

California Energy Commission

**DOCKETED**  
**12-HYD-01**

TN # 2861

AUG 14 2012

BEFORE THE  
CALIFORNIA ENERGY COMMISSION

In the matter of	)	Docket No. 12-HYD-1
	)	
Hydrogen Fueling Infrastructure	)	
Solicitation Development for	)	
the Alternative and Renewable	)	
Fuel and Vehicle Technology	)	
<u>Program (ARFVTP)</u>	)	

Approaches for Selecting Locations  
for the Hydrogen Infrastructure Network  
Hydrogen Fueling Stations

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

FRIDAY, JUNE 22, 2012  
9:00 A.M.

Reported by:  
Kent Odell

## APPEARANCES

Staff Present:

James McKinney  
Jean Baronas  
Tobias Muench  
Jonah Margolis

Also Present (\* Via WebEx)

Matt Miyasato, South Coast Air Quality Management District  
Joan Ogden, U.C. Davis  
Jared Farnsworth, Toyota  
Gerhard Achtelik, California Air Resources Board  
\*Damian Breen, Bay Area Air Quality Management District  
Tim Brown, U.C. Irvine  
Michael Nicholas, U.C. Davis  
Bill Elrick, California Fuel Cell Partnership  
John Tillman, Mercedes Benz Daimler  
Alex Keros, GM  
Stephen Ellis, Fuel Cell Vehicle Sales Marketing Manager,  
American Honda Motor Company  
Lance Atkins, Nissan Technical Center, North America  
Dan Poppe, Hydrogen Frontier  
\*Paul Staples, HyGen Industries  
Steve Eckhardt, Linde  
\*Ed Heydorn, Air Products & Chemicals  
Gus Block, Nuvera Fuel Cells  
Joe Cargnelli, Hydrogenics

Public Comment

John Shears, Center for Energy Efficiency and Renewable  
Technologies  
Charles Powers, Sinclair Research  
Ghassan Sleiman, Hydrogenics, USA  
Angela Nanalal, Powertech Labs  
James Provenzano, Clean Air Now  
\*Ben Maita, Hydrogenics  
Dhaval Brahmhatt, PHYchip Corp., San Jose

## INDEX

	PAGE
Welcome and Introduction	
Jim McKinney, California Energy Commission	5
Government Agencies	
1. California Air Resources Board - Gerhard Achtelik	13
2. South Coast Air Quality Management District - Dr. Matt Miyasato	23, 32
3. Bay Area Air Quality Management District - Damian Breen	26
4. Questions and Answers	41
Academic Institutions	
1. University of California, Irvine - Dr. Tim Brown	61
2. University of California, Davis - Dr. Michael Nicholas	74
3. Questions and Answers	96
Morning Wrap-Up	
Jim McKinney, California Energy Commission	118
Industry Organizations	
1. California Fuel Cell Partnership - Bill Elrick	125
2. Questions and Answers	132

## INDEX (Continued)

	PAGE
Automakers	
1. Daimler/Mercedes-Benz - John Tillman	142
2. General Motors - Alex Keros	147
3. Honda - Stephen Ellis	154
4. Nissan - Lance Atkins	164
5. Toyota - Jared Farnsworth	168
Questions and Answers	173
Station Developers	
1. Air Products and Chemicals - Ed Heydorn	200
2. Hydrogen Frontier - Dan Poppe	206
3. HyGen Industries - Paul Staples	213
4. Hydrogenics - Joe Cargnelli	222
5. Linde - Steve Eckhardt	231
6. Nuvera Fuel Cells - Gus Block	241
7. Questions and Answers	245
Public comments	264
Afternoon Wrap-Up, Conclusion and Next Steps	
Jim McKinney, California Energy Commission	269
Adjourn	271
Certificate of Reporter	272

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

2 JUNE 22, 2012 9:10 A.M.

3 MR. MCKINNEY: Good morning, everybody. We're  
4 about to get started here. We would like to ask the key  
5 stakeholders and participants to come and join us at the  
6 roundtables, I think we have most of the morning  
7 presenters and stakeholders -- great, okay.

8 So, again, good morning. And I'd like to  
9 welcome you to today's workshop. I'm Jim McKinney, I'm  
10 the Manager of the Emerging Fuels and Technologies  
11 Office. We administer the AB 118 Program, of which our  
12 funding for hydrogen plays a key role.

13 This is going to be the first of at least  
14 three public workshops that the Energy Commission will  
15 host as we develop our next Hydrogen Fueling  
16 Solicitation. The next two workshops are scheduled for  
17 June 29th, so that's next Friday here at the Commission,  
18 and on July 10 at the South Coast AQMD Office at Diamond  
19 Bar, and I want to thank Matt Miyasato and his team for  
20 offering to host that workshop down where a lot of the  
21 initial deployment and stations will be.

22 We've tried to assemble all the key market  
23 participants and government agencies and academic groups  
24 working to create a hydrogen fueling network in  
25 California that can support the large-scale rollout of

1 Fuel Cell Vehicles scheduled for 2015 here in  
2 California. It will take all of us working together to  
3 create this network.

4 At this point, this summer, we were all  
5 planning on writing Grant Agreements for the hydrogen  
6 stations and not revising our solicitation. We  
7 cancelled the solicitation because, on further review  
8 and internal discussion, we realized we needed to  
9 substantially revamp our process, our program  
10 requirements, and our scoring criteria.

11 This was a serious decision. I know many of  
12 you invested many hours and real dollars into preparing  
13 your proposals; thank you for that effort. Please note  
14 that we also invested hundreds of staff hours in  
15 reviewing the proposals and writing the NOPA, and those  
16 of our staff here, especially Tobias Meunch, Charles  
17 Smith and some of our new staff, Eric Law, James Zhang  
18 (ph), also played a key role in that.

19 We need to make the next solicitation better  
20 and we need your help, and that's why we've asked you  
21 here today. The solicitation we're working on now will  
22 total nearly \$30 million and will cover three fiscal  
23 years' worth of funding from 2010 through the 2013  
24 fiscal year funding cycle. We think this should get us  
25 another 15 to 20 stations, depending on the ultimate

1 cost and size of those stations.

2 At this phase of hydrogen fueling station  
3 development, the Energy Commission is the primary source  
4 of government incentive funding for station development  
5 in California. The Air Resources Board carried the  
6 torch, initially, and got the industry and the state off  
7 to a strong start with their initial funding in that  
8 first round of stations.

