENMILLER: Yeah.

10 COMMISSIONER MCALLISTER: Okay. Julia Levon from  
11 Bioenergy Association.

12 Hi, Julia.

13 MS. LEVON: I think you made some of my comments  
14 for me. Thank you, Commissioner.

15 So good morning, Mr. Chairman and Commissioner.  
16 Julia Levon with the Bioenergy Association of California.

17 And, Commissioner McAllister, you did bring up  
18 several of the things I wanted to mention. But I'm going to  
19 start actually with a really important technical correction  
20 to the draft.

21 Your definition of biogas, which I assume was  
22 taken from AB 1900, 2012 legislation by Assemblyman Gatto,  
23 actually contradicts your own definition of biogas in the  
24 RPS eligibility guidebook. And I would strongly encourage  
25 you to use your own definition, which Assemblyman Gatto has

1 also said more recently is the correct definition for biogas  
2 generally because it includes not just biogas from anaerobic  
3 digestion, but biogas from any conversion method that uses  
4 organic waste as the feedstock. That's also consistent with  
5 more recent legislation --

6 CHAIR WEISENMILLER: Could you -- if you have a  
7 letter from him --

8 MS. LEVON: We do.

9 CHAIR WEISENMILLER: -- if you could support it --  
10 if you would submit it into our record, that would be  
11 terrific.

12 MS. LEVON: I will do that, along with the  
13 language from your RPS Eligibility Guidebook, and SB 498,  
14 legislation by Senator Lara last year which further  
15 elaborated on the definition of biogas.

16 The reason this is so significant is because more  
17 than half of all the eligible organic waste is not suitable  
18 for anaerobic digestion. Anaerobic digestion is great for  
19 food waste and grass and other non-cellulosic waste. But if  
20 we want to get at the massive volume of forest biomass which  
21 is critical to reduce wildfire, if we want to get at most of  
22 the agricultural waste, and even the majority of the organic  
23 waste that we're currently putting in landfills, it's wood  
24 waste, it's construction debris, it's prunings, things that  
25 are not suitable to anaerobic digestion.

1           This is really significant because to your point,  
2 Commissioner McAllister, about what's really the potential  
3 for biogas to replace fossil fuel gas, it is significantly  
4 higher if we include all of the organic waste, available  
5 waste, and all of the different conversion technologies.  
6 That doesn't even include power to gas which is a whole  
7 other area of renewable gas that I encourage you to include  
8 in the final version of this report.

9           But biogas alone could provide two-and-a-half  
10 billion gasoline gallon equivalents of transportation fuel,  
11 or by your own assessment, again from the 2012 Bioenergy  
12 Action Plan which as the author of the plan I have to say is  
13 horribly out of date at this point, I would encourage you to  
14 update it in 2016. I think it's -- it's past time. But  
15 that plan found that we could provide 5,000 to 6,000  
16 megawatts of flexible generation renewable power just from  
17 technically available organic waste.

18           So, Commissioner McAllister, to your point, the  
19 potential is huge to provide either flexible generation  
20 power or the lowest carbon transportation of any kind, and  
21 to meet the state's goals to reduce methane from organic  
22 waste, and probably even more significantly now, black  
23 carbon from wildfire. All of the benefits that we have in  
24 reducing black carbon from diesel emissions and cleaning  
25 power plants have been obliterated by the increase in

1 catastrophic wildfire in California, and we're seeing the  
2 effects of that right now.

3 COMMISSIONER MCALLISTER: As well as, apparently,  
4 the additional unaccounted for emissions for Volkswagen's  
5 cars.

6 MS. LEVON: So the opportunity is huge. I will  
7 submit this information in the record. And thank you very  
8 much for looking at this.

9 COMMISSIONER MCALLISTER: Thank you.

10 Alison Smith from SoCalGas.

11 MS. SMITH: Good morning and thank you.

12 Julia already covered some of the biogas issues.  
13 But I would also like to add that you've looked in the study  
14 at the sources of biogas in California but haven't examined  
15 any of the sources that are out of state. And I think  
16 that's also important in considering what's the long-term  
17 potential to help us greenhouse gas emissions. For example,  
18 in the transportation sector the LCFS allows for out-of-  
19 state biogas to be brought in and used. And so I think we  
20 need to include that area in the report.

21 Julia also mentioned power-to-gas. And SoCalGas  
22 would echo that comment that it's important to add the  
23 opportunity for power-to-gas into the report, looking at it  
24 as an opportunity for lower carbon natural gas, but also as  
25 a way of integrating the electric grid and the natural gas

1 grid in providing long-term storage as we move to more and  
2 more renewable electricity.

3           The other thing that I would like to comment on  
4 is, and I think Commissioner Weisenmiller had sort of  
5 mentioned this, that we do need to look at prioritizing some  
6 of the research that needs to be done. There's a number of  
7 things that have been identified. I would concur with Julia  
8 Levon's comment that we should update the Bioenergy Action  
9 Plan. But there's also items related to CHP and to the  
10 development of biogas. And I would like to see the report  
11 add in some concrete steps on how we're going to go about  
12 evaluating these. These are all things that SoCalGas is  
13 interested in and would like to support.

14           The final area that I'd like to comment on,  
15 Commissioner McAllister had brought up ZNE and the long term  
16 use of natural gas for residential and commercial. And  
17 SoCalGas has been doing studies with Navigant and E3,  
18 additional studies with them, that we're just finalizing  
19 now. And while they really aren't ready to be included in  
20 this report, we think they'll help inform as the Commission  
21 starts to look at those policies over the next couple of  
22 years to formulate the plan for the 2019 Energy Efficiency  
23 Targets. And we think there are some interesting results  
24 there about the use of biogas can really help us reduce  
25 greenhouse gas emissions more than some of the near term or

1 some of the plans for electrification.

2           So we're excited about these studies and do want  
3 to share them with CEC staff, and we'll be looking to do  
4 that over the next few months.

5           COMMISSIONER MCALLISTER: Great. So if you -- I'm  
6 excited to hear about that, as well. And I guess, you know,  
7 if you can keep an eye toward the market pathways and the  
8 cost effectiveness issue and kind of look out, maybe a  
9 little more than you're comfortable with, but help us  
10 imagine, you know, what -- what the relative scenarios are  
11 between, you know, near-term electrification, potential  
12 long-term impacts of that electrification, and sort of  
13 similar considerations for gas, I think that would be really  
14 helpful.

15           MS. SMITH: And I will admit that I think we have  
16 more work to do on that for our company as well. But those  
17 are areas that we definitely want to support the -- the work  
18 that CEC is looking to do.

19           We will be submitting written comments, some  
20 extensive written comments on these areas and additional  
21 areas that were addressed in the report. And there isn't a  
22 lot of time for public comments. We do hope that you'll be  
23 able to incorporate as much as the -- of the written  
24 comments from the public as possible.