9 When the FY 2013 station funds are included,  
10 the Energy Commission will have invested nearly \$55  
11 million in ARFVTP funding for hydrogen fueling station,  
12 station citing support, standards development, and fuel  
13 cell bus demonstrations. As I understand it, we have  
14 about five active stations here in California with five  
15 more under construction from the ARB funding awards.  
16 The 11 stations funded from our 2010 cycle, so eight new  
17 stations and the three upgrades, will double that number  
18 of stations to about 20. Another 15 stations will get  
19 us to about 35, which is about half way to the magic  
20 number of 68 recommended by the Fuel Cell Partnership  
21 and their coalition of stakeholders; and as we  
22 understand it, this is the number needed to get us to  
23 the initial deployment in 2014, 2015 and 2016 when we  
24 could see up to 50,000 Fuel Cell Vehicles here in  
25 California.

1           Our primary goal today is to understand two  
2 key points: 1) What defines the optimal station location  
3 for hydrogen fueling stations; and 2) what is the best  
4 approach for the Energy Commission to use in selecting  
5 site locations for hydrogen fueling stations in the  
6 future?

7           There are a lot of other key questions,  
8 economic factors, datasets, station performance metrics  
9 and decision criteria associated with these key  
10 questions. And most importantly, or very importantly,  
11 how do we factor in sensitive and proprietary market and  
12 cost data from both the automakers and the station  
13 developers? We need to understand this so we can be as  
14 informed as possible as we develop a new solicitation.  
15 We want everyone here to make their best recommendations  
16 to us and we want you to be frank and direct. What we  
17 don't cover today, we'll get to in the next workshops  
18 and, again, today is really location, location,  
19 location.

20           Today's workshop is not about looking back and  
21 dissecting the last solicitation, we don't plan to go  
22 there and we will redirect the conversation looking  
23 forward if that comes up. Again, we want the best data,  
24 decision factors, decision tools, market data, and  
25 everything else we need and you think we need for the



1 next solicitation.

2 Energy Commission staff is here primarily  
3 today to listen and ask questions. This is the longest  
4 speech you're going to hear from any of us today. And,  
5 again, we want you to ask questions of each other. This  
6 is the configuration we used in our Advisory Committee  
7 for the AB 118 Investment Plan, so again, we've got a  
8 circle and throughout the day we want to have a good  
9 cross dialogue as we go forth.

10 Basic ground rules. Respect the speakers,  
11 please save your questions for the allotted Q&A period  
12 workshop participants, and by that we mean speakers and  
13 stakeholders; we'll get the first cut of questions and,  
14 as time allows, we'll make time for public comment both  
15 at the end of the Q&A sessions, and at the end of the  
16 day for a more formal public comment period.

17 Everything that we say here today is on the  
18 public record, this is intentional, and I want to say hi  
19 and welcome to our Court Reporter, thank you, sir. So  
20 when you speak -- this is also on WebEx -- so when you  
21 speak, please speak into a microphone and it's  
22 especially important when we get into kind of the  
23 dialogue and the Q&A, if you're going to be speaking  
24 from the audience, please come up to the speaker's  
25 podium there. So that's mostly what I have to say for

1 today. I'm going to sit down and I really want to  
2 listen and ask questions.

3 I'm going to turn it over to Jean Baronas  
4 pretty shortly, and she's going to moderate for us  
5 today. I want to acknowledge for those that you don't  
6 know, Pat Perez, our Deputy Director over here, he's  
7 going to be with us for a little while this morning to  
8 listen in, and then he's going to go down and get in  
9 line to drive a Model X Vespa later on today.

10 So with that, I'm going to turn it over to  
11 Jean Baronas and, for those of you who don't know, she  
12 is our incredibly capable new supervisor over Biofuels  
13 and Gaseous Fuels here at the Energy Commission.

14 MS. BARONAS: Good morning, everyone. Thank  
15 you, Jim. And welcome. For those who may be here the  
16 first time, the exits are well marked outside of this  
17 room and, in the event of an emergency, and the  
18 restrooms are outside this door and to the left. Coffee  
19 is up one flight of stairs in the major stairway.

20 And so welcome to this meeting. Many of you,  
21 I think, came pretty long distances to be here today,  
22 we're going to be as efficient as we can, and as  
23 informative as we can. I want to review the workshop  
24 objectives today and focus people's attention there just  
25 for a moment. And then I'd like to go around the table

1 and self-introduce speakers, and if there are any  
2 individuals on WebEx, if they are speaking, if they  
3 would also kindly introduce themselves?

4           So I'm looking at the agenda which was handed  
5 out at the door and also emailed to you. The first  
6 objective, to discuss what defines the optimal station  
7 location for hydrogen fueling stations. Second  
8 objective, what is the best approach for the Energy  
9 Commission to use in selecting site locations for  
10 hydrogen fueling infrastructure in the future?

11           So at this time, if we could please go around  
12 the house and introduce the presenters. Dan?

13           MR. POPPE: Dan Poppe from Hydrogen Frontier.  
14 Good day.

15           MR. TILLMAN: John Tillman, Mercedes Benz  
16 Daimler.

17           MR. KEROS: Alex Keros with GM.

18           MR. ATKINS: Lance Atkins, Nissan Technical  
19 Center, North America.

20           MR. ELLIS: Steve Ellis, Fuel Cell Vehicle  
21 Sales Marketing Manager, American Honda Motor Company.

22           MS. OGDEN: Joan Ogden, U.C. Davis.

23           MR. ELRICK: Bill Elrick, California Fuel Cell  
24 Partnership.

25           MR. MCKINNEY: Jim McKinney.

1 MR. FARNSWORTH: Jared Farnsworth with Toyota.

2 MR. ECKHARDT: Steve Eckhardt with Linde.

3 DR. NICHOLAS: Michael Nicholas, U.C. Davis.

4 DR. BROWN: Tim Brown, U.C. Irvine.

5 DR. MIYASATO: Matt Miyasato, South Coast Air  
6 Quality Management District.

7 MR. ACHTELIK: Gerhard Achteлик with the  
8 California Air Resources Board.

9 MS. BARONAS: Thank you. And on WebEx this  
10 morning, are any speakers able to introduce themselves?

11 MR. STAPLES: Yes, can you hear me?

12 MS. BARONAS: Yes, we can hear you, yes?

13 MR. STAPLES: This is Paul Staples with  
14 Hydrogen Industries.

15 MS. BARONAS: Thank you, Paul. Any other  
16 speakers on WebEx?

17 MR. BREEN: Damian Breen with the Bay Area Air  
18 Quality Management District.

19 MS. BARONAS: Thank you very much, Damian.  
20 Any other speakers on WebEx? Hearing none, thank you  
21 everyone for your introductions. Okay, so moving along  
22 on the agenda, this collection of talks is from  
23 individuals in governmental agencies. And so we're  
24 kicking off this meeting to hear the perspectives of  
25 individuals from a policy/technology point of view, and

1 we're going to start off with Gerhard Achtelik from the  
2 California Air Resources Board.

3 MR. ACHELTIK: Okay, so I guess I will go up  
4 to the podium, I assume.

5 MS. BARONAS: Yes, that would be great.

6 MR. ACHELTIK: Thanks, Jean. Thank you, Jim.  
7 Thank you, Jean. Good morning, everybody. And thanks  
8 for the workshop, it should be a productive workshop  
9 today and looking forward to being -- I appreciate being  
10 a part of this and I think we'll probably be learning a  
11 lot today. But I appreciate the Energy Commission  
12 putting this on.

13 And as I introduced myself already, I'm  
14 Gerhard Achtelik with the California Air Resources  
15 Board. Hydrogen infrastructure and Zero Emission  
16 Vehicle infrastructures is one of the main projects I've  
17 been working on lately, and my presentation is sort of  
18 broken into three parts. And the first part I call the  
19 "Infrastructure Drivers," I'll touch upon just one slide  
20 on the Regulation and the Survey that the ARB and the  
21 Energy Commission has conducted. And then we'll -- the  
22 answer to questions that we are discussing indirectly,  
23 then, I will also give some direct comments on and  
24 approaches.

25 This overall is to look at, you know, a lot of

1 information will be presented today and, at least from  
2 my information, there are things that are of higher  
3 priority and lower priority, but throwing out sort of, I  
4 guess, a buckshot approach of information here today.

5           And just the first point is that we need the  
6 infrastructure, so first of all, the big picture is we  
7 need the infrastructure in California. The Air  
8 Resources Board in January adopted modified Regulations  
9 that dramatically increased the number of vehicles that  
10 are required, so the key message here is we expect a lot  
11 of cars and, in order to enable that to happen, we need  
12 to have the infrastructure in place to allow the  
13 manufacturers to sell those cars in California.

14           So my first message is that we need stations  
15 in California. And then 15 percent of the sales in 2025  
16 will be zero emission vehicles of some kind.

17           The survey that ARB and Energy Commission has  
18 conducted, we conducted three surveys, and what has been  
19 really consistent is the fact that we expect tens of  
20 thousands, upwards to 50,000 vehicles in the 2015 to  
21 2017 timeframe, and while most of the focus in the early  
22 years has been in Southern California, we can see that,  
23 as we hit the 2015 to 2017 timeframe, we expect a  
24 roughly one-third to two-third split between Northern  
25 and Southern California, so from a big perspective,

1 that's one way to start looking is we think the station  
2 should be roughly allocated along that same ratio.

3 And the one thing you will see, now, if you  
4 look at the numbers closely, you see that there's been a  
5 slight decrease in the number of cars in the early  
6 years, but that really, just from my perspective, that  
7 represents the fact that we haven't done as good of a  
8 job in getting out the early infrastructure as we  
9 initially thought.

10 When we started, we thought we would have some  
11 of these stations in operation that are just opening up  
12 right now, a couple years ago. So it's a perspective  
13 not, you know, in a lack of commitment from the  
14 automobile manufacturers, but it's just that we've seen  
15 more challenges on infrastructure than we anticipated.

16 Now, I'm going to break down these slides, the  
17 first slide into more pieces, and this is just to  
18 roughly show you where the focus is in Northern  
19 California, and this is from the last survey that was  
20 conducted October 2011, and it's been pretty consistent.

21 The target areas for Northern California are  
22 the East Bay Area, the Berkeley, Emeryville, Oakland,  
23 and then the Peninsula and South Bay, and then we also  
24 have the Sacramento Valley for Northern California.

25 And the vehicle numbers, the percentages I

1 show you here are just to show you the split on that  
2 early survey, but remember that from 2015 to 2017 we saw  
3 an increase in the amount of vehicles in Northern  
4 California, so these numbers would actually be larger as  
5 far as what we will need in Northern California, but  
6 that's just to reflect what we collected in the survey.

7           Some of this, you will see probably a number  
8 of times today, but this is what the survey showed us,  
9 and it's been pretty consistent, you know, what you see  
10 here is the clusters, or the basic communities that have  
11 been the focus inside of California.

12           The Santa Monica, West Los Angeles, the  
13 Torrance Coastal Beach areas, and then we hit into  
14 Orange County and Southern Orange County, so it's  
15 mainly, you know, if you look at it just from a very top  
16 level, the areas of focus are in the South -- basically  
17 in the Greater Los Angeles Area and the South Coast  
18 Area, and sort of roughly, you could say, West of the  
19 405, those are sort of the key focus areas. I mean,  
20 just speaking very top level type idea.

21           And so you're looking at some of the coastal  
22 communities were based on the information that the  
23 vehicle manufacturers provided us, is I think were the  
24 most likely to see the adoption of the early vehicles.  
25 And then, not to leave out other locations, I mean, I



1 don't want to focus strictly on those key communities,  
2 we've also got to make these cars be able to work in the  
3 way they function and are designed to work, so we're  
4 looking to expand the markets. We've got to have some  
5 of these outlying areas, which could be either market  
6 expansion, or destination stations such as Santa  
7 Barbara, or Ventura, or we have San Diego.

8           In Northern California, while it didn't show  
9 up in the survey, it would be Tahoe. So the idea is, as  
10 you're all aware, there are different zero emission  
11 vehicles on the market and what this shows you is that,  
12 in order to give you what makes a Fuel Cell Vehicle  
13 different, it has greater range in order to allow the  
14 customer to fully utilize the car like that, we've got  
15 to expand into these other areas to allow the full  
16 utilization of these vehicles. And the survey already  
17 reflects that, even though the vehicle numbers are not  
18 as great as what we'll expect after 2014 is these  
19 communities are important in order to allow the full  
20 functionality of the vehicle.

21           I'll switch to some of the more direct  
22 questions that were asked. What is the best approach  
23 for selecting site locations? And, again, I'll say  
24 that, while I list a number of things, I have two slides  
25 on this question, they're not all of equal value, but

1 they can all be considered at different points. I will  
2 say, in a rough idea I have them in some priority, and I  
3 would utilize the vehicle manufacturers input in looking  
4 at where to target; just like we showed the survey, that  
5 gave us a starting point. We're not looking to put a  
6 station in Trona, or something like that, right? We're  
7 looking on the West Coast right now. And this is where  
8 we find that the manufacturers are looking to place  
9 their vehicles, different manufacturers have different  
10 markets, and so we are looking at multiple locations.