25           CHAIR WEISENMILLER: Great. One thing that would

1 be useful to talk about in your comments is it's interesting  
2 when you look at the amount of R&D we have through EPIC on  
3 the electricity side versus the amount or R&D monies we have  
4 for natural gas, it's really, as you know, much, much  
5 smaller. And there was a question about, you know, in fact,  
6 I don't think the electric numbers are high enough but, you  
7 know, certainly it's probably time to have a conversation  
8 about whether the gas numbers should be greater. And I  
9 think that gets to the question of some of the unmet  
10 research needs.

11 COMMISSIONER MCALLISTER: That's more -- that  
12 becomes a legislative issues; right? Because don't we  
13 have --

14 MS. SMITH: Or CPUC.

15 CHAIR WEISENMILLER: It's the PUC. I think we've  
16 done enough checking to say that, you know, the legislation  
17 basically has a surcharge on gas flows, which includes  
18 pipelines in California. And that surcharge, the PUC  
19 basically sets the level of the surcharge, or could adjust  
20 it up.

21 MS. SMITH: Thank you.

22 COMMISSIONER MCALLISTER: Finally, Ryan Kenny.

23 MR. KENNY: Good morning, Chair Weisenmiller,  
24 Commissioner McAllister, thank you for your time. My name  
25 is Ryan Kenny. I represent Clean Energy, the nation's

1 largest provider of natural gas and renewable natural gas  
2 transportation fuel. We have over 550 stations nationwide,  
3 154 of which are here in California. And I'd like to  
4 briefly comment this morning on Chapter 5, Natural Gas as a  
5 Transportation Fuel.

6           And just reviewing the report, we view it as a  
7 positive report. It's a good step in the right direction.  
8 We're pleased with the content of it, but we do think it's a  
9 little bit conservative. We would like to see a little bit  
10 more affirmative statements in regard to both natural gas  
11 and natural gas vehicles in the report, including something  
12 along -- towards the lines of the state should do more to  
13 develop, distribute, and deploy heavy-duty .02 NOx engines.  
14 There's nothing else really available right at this time for  
15 Class 7 and 8 engines. And we think that going towards --  
16 towards that would be a step in the right direction for the  
17 state.

18           Along those same lines, in the report there  
19 isn't -- and then, of course, this isn't the fault of the  
20 author, I don't think, but over the last week or so ARB has  
21 certified a Cummins Westport .02 NOx engine for Class 7 and  
22 8. And, in fact, it's actually certified at .01, so it  
23 beats the optional low-NOx figure.

24           So we do think that this is a game changer. And  
25 we'd like to see this more or less included in the report

1 and a more robust section on maybe improving strategies and  
2 recommendations, using that for both natural gas and  
3 renewable natural gas.

4           Just for what it's worth, Cummins Westport does  
5 believe that the nine liter should be ready -- well, it's  
6 going to be ready in early 2016 after it's been certified.  
7 They believe 33,000 units could be possibly produced next  
8 year. And then the 12 liter should be ready in 2017.

9           So like I said, it's a game changer. There are  
10 things that can really benefit the state going forward.

11           Also, I'd like to just reiterate what Alison  
12 mentioned. You know, as you know, there are impediments  
13 here in California for in-state production of renewable  
14 natural gas. And we'd love to see more production but those  
15 impediments are cost prohibitive. So we'd love to see more  
16 discussion of out-of-state production, as well, and how to  
17 use that within the strategies and recommendations going  
18 forward.

19           And also, just for what it's worth, you know, we  
20 have 154 stations here in California, as I mentioned, most  
21 of which we do provide renewable natural gas as a  
22 transportation fuel, just because, you know, we're able to  
23 get the LCFS credits and green credits. So we'd love to see  
24 more strategies and recommendations regarding renewable  
25 natural gas in the report as well.

1           So those are just our comments. We'll be  
2 submitting a comment letter along the same lines, as well,  
3 so thank you.

4           COMMISSIONER MCALLISTER: Thank you for being  
5 here.

6           CHAIR WEISENMILLER: Yeah. Thanks.

7           Also we have -- Staff hadn't mentioned, but there  
8 was obviously the Sustainable Freight Strategy which is  
9 kicking off. Basically, goods movement in Southern  
10 California is at least 20 percent of the economy, so it's a  
11 key resource. And whenever I see Barry Wallerstein's charts  
12 of pollutants, certainly that's also a key part or at the  
13 top of the scale. You know, it sort of dwarfs the power  
14 plant side.

15           So trying to really come up with ways to keep  
16 goods movement viable there, at same time trying to clean up  
17 the air, is sort of one of the big challenges of the next  
18 decade.

19           COMMISSIONER MCALLISTER: Okay. Well, thanks.

20           Let's move on to the next presentation. So that's  
21 Anthony Dixon.

22           MR. DIXON: All right. Good afternoon,  
23 Commissioners. Good afternoon everyone. I am Anthony Dixon  
24 with the Supply Analysis Office. And today I will be going  
25 over our Draft Natural Gas Outlook Report. This is a

1 preview of the major story lines throughout the report. The  
2 report should be available in the next two to four weeks.  
3 And we will be having stakeholder comments for that, for  
4 sure. And we'll be issuing a Notice of Availability when it  
5 is ready.

6           A couple things to note about this year's outlook,  
7 it is different from the past outlooks. We will be not  
8 addressing as many trends and issues as they are being  
9 addressed in the AB 1257 report.

10           So first look at Henry Hub prices. We do see  
11 prices increasing over at our forecast horizon. There will  
12 be more detail on this when Leon presents next.

13           And our price uncertainty, we revamped this a  
14 little bit for this year, since the last time. And we do  
15 see a range of prices by 2030 ranging anywhere from the high  
16 of \$9.50 to a low of \$2.50.

17           Some of the changes to this work, we obviously  
18 updated with the newer NAMGas numbers. And we dropped three  
19 of our forecasts from the report as they were very bias low.  
20 That was something that was discussed in the last workshop  
21 on this.

22           Now California, more specific to California, we do  
23 see the California main hubs of Malin and Topock trending  
24 with the national trend at Henry Hub, even though they are  
25 disconnected with each other physically but they are

1 connected in the market. So the Topock is mainly coming  
2 from the San Juan basin, and Malin is from the Canadian --  
3 Canada and the Rockies. And more of this will also be  
4 discussed in Leon's presentation following mine.

5 In end-use demand here in California the biggest  
6 thing is the forecasts this time are much higher than --  
7 well, they're higher than the last forecast in 2013. This  
8 is due to a couple factors. One is the fact that the  
9 actuals were higher than what we had forecasted, so it gave  
10 us a higher starting point. And then there's also -- and  
11 one thing driving down use in the last forecast was a steep  
12 price increase that never actually materialized. And then  
13 increasing the demand also in the higher growth rates is a  
14 higher demand for transportation, for natural gas for  
15 transportation.

16 We do discuss some issues. We do go over some  
17 resources and infrastructure issues in ours, it's just we  
18 really go over that the legislature, the PUC, and the  
19 utilities are all working together along with us to really  
20 bring about a new regulatory framework to make sure these  
21 pipelines are safe.

22 And more on our resource infrastructure. We do  
23 see an increasing -- excuse me -- increasing resource and  
24 expanding resources, which does bring the possibility of  
25 exporting LNG. We do have eight approved LNG facilities in

1 the country. But like I said, all of these facilities are  
2 outside of California. There are none approved or in the  
3 works here in California at this time.

4 In California storage numbers, we are lining up  
5 with our five-year average, which is good because we're  
6 coming up on the big draw season. And then for natural gas  
7 for power generation is declining across all three IEPR  
8 cases here in California, which is different than the rest  
9 of the country. The rest of the country sees increasing use  
10 of natural gas for power generation due to coal retirements.  
11 But here in California we are seeing decreasing use.

12 And that is all for mine. Any questions, or I  
13 guess we'll be going on to the next presentation, so we'll  
14 be going on to the next presentation.

15 CHAIR WEISENMILLER: Well, obviously, I think both  
16 of us want to understand much better the fuel price  
17 forecast. It seems like we always have that sort of it's  
18 coming and it never comes. And so -- but there's going to  
19 be more in the next presentation and certainly trying to  
20 understand the associated loads with that.

21 COMMISSIONER MCALLISTER: Yeah. I guess I kind  
22 of -- obviously, you know, we talked a little bit about the  
23 fact that generation drives much of the demand. And over  
24 time, you know, as we look down the road, you know, there  
25 are a number of scenarios in terms of like which, how many,

1 where the plants are going to be as, you know, sort of  
2 recommissioning or repowering does or doesn't take place,  
3 along the coast for the most part and other -- other aged  
4 plants. And we're going to continue to see gas consumption  
5 go down. The question is sort of what's -- what are the  
6 scenarios in the marketplace for, you know, for the various  
7 load pockets, etcetera.

8           So there's obviously a lot -- a lot of overlap  
9 between sort of the scenarios that -- for natural gas and  
10 those for electricity. Katy kind of referred to that  
11 earlier. So I think, you know, some joint work on the  
12 electric modeling and the natural gas demand, to dig into  
13 that issue and sort of some geographically specific  
14 scenarios. Not -- I'm not sort of asking you to do that  
15 right now but -- or even necessarily in this IEPR, but sort  
16 of a long-term appreciation of the different scenarios for  
17 that might be helpful.

18           CHAIR WEISENMILLER: Yeah. No. I think it's  
19 pretty clear that natural gas is the marginal fuel for the  
20 power system. But the power system is the marginal loads  
21 for the gas system. And even -- well, perhaps I would tend  
22 to argue, you know, it's pretty clear that the power loads  
23 are going to start -- they're going to keep decreasing  
24 even -- and with the repowers it may be more, may be less.  
25 But, you know, but it's pretty clear what the broad strokes

1 are.

2 COMMISSIONER MCALLISTER: Yeah. No. For sure. I  
3 guess the -- you know, for a given plant, not that -- not  
4 that it's necessarily entirely our job, but to understand  
5 sort of, okay, well, how many hours is -- is a plant likely  
6 to operate, you know, versus, you know, it could be more or  
7 less. And if it's less, then what does that mean for the  
8 economics of that and, therefore, for the -- the market  
9 structure that might be needed to support some of those  
10 plants, or whether they're viable at all.

11 So I guess I'm really wondering about that more  
12 than anything. But in any case, it's all related.

13 MS. RAITT: Thank you and up next we have Leon  
14 Brathwaite.

15 MR. BRATHWAITE: Good morning, Commissioners,  
16 members of the audience. My name is Leon Brathwaite. I  
17 work in the Natural Gas Unit in the Supply Analysis Office.  
18 So this morning I just want to talk a little bit about the  
19 key changes that we have made in our modeling efforts since  
20 the preliminary results, or since our preliminary runs.  
21 I'll also be talking about some elements of all common  
22 cases, the three common cases that we have developed. And  
23 we also will be talking about the results, which is probably  
24 the main -- my main task this morning. We'll look at demand  
25 and supply prices, and any trends that we can discern from

1 our work.

2           So what were our major activities since the  
3 preliminary runs?

4           Number one, we revised the power generation demand  
5 for natural gas in the WECC. Most of that work came from  
6 our (inaudible) modeling group. We also incorporated  
7 California-specific results from other Energy Commission  
8 demand models. Residential, commercial, and industrial  
9 demand came from the CED. The transportation demand, which  
10 we also have incorporated into our work, came from our  
11 transportation model which is housed in the transportation  
12 office or the transportation unit.

13           We also -- excuse me. We also ensured consistency  
14 with the U.S. EPA's 111(d) Rule. We verified the coal  
15 retirement scenarios that we have constructed, and we  
16 verified the Renewable Portfolio Standards' scenarios.  
17 Also, there is quite a bit of uncertainty with that rule, so  
18 we are trying to deal with that uncertainty in our modeling  
19 efforts.

20           All of these activities so far had to do with  
21 demand-side work. We also did one major adjustment on our  
22 supply side, and that was we took a harder look at our  
23 Canadian supply cost curves. We felt there was a little bit  
24 of an issue there. It was definitely producing and  
25 supplying too much gas into the Lower 48, so we did adjust

1 those curves and that was incorporated.

2 As we did in our preliminary work, we developed  
3 three scenarios. We have a mid-energy case or mid-demand  
4 case. You'll hear me refer to that as a reference case. We  
5 have a low-energy case, a low-demand case. And we have a  
6 high-energy or high-demand case.

7 So these are some of the major inputs that went  
8 into our work, into -- into different cases. One minor  
9 adjustment I would like you guys to make to this slide, in  
10 the -- the very last line where it says "cost environment,"  
11 I would like you to switch the location of the words "high"  
12 and "low."

13 Anyway, the most important thing on this slide is  
14 obviously our coal retirement scenarios. In our mid case we  
15 retired -- we assumed retirement is going to be around 61  
16 gigawatts. In our low case we assumed 31 gigawatts. And in  
17 our high case where we are really assuming some very high,  
18 aggressive retirements we assume 121 gigawatts will be  
19 retired.

20 This was a supply cost curve that we have  
21 incorporated into the model. Now this particular curve  
22 appears nowhere in our model. This is an aggregation of  
23 over 400 supply cost curves in various basins and various  
24 zones within those basins. As you can see, starting in  
25 2007, going to 2011, 2013, and now we are in 2015, our

1 supply cost curve is shifting to the right. That is  
2 technology at work. The expansion of the resource base is  
3 occurring. We are having a lot more gas available at lower  
4 costs.