11 We're looking also at modeling data and you'll  
12 have presentations later on today from the University of  
13 California at Irvine and University of California at  
14 Davis that look at -- that did some very extensive  
15 studies on where the early adopters of new technologies  
16 are, and how to establish a minimum network that still  
17 makes an appealing network for the customers, but those  
18 are things to look at.

19 The California Roadmap document, a number of  
20 stakeholders in this arena are participants in the  
21 Roadmap, and this Roadmap is a compiled version of  
22 information that, when you talk to the Vehicle  
23 Manufacturers individually, you get one input, but the  
24 Roadmap represents a compilation of information, and is  
25 another good source to work off of in trying to find

1 where we begin to look for infrastructure. So you can  
2 prioritize your solicitations on geographic locations,  
3 so roughly, you know, over at the end -- not off each  
4 single solicitation, but we go back to there's roughly a  
5 one-third, two-third split in vehicles expected, so sort  
6 of a prioritization along that line, that distributes  
7 the stations throughout the state, not just in one area.  
8 But you've got to look at this over -- I realize now  
9 you're putting out what would have been three  
10 solicitations into one, but geographic location is  
11 definitely important in covering statewide, those are  
12 things to look at.

13 To hold workshops like you're doing now, but  
14 hold the workshop in the targeted regions to make those  
15 areas aware and help raise participation, but go to  
16 those workshops and see if you can get participation  
17 from the infrastructure providers from the stations,  
18 even from the communities that will have these stations,  
19 to make sure that the process becomes easier. Visit  
20 each station if it's feasible, and on the early days,  
21 depending on the number of solicitations, and something  
22 we had done and it makes a difference if you go look at  
23 a site and you actually drive it, and you can figure  
24 out, well, this is a morning route, or this is an  
25 evening route; or, if it's along the freeway and if I

1 missed this exit, I now have to go 20 miles and I didn't  
2 calculate my range right and I might need to call the  
3 tow truck already. So those are some things to think  
4 about.

5           Consider the petroleum marketers input. And  
6 by that, I mean talk to them and find out where do they  
7 think, you know, what kind of properties do they have  
8 that you can put a station in, and the same with the  
9 technology providers, you know, there are different  
10 technology providers that offer different products, that  
11 take different amounts of space, and by gathering this  
12 information it will help you select stations because not  
13 every station will work in every location, so those are  
14 things to keep in mind.

15           And then another potential option is just, if  
16 you're looking for even more background, is to do some  
17 research on Department of Motor Vehicle Registrations  
18 and see where the hybrids and where are the battery  
19 electric vehicles going, or the Clean Vehicle Rebate  
20 Program gives you an idea of where in the state those  
21 awards are going, and those are also considered early  
22 adopters.

23           What defines the optimum station location?  
24 And again, optimum is -- I listed a number of different  
25 words and "optimum," I guess, varies with each -- almost

1 with each bullet, I guess, because we are in the very  
2 early stages and so in some ways it represents --  
3 really, it represents the best compromise. But, first  
4 of all, we want to serve the most customers, the  
5 priority is light-duty fuel cell vehicles. But, when  
6 possible, to consider transit and material handling, and  
7 in some limited applications, those will work. You can  
8 maybe find a transit location that is located and has  
9 the facilities that allow fueling of both, or a material  
10 handling location maybe in some locations where it could  
11 work, but those are things to keep in mind. I mean, the  
12 top priorities where most light-duty vehicle customers  
13 would be provided fueling.

14           Look at the ingress and egress of the station  
15 -- and some of these bullets sort of overlap between  
16 optimal location and best approaches. You know, how  
17 easy is it to get to the station? And by that, I mean,  
18 if you missed an exit, how do I get back there? And is  
19 the only way I can fuel there by making a u-turn and  
20 heading back four blocks through heavy traffic? So  
21 those are sort of things to look through.

22           Access to main thoroughfare -- is this station  
23 located on the route that most of the vehicle drivers,  
24 most of the consumers, will be on? And is it convenient  
25 and safe? We want these stations to be -- we want these

1 cars to go to the mass market, these are not going to be  
2 strictly fleet cars. We want these from the zero  
3 emission vehicle regulatory perspective, we want the  
4 everyday person to consider this car as an option when  
5 they transition from an internal combustion vehicle. So  
6 part of that is, is the station convenient and safe. Is  
7 it located to where my teenage daughter would be  
8 comfortable in fueling at midnight?

9           What defines an optimal station or can serve  
10 critical location customer, too? You know, we were  
11 talking about the primary one, but this is now the  
12 bridging stations, we want to expand the functionality  
13 of the vehicles, so now we want to also keep in mind the  
14 Lake Tahoe's, the Santa Barbara's, you know, how do we  
15 get from Sacramento to San Francisco? And potentially,  
16 you know, another option is these early stations will be  
17 -- another thing to think about is these early stations  
18 will actually promote future information, so does this  
19 station happen to have any kind of outreach implication?  
20 You know, is there a school nearby? What will it look  
21 like when the person driving their standard internal  
22 combustion vehicle and is ready to move up and he sees  
23 that hydrogen sign and wonders, "Okay, well, you know, I  
24 don't know anything about it." How does that station  
25 look? What kind of image does that station give that

1 potential new customer?

2 And can the station be located -- in some  
3 instances you can locate it for renewable hydrogen.  
4 Part of why we're doing this is we're trying to get away  
5 from the traditional harvested oil and is this station  
6 potentially a place where we can look at a source of  
7 renewable hydrogen to drive our vehicle? What benefit  
8 does that station also provide to potential  
9 Environmental Justice Communities? Is it located  
10 potentially in a community that can reduce emissions,  
11 have a better overall impact? I think that is my last  
12 slide, yeah. So I assume we're all taking questions at  
13 the end, then? Okay.

14 MS. BARONAS: Yes, thank you. There will be a  
15 Q&A session at the end of this first group of speakers.

16 MR. ACHELNIK: Okay.

17 MS. BARONAS: Thank you, Gerhard. Our next  
18 speaker is Matt Miyasato from the South Coast Air  
19 Quality Management District.

20 DR. MIYASATO: While they're pulling my slides  
21 up, I've just got to say, Gerhard, I'm surprised you let  
22 your teenage daughter out until midnight.

23 (Laughter)

24 So thank you. Let me first start off -- Matt  
25 Miyasato, Assistant Deputy for Technology Advancement at

1 the South Coast AQMD. I want to thank the CEC staff,  
2 Jim, Jean, and of course, Pat, and I'm glad to see Mike  
3 Smith in the audience, for their hard work. And, you  
4 know, it takes a lot of courage to say, "Hey, this is  
5 broken, let's fix it," and then do it in a public  
6 process, so I really have to hand it to you for doing  
7 this.