5           So before I get to some of the results I would  
6 like to talk a little bit about a blending process that we  
7 implemented. So what we did is that we got some data,  
8 actually a trade date (phonetic), September 14, 2015, we got  
9 this from the NYMEX website, the New York Mercantile  
10 Exchange website, and we looked at their price projection,  
11 their forward strip. It's really just a price projection.  
12 It's market information.

13           So we looked at the price in 2015, 2016, 2017,  
14 2018, and 2019. And we decided after some discussion within  
15 the office to blend the NYMEX forecast with our own  
16 fundamental forecast. And where we did this was the  
17 following: The 2015 and the 2016 NYMEX values became a part  
18 of the blended -- the blended forecast as is. Further, for  
19 2017, 2018, and 2019 we took an average of our fundamental  
20 forecast and a NYMEX forecast and made that the blended --  
21 the value for the blended forecast.

22           So what we ended up with was a forecast that  
23 reflects both current market information and the fundamental  
24 of -- the fundamentals of a forecast that we -- we also have  
25 developed.

1           Now beyond 2019, that is 2020 and beyond, all of  
2 those values of the forecast came out of the -- the NAMGas  
3 model.

4           We did equivalent blending for the high case, but  
5 we did no blending on the low case. So now let me show you  
6 the results of that blend that we did and completed.

7           As you can see, the high is out of the high --  
8 high demand case. The mid case is all the reference prices,  
9 the -- in red. It gives us some prices there that are  
10 growing at about 1.8 percent. These are Henry Hub prices  
11 that we are looking at. And the low case which was not  
12 blended with anything is as it is, growing also at about 1.8  
13 percent.

14           At the end of all forecasts, by the time we get to  
15 2030 we have the high case showing us prices of a little bit  
16 less than \$7.00. We have the mid case showing us prices a  
17 little bit less than \$6.00. And we have the low case  
18 showing us prices just about \$4.00. Again, all of these are  
19 growing between 2020 and 2030, growing at the rate of about  
20 1.8 percent.

21           If we can take a look -- if we can take a look at  
22 U.S. power generation demand, you can see that coal  
23 retirements are really pushing demand higher. And this is  
24 most evident in the high case, and that is shown as olive in  
25 our -- in our -- in this schematic. By the end of the

1 forecast in the high demand case, coal, natural gas demand  
2 in the power generation sector is well over 36 BCF per day  
3 and growing.

4           If we can now look at U.S. natural gas production,  
5 the highest production in general, we can see that the  
6 highest projection -- the highest production is occurring in  
7 our low-demand case. Well, that may sound a little bit  
8 counterintuitive, but when you think about you can see why.  
9 In our low-demand case what we are doing is making Lower 48  
10 production more competitive with Canadian imports.

11           As a result, we're having a lot more production in  
12 the Lower 48, trying to satisfy demand. Now we still do  
13 have Canadian imports. The Canadian imports play a very  
14 important role in satisfying our demands here in the  
15 lower -- in the Lower 48. But because of the fact that  
16 we're in a low-cost environment, we now have a lot more  
17 production occurring, significant more production occurring  
18 in the low -- in our low-demand case.

19           The reverse is happening in our high-demand case.  
20 We have weakened our competitiveness in the high-demand  
21 case. Thus, we have seen a lot more Canadian imports  
22 occurring in that case. So overall demand is growing and  
23 production is growing, reaching over 80 BCF per day by 2030.

24           How about prices here in California? Well, we  
25 looked at two important price points here in California, at

1 Malin and in Topock. Of course, Malin is in the north,  
2 Topock in the south. And the growth rates here are  
3 paralleling that of Henry Hub. Now we did do some blending  
4 of the prices also here in California. The California  
5 prices were also blended with the NYMEX future prices. So  
6 we're are seeing growth rates about 18 percent. As we saw  
7 with Henry Hub, we are also seeing a similar growth rate  
8 with -- with our -- at Malin and at Topock.

9           How about the differentials? Well, we are seeing  
10 two sets of dynamics going on here with our differentials.  
11 First, at Malin we are projecting or we are looking at a  
12 negative differential throughout our forecast horizon. The  
13 reason for that is that at Malin we have gas coming south on  
14 GTN. We have gas coming west on Ruby. And these two are  
15 colliding at Malin, competing very intensely to satisfy  
16 California demand. As a result, it is keeping adding  
17 downward pressure to prices, downward pressure, and thus  
18 resulting in this negative differential that we are seeing.

19           Now as to the positive differential at Topock,  
20 that's a slightly different dynamic. If you look at a map  
21 of the Lower 48 you would see that nearly all of the shale  
22 development that we are now seeing that is ongoing in the  
23 Lower 48, nearly all of it is occurring in the eastern part  
24 of the United States. As a result of that, that is adding  
25 more pressure on prices, downward pressure on prices, in the

1 east as compared to the west. As a result, we end up with  
2 this positive -- this positive differential that we are now  
3 seeing here on this particular schematic.

4           How about a supply portfolio? How about a supply  
5 portfolio for California?

6           Well, we chose 2025 as a year to demonstrate our  
7 point. Now we could have chosen any year. The absolute  
8 values would be different but the dynamic would be the same.  
9 So mostly California satisfied -- the demand in California  
10 satisfied from Malin in the north. But Malin consists of  
11 two resource items. We have natural gas coming from Canada  
12 and we have natural gas coming from the Rockies. That  
13 provides some of our -- our demand requirements. We also  
14 have the Rocky Mountains on Kern River, also satisfying some  
15 of our demand requirements. And we also have Southwest Gas.  
16 We have a variety of pipelines there bringing in Southwest  
17 Gas. All of these things are flowing into the state to  
18 satisfy our demand. In 2025 that's about five-and-a-half  
19 BCF per day.

20           But the one thing that we should note here is look  
21 at our in-state production. When you work it out it's about  
22 two percent of the -- of the demand requirements. And we  
23 will see this as a constant all over -- all through our  
24 cases. In-state production is declining and has been  
25 declining for a few years, and it will continue to do so

1 unless we decide to develop some other resource within the  
2 state.

3           In California overall demand is declining because  
4 of the implementation of renewable generation. And if you  
5 look at the high case you'll notice that there is virtually  
6 no growth, no growth in demand. But if you look at the low  
7 case and the mid case or the reference case you will see a  
8 distinct decline between about 2015 and about 2025. After  
9 the full implementation of the Renewable Portfolio Standard  
10 we do see demand creeping back up but they never -- in the  
11 low and the mid case it never exceeds a 2015 level.

12           So the decline rate is occurring at about -- about  
13 .6 percent between 2015 and 2026. Overall demand climbs  
14 about 5.8 BCF per day by 2030. But that level in our -- in  
15 our low and our mid case is below the 2015 level of demand.

16           Now we just -- I just told you about the decline  
17 in demand that is occurring because of the Renewable  
18 Portfolio Standard. We see if more evidently here in the  
19 power generation sector where each one of our cases, high,  
20 mid, and low are all declining because of the implementation  
21 of renewable generation. In general, we can say that power  
22 generation -- as power generation demand falls, power  
23 generation demand falls as renewable generation rises. And  
24 this is a phenomena that we expect to continue as the  
25 implementation of renewable get into -- into greater -- into

1 greater force here within the state. Now you do see some  
2 increase of natural gas demand in this sector at the end of  
3 the forecast. But again, it never gets back to the 2015  
4 level.

5           If we can again look at the supply portfolio  
6 across all the cases, in this -- in this schematic you will  
7 see that we have Malin represented, the Southwest  
8 represented. We also have in-state production. And we do  
9 also have Rocky Mountains, I'm sorry, Rocky Mountains  
10 represented. And you can see that there's variation across  
11 the cases. There's a lot of variation going on at Malin.  
12 Malin, of course, is where we have that intense competition  
13 between Canadian gas and Rocky Mountain's gas. And that is  
14 being reflected by the variation in the supply portfolio.

15           We chose 2025 as our -- as our year. We can  
16 choose another -- we can choose another year. But still,  
17 the result will be the same, a lot of -- quite a variation  
18 of Malin because of the intense competition occurring at  
19 that supply point.

20           Another important demand for Lower 48 gas comes  
21 from Mexico. Mexico has quite a large and growing power  
22 generation sector. And demand for natural gas, for U.S.  
23 natural gas is becoming quite high. There are several  
24 pipelines in the work to facilitate the shipment of gas to  
25 the south, to our southern neighbor.

1           So what we are seeing here is that demand is  
2 growing and growing pretty significantly in all cases. It's  
3 just following the trend of the historical. In the low --  
4 in the low-demand case, that's -- that's higher than all the  
5 other cases. And the reason for that is because development  
6 is quite -- gas is cheap, and Mexico is demanding quite a  
7 bit of it.

8           So we're exporting, demand is growing. It reaches  
9 a level of four-and-a-half BCF per day in the high case.  
10 And by the end of the forecast we see that demand exports --  
11 exports to Mexico have begun to drop -- begun -- begin to  
12 drop off. And that is a result of Mexico developing its own  
13 resources.

14           Now this process of developing its own resources  
15 begins quite early in the low-demand case. The reason for  
16 that is development is relatively inexpensive. So our  
17 southern neighbors start the process earlier than in the  
18 other two cases.

19           So what conclusions can we draw from what we have  
20 seen here?

21           Number one, U.S. demand for natural gas grows at a  
22 rate of about 1.4 percent between 2015 and 2030, reaching a  
23 level of about 84 BCF per day in our reference case.  
24 Implementation of renewable -- of renewable suppresses  
25 California demand, declining at a rate of about .6 percent

1 between 2015 and 2026 in our reference case. Overall demand  
2 does climb back to about 5.8 BCF per day by 2030, but  
3 remains below the 2015 level. And we have prices reach  
4 about \$6.00, 2014 -- using 2014 dollars, \$6.00 per MCF by  
5 2030. This represents a growth of about 1.8 percent between  
6 2020 and 2030.

7           Aggressive coal retirements outside of California  
8 contributes to high demand and higher prices. Now remember,  
9 those prices will affect here in California because we are  
10 connected to the rest of the country, and the rest of the  
11 country is connected to the rest of the continent by  
12 pipelines, of course.

13           California production is declining. And across  
14 the cases we are just occupying about two percent of the  
15 supply portfolio.

16           We are seeing fluctuations at Malin because of the  
17 intense competition between Canadian gas and Rocky's gas.  
18 And exports to Mexico are growing, as I just showed you in  
19 the schematic, reaching about -- a high of about four-and-a-  
20 half BCF per day, and then leveling off, and then beginning  
21 to decline.

22           Well, that brings me to the end of my  
23 presentation. I will take any questions from the Chair or  
24 from the audience at this point in time. And thank you very  
25 much for listening to what I have to say.

1           COMMISSIONER MCALLISTER: One question. I can't  
2 ask questions? I'm just kidding.

3           I guess I remember last IEPR we -- I mean, this  
4 is -- this is a very thankless task, Leon. You know, you  
5 get charged with predicting the price trends of natural gas  
6 and, you know I feel for you.

7           MR. BRATHWAITE: Thank you, sir.

8           COMMISSIONER MCALLISTER: So I guess, you know,  
9 part of the -- part of the learning -- or part of the  
10 exercise needs to be kind of understanding the underlying  
11 dynamics of the price and, well, you know, sort of to the  
12 extent we can, open up the crystal ball and sort of polish  
13 it up and sort of figure out, okay, well, near term, medium-  
14 term, long term, kind of what are the market dynamics.

15           And I guess I'm wondering, we were sort of  
16 chatting, okay, well, you know, in the near term it may be  
17 that there's a lot of -- you know, there's -- there's a high  
18 elasticity, say, or there's a lot of, you know, supply  
19 that's -- that could -- you know, may or may not be  
20 exploited, and the price is going to sort of stay down. But  
21 at some point that's going to change. And in a relatively  
22 short period of time you could have the markets tighten up.

23           MR. BRATHWAITE: Yeah.

24           COMMISSIONER MCALLISTER: You could have sort of  
25 supply, you know, sort of be -- the low -- the lowest cost

1 supply be exhausted. And in the meantime people have added  
2 load, and then you get this tightening, right, so there's  
3 slack, and the system kind of goes away. And that happens  
4 over a relatively short period. So the -- you know, when  
5 you do modeling you're sort of -- you have to make some  
6 assumptions. And you intend to get a more linear outcome.

7 I guess, you know, have you thought about how, you  
8 know, those underlying dynamics might affect the various  
9 scenarios and generate those, you know, distinguish between  
10 sort of medium-term effects and longer-term effects?

11 MR. BRATHWAITE: Well, yes, Commissioner. This  
12 is, I mean, this is something that we -- we -- is always in  
13 discussion in -- within the office.

14 Now one of the things that we are -- that we are  
15 in the process of doing is trying to go to a model that will  
16 give us a shorter timeframe outlook. I mean, here we're  
17 talking about 15, 20 years, or maybe even longer. And we  
18 are talking about going to something like more like a three-  
19 year outlook. And the reason for that is because of these  
20 very issues that you are raising as to what could happen in  
21 the short term. I mean, could -- could we have higher  
22 depletion rates on some of those things that -- now right  
23 now shale is looking very, very good. We have lots of it.  
24 We have an abundance of it, as -- as our supply cost curves  
25 show. But what if depletion rates are higher than we are

1 right now projecting? And that will speak to your very  
2 issue. So the market could tighten up in that regard.