8           So as soon as my slides come up, I can begin.  
9 Let me first start off with some general impressions,  
10 and I want to thank Jim for his opening comments. But I  
11 do take issue with one comment that he made, that the  
12 ARB really kickstarted the whole infrastructure process  
13 off, and I would argue from the South Coast perspective,  
14 because we need cleaner vehicles here, we actually had  
15 five city stations before that and also co-funded some  
16 DOE stations, so that's just a slight nitpick that I'll  
17 take up with Jim. We're having technical difficulties.

18           MS. BARONAS: So this is Jean. I'm just  
19 curious, Matt, when did you send us your presentation?

20           DR. MIYASATO: It was here bright and early  
21 this morning.

22           MS. BARONAS: Oh, okay. So perhaps while  
23 we're waiting for the slides to come up, Matt, if you  
24 could kindly tell us a little bit about the July 10th  
25 availability of your facility for our third workshop in



1    this series?

2                   DR. MIYASATO:  I would be happy to.  So when  
3    we heard of the notice coming out for the workshops  
4    today and next week, we were also eager to have it, as I  
5    think Jim mentioned -- or, no, it was probably in  
6    Gerhard's presentation -- is to have these workshops,  
7    these open forums available in the locations that are  
8    going to be served by hydrogen infrastructure, so we  
9    thought it was appropriate if we hosted a workshop at  
10   our location in Southern California at the South Coast  
11   AQMD and our headquarters at Diamond Bar, we have a very  
12   nice auditorium, a large venue for potential station  
13   providers to come and actually hear the information by  
14   the Energy Commission and the stakeholders first hand,  
15   so we offer that up and we're pleased to hear that the  
16   Energy Commission was most welcoming of that invitation,  
17   and so we are having that workshop at our facility.  And  
18   I believe we'll also be able to WebEx that, as well.

19                   Great, so after the long prelude, hopefully my  
20   slides will be worth it.  So we were asked to present by  
21   the Energy Commission a template, and I'm not sure how  
22   to fit this into the window here.  Let me make the  
23   suggestion that you go on to Damian's presentation and  
24   then we'll try to fix the file compatibility and present  
25   after him?

1 MS. BARONAS: Okay, that's fine. Damian,  
2 you're online and we've asked you to go ahead, please.  
3 Is that possible? Damian, would you please go ahead  
4 with your presentation? So perhaps he's involved with  
5 something else. So I'd like to --

6 MR. BREEN: Can you hear me?

7 MS. BARONAS: Yes, we can.

8 MR. BREEN: Sorry, just a little problem. I'm  
9 happy to go ahead if that's okay.

10 MS. BARONAS: Yes, your slides are up now.  
11 Thank you.

12 MR. BREEN: Okay. I'll ask you, though, to  
13 operate the slides for me there. And so this is Damian  
14 Breen and I'm the Director of the Strategic Incentives  
15 Division at the Bay Area Air Quality Management  
16 District.

17 You know, we're very happy to be here this  
18 morning presenting for the CEC and to participate in  
19 this workshop. If I could have the next slide, please?

20 So as we've prepared for today, you know, we  
21 concentrated on kind of two large questions, one is,  
22 what are the optimum locations for hydrogen stations;  
23 and then, what is the best approach for us in terms of  
24 selecting site locations for the stations of the future.  
25 Next slide, please.

1           And so one of the things that I think is very  
2   important for people to understand in terms of where you  
3   put your site locations, it depends on, you know, the  
4   great debate is, well, you know, the chicken and egg, it  
5   depends on what your strategic purpose really is for  
6   that station. You know, we've listed a couple of  
7   objectives you may have in terms of locating a station,  
8   one objective would be to support the vehicles predicted  
9   vehicle demand and user demand, which would be that kind  
10   of cluster scenario that most folks are familiar with.  
11   Another might be a strategic goal which, you know, the  
12   presenter from ARB had alluded, which is to open a  
13   travel corridor. You know, as we kind of think about  
14   where we could locate hydrogen stations here in the Bay  
15   Area, it would be important for us to open travel  
16   corridors obviously north to Sacramento, south to  
17   Monterey, and south to Los Angeles, so in terms of where  
18   you would actually locate the station, that could be  
19   another goal. And then, a third goal that we thought  
20   was important would be the promotion of vehicle use by  
21   having it prominently displayed at a location where it  
22   is visible to the public, where they can see that it's  
23   in use, where it demonstrates the reliability and  
24   robustness of the technology.

25           So to give you kind of an example, you know,

1 the Emeryville Station in the Oakland Corridor, I would  
2 say, along 880, provides us a number of those strategic  
3 purposes. It promotes the use of the vehicles because  
4 it supports buses that have high visibility, it opens  
5 the strategic corridor for us in that it's along 880,  
6 one of the most congested corridors in California, and  
7 it gives us the ability to move north and south from  
8 there and then, of course, you know, it does have the  
9 ability, the limited number of hydrogen vehicles that we  
10 have are actually located, a lot of them in that area.  
11 So it serves all of those strategic purposes.

12           So that is definitely one of the main  
13 considerations, I think, in the location of these  
14 stations, is what your goal is, and then as you define  
15 that goal, it gives you an idea as to how you would  
16 actually -- or the places and how you would go about  
17 locating those stations.

18           In terms of, as we kind of look to the future,  
19 how now we would locate the stations for the vehicles  
20 that we are projecting in the future, one of the ways I  
21 think that's been mentioned, and one of the things that  
22 we have to do, is we kind of have to look at modeling  
23 because we don't have the numbers of vehicles out there  
24 that would necessarily dictate, you know, the location  
25 of the stations. And as we look at that modeling, there

1 are a number of different ways that it can be done. We  
2 are expecting up here in Northern California that the  
3 majority of our users would be early adopters, then they  
4 would be similar to the folks who currently drive  
5 hybrids, PV, and natural gas vehicles.

6 In terms of the modeling, what we would expect  
7 to do would be to do heat maps for those folks, identify  
8 the travel corridors that they're moving in in Northern  
9 California, identify where their vehicles are currently  
10 located, look at their use patterns, and then overlay  
11 the kind of hydrogen metrics on top of that, so that we  
12 could see for those particular users where would be the  
13 best and most useful place to locate stations. And if I  
14 could have the next slide, please.

15 As you select a station, I think when it comes  
16 down to the actual building, I think you have to be very  
17 very clear on what your objective is. You know, cluster  
18 vs. corridor is a huge deal in terms of actually  
19 building a station, and I want to explain that a little  
20 bit. In an area where you've got a high density of  
21 vehicles and you have a lot of predicted travel, you may  
22 not have an ability to be very selective in terms of  
23 where a station goes. You may need it in a location and  
24 then you're going to have to go and jump through all of  
25 the hoops that are necessary to put it in that location.