3 So these are the kind of questions that we are  
4 going to try to answer with our short-term model when we  
5 could get it fully implemented. But that has been a task,  
6 one of the thankless -- thankless tasks that I have not yet  
7 completed.

8 COMMISSIONER MCALLISTER: So, yeah. And I guess  
9 then the question becomes, well, does that -- does -- does  
10 the hockey stick sort of happen, you know, at 8 years out or  
11 6 years out or 12 years, you know? And I don't think  
12 anybody -- it would be unreasonable to expect, you know, a  
13 definitive answer on that.

14 MR. BRATHWAITE: Sure.

15 COMMISSIONER MCALLISTER: But sort of the form of  
16 the curve, I think, you know, I think, you know, our sense  
17 is that -- that, well, we're going to have -- we're going to  
18 have cheap gas for a while longer; right?

19 MR. BRATHWAITE: Yes.

20 COMMISSIONER MCALLISTER: And so at some point --  
21 you know, so the form of the curve is going to be more kind  
22 of hockey stick than line.

23 MR. BRATHWAITE: Right.

24 COMMISSIONER MCALLISTER: And I guess I'm  
25 wondering if the model can -- if you're -- the way you --

1 the underlying inputs of the model and the way the model  
2 works can sort of capture that -- capture that dynamic?

3 MR. BRATHWAITE: Well, I would have to say the  
4 long-term version of the model cannot. But a short-term  
5 version of the model safely can --

6 COMMISSIONER MCALLISTER: Oh. Okay.

7 MR. BRATHWAITE: -- which could -- we could  
8 develop scenarios to look at, you know, varying depletion  
9 rates and that kind of stuff and probably tell you when  
10 it -- well, maybe I shouldn't say tell, but probably  
11 project --

12 COMMISSIONER MCALLISTER: Yeah. Within a range,  
13 right.

14 MR. BRATHWAITE: -- when a range when the hockey  
15 stick, as you -- as you called it, can occur.

16 COMMISSIONER MCALLISTER: Uh-huh.

17 MR. BRATHWAITE: We can probably give you a little  
18 more intelligence on it than I can at this point in time  
19 using the long-term version of the model.

20 COMMISSIONER MCALLISTER: Okay. So great. That  
21 was kind of my general comment.

22 Maybe Ivin wants to make a comment here?

23 MR. RHYNE: So thank you, Commissioner.

24 One of the -- one of the reasons why, actually to  
25 go to your question about the distinction between the short

1 and the long term, the fundamentals of the model as it's set  
2 up, and looking at the market where it is today, one of the  
3 reasons that we decided to go and blend using the -- the  
4 future strip in the near term versus the longer-term  
5 fundamentals forecast is precisely because the fundamentals  
6 of the model as it's structured right now, we have a little  
7 bit of a harder time capturing that sort of hockey stick  
8 movement.

9           You're exactly right, and I think Leon has sort of  
10 pointed out in his presentation, that largely there's --  
11 there's two major forces at play here in terms of on -- we  
12 understand the -- the demand side is it starts to shift.  
13 There's a little more -- there's a little more inertia in  
14 that part of the system. We can see some of the long-term  
15 dynamics coming into play with the retirement of coal.

16           But I think one of the -- the more important and  
17 fundamental questions is on the supply side. We model using  
18 a cost environment that looks back at the historical cost  
19 environments of how much does it cost to produce over time  
20 in each of these individual, I think it's over 400 basins,  
21 that we --that we look at. The problem that we have is that  
22 we're in a transition between a longer-term history that has  
23 relied on conventional gas and a more near-term shift in  
24 that cost environment. And so there's a lot of slack in the  
25 system, as you said. And the point at which that tightens

1 up becomes much more difficult to integrate into the model.  
2 We would have to go in and sort of place on a year-by-year  
3 basis and make a number of changes to individual basins in  
4 order to capture that.

5 But it's -- it's a valid question and one that --  
6 that, as Leon pointed out, I think would be more appropriate  
7 to answer in the shorter term, perhaps, effort. But in the  
8 meantime we thought it was appropriate to use the -- the  
9 information and the foresight of the futures traders in the  
10 market, the folks who are in the market today. They have  
11 money on the table. They're -- it's sort of in their  
12 interest to understand where and how much gas is likely to  
13 cost in the near term. And then as we transition we can see  
14 that the future strip actually is normal, in other words,  
15 it's growing in terms of price. And it doesn't grow exactly  
16 the rate of the longer-term forecast. But as we blend and  
17 transition up into that you can see we -- we reach a trend  
18 line that's -- that's pretty reasonable.

19 So we -- what we have is 2015 and 2016. And on  
20 this chart, up for the red line, that's the reference case,  
21 are directly from the NYMEX future strips. Those are the  
22 prices that --

23 COMMISSIONER MCALLISTER: Right. Okay.

24 MR. RHYNE: Then 2017, '18, and '19 are blended  
25 between the -- what the future strip says and what the

1 fundamentals forecast in our -- the fundamentals forecasted  
2 is generated in the NAMGas model. So what we've done is  
3 essentially combine the information sets that we have from  
4 both futures traders and the -- the information in the model  
5 that we've --

6 COMMISSIONER MCALLISTER: Yeah.

7 MR. RHYNE: -- that we've garnered from a number  
8 of stakeholders and -- and from our other sources.

9 COMMISSIONER MCALLISTER: Okay. Great. Thanks,  
10 Ivin.

11 Chair?

12 CHAIR WEISENMILLER: Yeah. A couple questions.

13 I would be really interested in comments, either  
14 now or in the file from the utilities, on how they do gas  
15 price forecasts. My recollection from a couple years ago,  
16 and again, when I came back into public service I had done  
17 due diligence on a number of projects. And certainly the  
18 notion of using the future strip was sort of conventional,  
19 you know, and packed without blending in that sort of newer  
20 term. But certainly that's how everyone went forward was  
21 always using a future strip to start.

22 And if I recall correctly that seemed to be what  
23 the utilities were using, and again, just trying to get that  
24 in. And I don't think any of the utilities -- well, I think  
25 PG&E at the time might have been using a model similar to

1 this. But I think we concluded that the differences in the  
2 assumptions were so large we could never do any cross-  
3 comparisons.

4           So again, trying to just -- because, you know, I  
5 just -- I don't think anybody is necessarily that  
6 comfortable with the nature of the increase, although, you  
7 know, again it's pretty -- forecasting -- I think it's  
8 Heisenberg who said forecasting futures is -- "Forecasting  
9 is difficult, particular about the future." So you know,  
10 that -- that's certainly the case here.

11           So anyway, I think it would be good to get much  
12 more from the utilities on exactly how they do the price  
13 forecast, where it does line up, and trying to get a sense  
14 of how consistent or inconsistent we are, at least with  
15 their perspectives, and why.

16           I would note, in Mexico when I was there a couple  
17 of weeks ago, there is certainly a lot of interest, you  
18 know, in natural gas. You can see, you know, you can see a  
19 major shift from oil to natural gas. Texas is really trying  
20 to push very heavily for a shift on the power side and more  
21 towards natural gas. People say that in terms of shale gas  
22 formations or offshore, you can see where the border is by  
23 just -- on one side you see oil and gas development, the  
24 other side you don't, you know, and it just stops at the  
25 border. So there's a lot of interest in moving forward.

1           But at the same time there was certainly a lot of  
2 interest looking at solar and wind. Mexico has a couple  
3 thousand megawatts of wind, particularly down in the  
4 peninsula, like 50 megawatts of solar. I mean, for what's  
5 really a world-class solar resource, it's amazing how little  
6 solar is developed at this point. And certainly one of my  
7 jobs was to try to encourage them to think a little bit  
8 beyond the box on both solar and the wind side, an  
9 geothermal.

10           So anyway, but I think big market, lots of  
11 opportunities. I don't think any of us have a sense yet of  
12 how the split will be between gas and cleaner technologies,  
13 but certainly a major shifting between coal and petroleum.

14           MR. RHYNE: We do know, and I'll just speak to  
15 the -- the Mexico demand question a little bit, we do know  
16 from the pipeline companies who have come in and done  
17 presentations at past Natural Gas Stakeholder meetings that  
18 they certainly see a tremendous opportunity in Mexico.  
19 There are a number of pipeline proposals on the table to get  
20 gas from various sources down into Mexico. It's a little  
21 bit of a foot race as to see exactly how it's all going to  
22 play out.

23           But the question -- the bigger question of how the  
24 gas versus cleaner technologies ultimately develops in  
25 Mexico is one of the big questions yet to be seen. And

1 we're going to have to continue to monitor and perhaps make  
2 some assumptions about some -- more explicit assumptions  
3 about in our next forecast for the next IEPR.

4 CHAIR WEISENMILLER: Yeah. The definition of  
5 clean technologies is one where the Mexican legislature is  
6 concerned with that at this moment. So it's not by any  
7 means resolved. Then in the week after I was there the  
8 Governor of Texas was there with three themes. One was  
9 immigration is bad. Two, drugs are bad. But C, we have  
10 lots of great natural gas for you from Texas.

11 MR. BRATHWAITE: And, Commissioner, just to add to  
12 your issue about Mexico, just recently the new president  
13 just got through the legislature a very big change in their  
14 constitution that will allow development by non-Mexican  
15 nationals of some of their resources. So in terms of how  
16 that effects the -- the portfolio between clean and --  
17 cleaner energy and fossil fuel energy, I really don't know  
18 at this point in time. But it does suggest that something  
19 is happening in that regard.

20 CHAIR WEISENMILLER: Oh, yeah. No. When the  
21 governor and I were there last year they got it to the  
22 congress, the change --

23 MR. BRATHWAITE: Oh, okay.

24 CHAIR WEISENMILLER: -- the legislative change.  
25 Yeah.

1 MR. BRATHWAITE: Sure. Okay. Okay.

2 COMMISSIONER MCALLISTER: Right. Also, you know,  
3 the same theme of the gas-electric infrastructure, you know,  
4 dynamic applies here, too; right? I mean the restructuring  
5 is going to eventually result probably in, you know, in a  
6 big DC power line integrating Baja with the rest of Mexico.  
7 And that then opens up lots of potential on the generation  
8 side. And that will -- and given, you know, there's already  
9 an industrial load along the border that is electric and  
10 gas, really dependent on -- you know, it's part of the --  
11 the California system really.

12 MR. BRATHWAITE: Yes, indeed. Yes.

13 COMMISSIONER MCALLISTER: Now as that evolves and  
14 becomes more integrated with Mexico it's going to affect  
15 probably the -- the dynamics on all fronts with what you're  
16 doing for the IEPR. So --

17 MR. BRATHWAITE: Without a doubt.

18 COMMISSIONER MCALLISTER: Yeah. Okay. Great.

19 MR. BRATHWAITE: Without any more questions, I  
20 guess I'll take my seat. Thank you very much.

21 COMMISSIONER MCALLISTER: Thank you, Leon.

22 CHAIR WEISENMILLER: Thank you.

23 COMMISSIONER MCALLISTER: So one more card. Okay.

24 Scott Wilder from So Cal? Oh, there he is.

25 Great.

1 MR. WILDER: Hi. I'm Scott Wilder. I'm a  
2 Business Economic Advisor with Southern California Gas. And  
3 I can just comment briefly on our method for forecasting gas  
4 prices. And I'm gratified to know that it's actually very  
5 similar to what the CEC is doing.

6 We blend NYMEX prices two to three years out, and  
7 then essentially use the NYMEX future strip two to three  
8 years out. And then for about two to three years after that  
9 we will blend it. The one difference is rather than a  
10 single long-term source for fundamentals, we will tend to  
11 average about three sources, and one of those sources is the  
12 CEC forecast. And the other two tend to be from EIA, and  
13 then a private forecast firm such as either Global Insider  
14 or Wood Mackenzie.

15 COMMISSIONER MCALLISTER: Thank you.

16 I think we have no more blue cards here.

17 We have someone on the line who wanted to say  
18 something earlier, I believe, is all.

19 MS. RAITT: Yes, we have one person.

20 COMMISSIONER MCALLISTER: Oh, Tim Carmichael.

21 MR. CARMICHAEL: Good morning. It's Tim  
22 Carmichael. Can you hear me?

23 COMMISSIONER MCALLISTER: Yes, we can.

24 MR. CARMICHAEL: Hi. Thank you very much for  
25 taking my comment. I actually wanted to go back to the

1 transportation section. I tried to get a comment in there  
2 but I guess you couldn't hear me or see me. But if I could  
3 just add a couple of comments that weren't made.

4 My name is Tim Carmichael. I work with the  
5 California Natural Gas Vehicle Coalition. And I just wanted  
6 to add a couple of points. I echo the comments that were  
7 made by Alison Smith and Julia Levon and Ryan Kenny, but a  
8 couple additional points.

9 Renewable natural gas or biomethane is still a new  
10 enough fuel that a lot of people outside of the industry  
11 don't realize that it is interchangeable with fossil fuel  
12 and natural gas and both blending, but also running in the  
13 same engines that are using for compressed natural gas or  
14 liquefied natural gas in the fossil form. And I think  
15 that's a point that we can't say often enough as we're still  
16 educating people on the potential of this fuel. And I would  
17 encourage the report to add that -- that point.

18 I think it was Commissioner McAllister was asking  
19 about a Bioenergy Action Plan. And I wanted to note that  
20 there is a Renewable Natural Gas Roadmap under development,  
21 actually almost finished. It's a partnership between U.C.  
22 Davis, ITS, and the Energy Commission. And it's undergoing  
23 peer review right now, so I expect it to be released this  
24 fall sometime.