1 And as you consider corridor travel, your options, I  
2 think, become more expanded. You need something that  
3 is, well, obviously accessible to the travel corridor  
4 that you're trying to open, but it may not need to be in  
5 a very specific location, it gives you probably a range  
6 of locations where you could locate that station, and  
7 I'll explain why that's important as we move down kind  
8 of into the latter portion of this slide.

9           The other thing is it's very very important  
10 that you kind of locate these stations strategically to  
11 know who your target customers are. I talked about the  
12 modeling, I talked about the heat maps, but really you  
13 have to understand whether your customers for these  
14 stations are going to be primarily a commercial fleet,  
15 primarily folks who are going to be in transit, or  
16 primarily folks that would be in what we would call a  
17 cluster, where they're using that vehicle more  
18 frequently and they may need less fills, or they may  
19 want to fill up more frequently, at least initially. So  
20 I think knowing the target customer, who you're trying  
21 to serve, ultimately will make your station more  
22 successful.

23           And then one of the things that I think is  
24 probably overlooked at little bit in terms of when we  
25 think about, you know, our overall strategic goals, it's

1 also important, I think, that you know who your local  
2 jurisdictions are. I think we all know in this day and  
3 age that certain jurisdictions are more progressive than  
4 others, certain jurisdictions are more open to this,  
5 they have more experience in terms of the permitting,  
6 and I would say a permitting siting and dealing with the  
7 issues that are associated with alternative fuel  
8 stations.

9           So when you think about what we've talked  
10 about, you know, cluster vs. corridor, the heat maps,  
11 then really knowing the jurisdictions that you would be  
12 working with, and their level of experience in terms of  
13 the siting of that location, kind of leaves you to zero  
14 in maybe on certain areas, especially for corridor  
15 transportation that may be far more favorable for  
16 station location than another one.

17           And then, finally, as you kind of look at the  
18 overall mechanism for siting of these stations,  
19 especially if it's in terms of a strategic goal of you  
20 can have all of the other three elements that work, but  
21 really, you know, if you're not going to have an  
22 automaker who can supply the vehicles, or who can deploy  
23 them in the area that you're going to be locating that  
24 station, ultimately, you know, you're not going to be  
25 successful.

1           So it's very important as you kind of look at  
2   this that you're coordinated with the automakers, that  
3   you understand how their rollout will work, the areas in  
4   which they'll be selling those vehicles, and you have to  
5   understand what their target customer is. And all of  
6   those factors need to play together in terms of the  
7   actual physical location and selection of a site for a  
8   station. So I'm going to end my comments there and  
9   hopefully pass it back to Matt.

10           MS. BARONAS: Thank you, Damian. And so now  
11   we're back to Matt Miyasato from South Coast Air Quality  
12   Management District.

13           DR. MIYASATO: You're getting a quick preview  
14   without the narrative. Thank you, Pilar. So sorry for  
15   the delay, although I have to blame Adobe for their PDF  
16   software.

17           So we were asked to give -- this is Matt from  
18   the South Coast AQMD, we've been asked to present on the  
19   two questions that Damian just went over in selecting  
20   locations for hydrogen infrastructure. And as I  
21   mentioned previously, let's see, in commenting on Jim's  
22   opening comments, we've been a long supporter for  
23   hydrogen fuel cells dating back to the late '80s where  
24   we supported the Department of Energy and the  
25   development of fuel cell battery powered buses. We were



1 one of the first public agencies to co-fund the Ballard  
2 Transit Fuel Cell Bus Project, and we had the first  
3 commercial installation of a station fuel cell project  
4 at our headquarters in Diamond Bar, so we have a very  
5 long and rich history for supporting zero emission  
6 technologies at the South Coast AQMD. And the reason,  
7 really, is because -- Gerhard showed that chart of  
8 vehicle penetration for zero emission vehicles -- that  
9 is a state penetration rate; the sad fact of the matter  
10 is that we're going to need that type of penetration in  
11 the South Coast much sooner if we're going to meet the  
12 Federal requirements. And so, because of the severe  
13 challenge that we face with air quality, we need to have  
14 these zero emission technologies brought to bear in our  
15 region, first.

16           Specifically with regard to hydrogen  
17 infrastructure, we had the first Southern California  
18 Hydrogen Net Station back in the AQMD in 2004, I think  
19 the first with U.C. Davis, so that was the first  
20 northern station in the network and we were the first  
21 Southern California station, and we have co-funded over  
22 20 stations, hydrogen stations, some are funded with the  
23 Department of Energy, many with the ARB, and the most  
24 recent ones with the Energy Commission, about \$9 million  
25 funded to date, and we recently co-funded, as I

1 mentioned, the Energy Commission's recent round, and  
2 most notably the ones that would be upgrading the  
3 station at our headquarters, the one that I mentioned  
4 that was open in 2004 that will be upgraded to 700 bar,  
5 but also the Linde Station in Orange County. So any  
6 stations that are coming into our region, and if there  
7 is a need for our support, we are happy to consider  
8 that.

9           Now, to address the question specifically that  
10 were posed, what defines the optimal hydrogen station  
11 location, the concern that we had was with the word  
12 "optimal hydrogen station location," or the phrase  
13 "optimal" because optimizing seems to connote or imply  
14 that you are fine tuning and you have the ability to  
15 fine tune several variables, and I guess our concern is  
16 that we're not at that stage yet, we don't feel that  
17 we're at that stage yet, and we need to put stations on  
18 the ground at an accelerated pace.

19           We keep hearing the automakers are very  
20 concerned about their ability to bring vehicles without  
21 that infrastructure, and we saw from Gerhard's survey  
22 that perhaps the decline in the initial numbers is  
23 because of the lack of infrastructure. But that aside,  
24 the third bullet, essentially the best location is where  
25 it can be utilized by the vehicles and has a willing

1 operator, so having the location nailed down without a  
2 willing operator is not a formula for success, so you  
3 need to have both, you need to have a vehicle demand and  
4 you need to have the operator that is willing to  
5 entertain that business for a short time period before  
6 the vehicle numbers increase. So you need demand, you  
7 need the operability.

8           The second question is what is the best  
9 approach for selecting site locations for stations in  
10 the future, and there's just been a huge amount of work  
11 that's been done by the California Fuel Cell Partnership  
12 and many of the OEMs have provided input, many of the  
13 fueling providers have also tried to provide input, and  
14 I think it's ironic because the Energy Commission is a  
15 member of the Fuel Cell Partnership, you know, many of  
16 your staff have been at these meetings, and I know it's  
17 a resource issue associated with being able to spend  
18 time and countless hours in developing these type of  
19 Roadmap plans, but clearly a lot of work has been done  
20 and being exposed to that as it's developed has been  
21 very helpful for us, in particular, to understand how  
22 these stations are rolling out, what the need is, what  
23 the methodology was for coming up with a certain number  
24 on the dollar amount, so the whole fuel cell partnership  
25 road exercise, as well as the hydrogen infrastructure

1 trust activities really helped to solidify many of the  
2 stakeholders around this kind of 68 number and the total  
3 funding amount.