25 And finally, I just wanted to echo support for the

1 research recommendations that are in the draft report. We  
2 think all of those make sense.

3 Thank you very much for taking my comments. And  
4 we will be submitting written comments as well.

5 COMMISSIONER MCALLISTER: Great. Thanks very  
6 much. And sorry for missing you the first round.

7 MR. CARMICHAEL: No worries. Thank you.

8 COMMISSIONER MCALLISTER: Okay. Do we have  
9 anybody else in the room who wants to make a comment?

10 It looks like Mr. Tutt.

11 MR. TUTT: Good morning, Chair, Commissioner. Tim  
12 Tutt representing Sacramento Municipal Utility District.  
13 And I'd just like to discuss a little bit the issue of  
14 marginal fuel.

15 I think there's no doubt that in all hours of the  
16 year, or at least nearly all hours of the year, the marginal  
17 fuel in California for producing electricity is natural gas.  
18 But I also think that the state's Renewable Portfolio  
19 Standard kind of complicates the picture of how that, in  
20 fact, is used in additional analysis.

21 So if we're going to add a million electric  
22 vehicles in the state in the next 10 or 15 years, all of  
23 that load is not going to be met by natural gas necessarily.  
24 When each vehicle is plugged in, yes, the additional load  
25 will be met by natural gas on a marginal basis. But because

1 of the Portfolio Standard you can't add all of that  
2 additional load and it come up with the same amount of  
3 natural gas in aggregate. Somewhere else somebody is going  
4 to have to do renewables and turn down a natural gas power  
5 plant in another hour.

6 I don't know how you deal with that in a variety  
7 of analyses. But I just wanted to make sure that point was  
8 there. Thanks.

9 CHAIR WEISENMILLER: Thanks. I've been  
10 encouraging everyone to read Ed Kahn's book, particular the  
11 chapter on production cost modeling since most people don't  
12 understand production cost modeling.

13 But having said that, we often are talking about  
14 over gen. Well, over gen would be when renewables are on  
15 the margin.

16 MR. TUTT: Yes.

17 CHAIR WEISENMILLER: So again, it's something  
18 where, and I'm not sure I'd even say 100 percent now, I  
19 would tend to guess more like 80 percent now, but that gets  
20 into -- if you line up all the modelers in one place you can  
21 get variations across that. But having said that, over time  
22 certainly renewables are going to be more and more in the  
23 margin. But that gets to your timing or piecing of stuff.

24 COMMISSIONER MCALLISTER: Yeah. This is all  
25 about --

1 CHAIR WEISENMILLER: Right. Yeah.

2 COMMISSIONER MCALLISTER: -- demand response and  
3 storage. And that -- those are mechanisms to increase the  
4 number of hours that renewables actually are on the margin;  
5 right? So --

6 CHAIR WEISENMILLER: Well, actually, storage could  
7 take the renewables from an over gen, store it and bring it  
8 back --

9 COMMISSIONER MCALLISTER: On the margin.

10 CHAIR WEISENMILLER: -- on peak when, you know, it  
11 would not be on the margin --

12 COMMISSIONER MCALLISTER: Oh, right. Sure.

13 CHAIR WEISENMILLER: -- (inaudible) peak.

14 COMMISSIONER MCALLISTER: Yeah. Yeah, exactly.

15 CHAIR WEISENMILLER: I mean, the way some storage  
16 works --

17 COMMISSIONER MCALLISTER: Yeah.

18 CHAIR WEISENMILLER: -- is you -- you have to  
19 match the area, correcting for losses, between sort of your  
20 lowest load periods and your highest load periods --

21 COMMISSIONER MCALLISTER: Correct.

22 CHAIR WEISENMILLER: -- matching the energy of the  
23 areas with, as I said, after you adjust it.

24 COMMISSIONER MCALLISTER: Yeah.

25 CHAIR WEISENMILLER: So basically there's only

1 that load. So basically is you have more -- storage should  
2 basically shift renewables from being not over gen to  
3 valuable at other times of load.

4 COMMISSIONER MCALLISTER: For sure.

5 CHAIR WEISENMILLER: But still the bottom line is  
6 over the next ten years it will be a very interesting power  
7 grid as we go through things. It's just, you know, right  
8 now, the next couple of years, you know, adding more  
9 electric load probably means more gas generation, more, you  
10 know, offsets, and more greenhouse gas.

11 I would also note probably one of the most  
12 interesting recent statistics is that in 2013 the power  
13 sector in California was 20 percent below 1990. So at the  
14 CEBA (phonetic) event, you know, basically after one of the  
15 economists had talked about how you don't want to have any  
16 one sector over meet, everyone sort of applauded the  
17 utilities there for doing more than their contribution in  
18 taking some of the burden off the other industrial  
19 customers.

20 MR. TUTT: Thank you.

21 COMMISSIONER MCALLISTER: Thanks, Tim.

22 Do we have anybody else in the room or online?

23 MS. RAITT: Oh, we'll go ahead and open up the  
24 phone lines.

25 COMMISSIONER MCALLISTER: Great.

1 MS. RAITT: So there's a couple of people on the  
2 phone. If you had comments this is your opportunity. If  
3 not, please mute your line. Okay. I think that's it.

4 COMMISSIONER MCALLISTER: All right. Well,  
5 hearing none, thanks everybody for coming. I think we've  
6 kind of gotten all our questions out there, and looking  
7 forward to everyone's comments October the 1st; correct?

8 MS. RAITT: Yeah.

9 COMMISSIONER MCALLISTER: And thank you very much  
10 to Staff for presenting good stuff. Looking forward to  
11 seeing things as they evolve going forward. So thanks a  
12 lot.

13 CHAIR WEISENMILLER: Yeah. And thanks, everyone, for  
14 being here. Certainly comments on the gas price are  
15 welcome. That feeds into the retail rate forecast, and that  
16 feeds into the demand forecast. So in terms of all these  
17 various pieces, that's the one we're looking for a lot of  
18 comments today. Thanks.

19 COMMISSIONER MCALLISTER: Great. All right. And  
20 we are adjourned.

21 (Whereupon, the California Energy Commission's IEPR  
22 Commissioners Workshop adjourned at 11:52 a.m.)

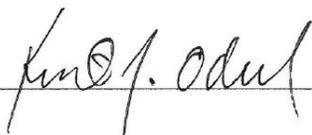
23  
24  
25

**REPORTER'S CERTIFICATE**

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

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

IN WITNESS WHEREOF, I have hereunto set my hand this 25th day of September, 2015.



---

Kent Odell  
CER\*\*00548

## CERTIFICATE OF TRANSCRIBER

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

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

I certify that the foregoing is a correct transcript, to the best of my ability, from the electronic sound recording of the proceedings in the above-entitled matter.



MARTHA L. NELSON, CERT\*\*367

September 25, 2015