4           And that was reliant on a couple key issues,  
5 one is OEM input, you need to have the automakers  
6 instruct the market where they're planning to sell these  
7 vehicles and where these vehicles need to be supplied  
8 with fueling infrastructure. And through that Roadmap  
9 process, the automakers were able to agree on cluster  
10 areas, or prioritization of these regions, in  
11 particular, Southern California. And I think Gerhard  
12 mentioned it two-thirds to one-third. We want to see  
13 these stations in our region first because not only is  
14 that where we're going to see the most air quality  
15 benefits, but that's where the market is going to  
16 develop initially. No offense, Damian.

17           And then, clearly, the strategy is to have  
18 coverage vs. capacity. Now, coverage means you want to  
19 put an infrastructure, a network across the state in  
20 these regions vs. building up large amounts of capacity  
21 that won't be utilized, so it's having those main points  
22 addressed in your solicitation to provide  
23 infrastructure.

24           And then the second bullet point is you need  
25 to rely on the station operators, or those who are going

1 to propose for the very specific locations. So, as I  
2 mentioned in the previous slide, you need demand, that's  
3 from the OEMs and the market surveys, but also the  
4 willing operators for specific locations. And then,  
5 once you process that information, you can validate  
6 whether these are desirable locations. And what I mean  
7 by that is you use your tools and utilities at your  
8 disposal to identify whether those are actually good  
9 locations, and I'll explain that in this next slide  
10 here, it's a bit of a messy graphic, I apologize, but  
11 let's start from the left-hand side. So the fuel cell  
12 partnership with all the stakeholders, government,  
13 industry, have provided input to this Roadmap process  
14 where they've identified clusters of communities where  
15 the OEMs will be selling vehicles into. So we had a  
16 large amount of OEM input, lots of staff hours that went  
17 into that, and it's a solid document in terms of what  
18 those priority clusters are.

19 Now that input should be utilized by the  
20 Energy Commission as you look towards this new  
21 solicitation. Now the previous process, and as you're  
22 going forward, you're going to accept specific proposals  
23 from entities that are going to propose on very detailed  
24 locations for the station, and that is critical to have  
25 that type of willing operator. In the past, you had the

1 OEMs providing support letters for the operators, I  
2 don't know if that's going to continue in the future,  
3 but what that helped to do is identify to the Energy  
4 Commission where these priority locations were in terms  
5 of the markets, so it went from clusters to an actual  
6 ranking in terms of the proposals that were submitted.  
7 Now, if you're not going to do that, and if you're not  
8 going to have the OEM input and writing support letters,  
9 I have a dash line that shows, well, then you need to  
10 validate the sites and the ranking for these stations  
11 that you receive. And some of the tools that you would  
12 be able to use are modeling tools such as a STREET  
13 Program by U.C. Irvine, or the U.C. Davis that Mike  
14 Nicholas will talk about, but that should help you  
15 validate whether the stations that are identified are  
16 actually the high profile ones, or the high utilization  
17 ones that you want to fund. Of course, that entails  
18 using some engineering judgment. I think Gerhard  
19 mentioned one tool that they use is they did site  
20 visits. I know that ARB staff, when they first went out  
21 with their solicitation, asked the AQMD staff to do  
22 ride-along's with them and to kind of ride shotgun as  
23 they went through the process, to help them understand  
24 how you -- or what makes a good site, help us identify  
25 how our prioritizations should occur, and we were happy

1 to do that and we would be happy to also assist in this  
2 case.

3           We also recommend that you would use outside  
4 evaluations, i.e., outside technical review panelists.  
5 So, again, in the ARB solicitations they entertained,  
6 the AQMD sat on a technical review panel, and we didn't  
7 actually score the proposals, but we gave our input and  
8 that input was listened to, and we appreciate that, and  
9 we arrived at jointly stations that we thought were of  
10 high value. The co-benefit of that is that, in many of  
11 these stations, we actually put in some funding. So in  
12 terms of spreading out the risk for the different public  
13 agencies, we thought that was a good strategy to use and  
14 we use it often when we do RFPs and technical reviews of  
15 those proposals.

16           So the last bullet is that you need to have  
17 OEM input in some fashion, the automakers have to  
18 provide input on that market, so be it through the  
19 process of the Roadmap and actually having them rank the  
20 locations, or having them write support letters for  
21 specific stations, or if you're not going to have that  
22 input on the front end, do it on the back end, and you  
23 could have, for example, a blind survey of your  
24 proposal. So a geographical map that says here's all  
25 the station proposals that we received, where would you

1 rank these in terms of priority, so we don't get an  
2 instance where you're double-dipping in an area which  
3 may not have high value.

4           And so the final slide I have are just simple  
5 recommendations, is to leverage the resources that are  
6 already at hand. The Fuel Cell Partnership has put an  
7 inordinate amount of effort in identifying the cluster  
8 locations and the coverage vs. capacity, we think this I  
9 a valuable document, please use this. You are a member  
10 of the California Fuel Cell Partnership, so it is a  
11 natural fit for you and of the other government agencies  
12 to work together. And then, how do you decide on the  
13 specific sites? You should use the proposed -- once  
14 they're received, you can use your modeling tools by  
15 both of these fine University of California  
16 institutions, use your judgment in terms of site visits,  
17 or do this blind OEM input on a survey, depending on how  
18 you seek their advice on the ranking. And I put in a  
19 parenthetical here, so the ranking that comes out of  
20 this process, is it based only on location? And I say  
21 that because I know there are other things that you need  
22 to consider -- cost-effectiveness, you have to consider  
23 the technology, you have to consider the experience of  
24 the proposers, which is extremely critical, and you also  
25 have to consider did they understand the scope of the



1 RFP and the length of the project? Are they willing to  
2 take those risks alongside the State and the other  
3 stakeholders? So this is only giving you one portion of  
4 your decision matrix. And then, finally, I would offer  
5 that you should solicit external technical review from  
6 other government agencies such as the California Air  
7 Resources Board, Department of Energy, NREL, and the  
8 AQMDs, and we would be happy to assist you in that  
9 regard. So, thank you.

10 MS. BARONAS: Okay. Thank you, Matt. Okay,  
11 so we're a little ahead of schedule. We do have 20  
12 minutes allotted for Q&A session, and so I would like to  
13 open it up to the people on WebEx. Do you have any  
14 comments you'd like us to consider in terms of Q&A at  
15 this point? And if not, we can come back to you soon  
16 after.

17 MR. STAPLES: Hello?

18 MS. BARONAS: Yeah, hello. We do hear you.  
19 Please identify yourself.

20 MR. STAPLES: Yeah, this is Paul --

21 MS. BARONAS: Other people on the call, please  
22 mute your phone. Thank you. Yes, sir, please identify  
23 yourself.

24 MR. STAPLES: Paul Staples of Hydrogen  
25 Industries.

1 MS. BARONAS: Thank you, Paul.

2 MR. STAPLES: Part of -- hi, yeah -- in  
3 reference to the AQMD's presentation, I think that  
4 basically they're thinking on a similar line that I have  
5 been thinking on in reference to this issue, as far as,  
6 would they be interested in possibly forming a Technical  
7 Committee similar to what the MSRC does, and be part of  
8 a selection committee that would deal with these issues?

9 MS. BARONAS: I'm sorry, I was speaking with  
10 someone else, Paul. Please repeat your question. It, I  
11 believe, referenced the AQMD presentation, that you  
12 agreed with it to an extent and then I had asked for a  
13 pen from someone, so please repeat what you said, sir?

14 MR. STAPLES: Yes, if I'm not coming through  
15 clearly, I can always get onto the phone line.

16 MS. BARONAS: You're fine.

17 MR. STAPLES: Okay. Well, really, it's just  
18 basically a comment trying to basically say that I think  
19 that Matt is thinking on the same lines that I'm  
20 thinking of, is that this whole process would be best  
21 served if you had a Tech Committee, okay, like the MSRC  
22 has, because there was a similar situation about 20  
23 years ago with that and that was what ended up being the  
24 end result, is that they formed a Tech Committee, that  
25 they had 20 like SAICs in their review process, and

1 reviewing the data, and scoring it, and then it was  
2 basically presented to the main Committee for final  
3 approval, and then it was up and down, and that was  
4 basically the way it worked out. And it eliminated any  
5 issues or any of the issues as far as here today. So  
6 I'm just wondering if that would be something that they  
7 would be willing to do along with the Bay Area AQMD, and  
8 members of CEC, as well, because this needs to be put in  
9 the hands of the people that are actually spending the  
10 money, right? And of course, taking input from the  
11 automobile manufacturers is very important, certainly,  
12 and other entities, but you know, not all of it is in  
13 one person's hands.

14 MS. BARONAS: Okay, thank you for that. I've  
15 made notes about your suggestion and your comment, and  
16 so noted, and thank you for your input.

17 MR. STAPLES: Well, just one last thing. I'll  
18 be going into that in a little detail in the next  
19 presentation next week, because I've outlined a whole  
20 plan to do it in that manner, similar to what the AQMD  
21 does. So I have great admiration for their ability.  
22 So, thank you.

23 MS. BARONAS: Thank you very much, Paul.  
24 Appreciate it. Any other callers on WebEx who would  
25 like to comment or make suggestions along the line of

1 discussion topics at this time? Hearing none, let's go  
2 around the table. I do have questions, but I'd like to  
3 open it up for people to provide some input and  
4 comments, and maybe their insight into what we heard  
5 this morning. Please raise your hand and you'll be  
6 acknowledged and can go ahead. Jim McKinney from the  
7 Energy Commission.

8 MR. MCKINNEY: So I have a general question  
9 for all the agencies that have spoke thus far. And it  
10 kind of follows from, I think, one of Matt's comments  
11 about, you know, is it too early to optimize and fine  
12 tune. So my general question, and I'll ask this  
13 throughout the day, is how important is precision in  
14 this? And I understand we have clusters, we have  
15 circles, we have market data, we have station operators,  
16 we have station developers, and all that, and then  
17 ultimately Energy Commission staff needs to make a final  
18 decision on what is the best location and the optimal  
19 location, the superior location, whatever adjective they  
20 want to use there. But, again, if I could ask Gerhard  
21 and Matt and Damian, again, considering the volume of  
22 proposals we get in some of our other solicitations, and  
23 this will be a large fund, again, how important is  
24 precision in your views?

25 MR. ACHTELIK: This is Gerhard Achteлик. And

1     so by "precision," are you asking how important is it  
2     that you hit the exact right spot?

3                 MR. MCKINNEY:  Hypothetically, we've got -- I  
4     didn't do any slides today, but kind of the image that I  
5     carry in my head is we have some circular form, we've  
6     got a center location, and then we've got an array of  
7     dots representing station proposals, and inside that  
8     circle on the edge of that circle, and just outside that  
9     circle.  So by "precision," I mean, you know, how  
10    important is it in terms of location do we choose  
11    exactly the right one?  Or is there more room for  
12    flexibility in evaluating other factors, aside from  
13    location?

14                MR. ACHELTIK:  You know, I would say it  
15    probably varies a little bit and if you, I mean, I guess  
16    my perspective would be, if you're making a connector  
17    station, you might have a little bit more flexibility,  
18    but depending on what you're connecting between, you  
19    have to look at the range of the vehicle; if you're  
20    connecting between L.A. and San Francisco, you have to  
21    make sure that you can meet the range of all the  
22    vehicles.  If you're connecting between Sacramento and  
23    San Francisco, you probably have a little bit more  
24    flexibility because most of the cars can make that -- so  
25    it probably depends on -- it's not a fixed one-mile,

1 two-mile, three-mile radius, it's going to be depended  
2 upon the application. MS. BARONAS: Thank you  
3 very much, Gerhard and Jim. And so, Matt, would you  
4 like to comment?

5 DR. MIYASATO: Sure. I'd like to offer -- so  
6 this is my personal opinion. I think accuracy is more  
7 important than precision. So Jim is looking at me with  
8 the furrowed brow. And by that I mean it's important to  
9 have the stations in the right cluster, and I think you  
10 can use either -- any of those tools that I mentioned,  
11 the OEM input for prioritization ranking, the modeling  
12 by STREET, or U.C. Davis, your ridealong's, and as you  
13 go through and find out if the station is located very  
14 closely to a freeway exit, to ensure that you're getting  
15 a sound and reasonable decision. So I think the times  
16 that that will occur and you'll have issues are if  
17 you're going to have multiple stations that are right  
18 next to each other. And you just have to provide clear  
19 criteria for how you're going to judge those, and it may  
20 not be location. As I mentioned, you have the other  
21 issues that you'll outline in your RFP solicitation,  
22 that it has to be cost-effective, cost-share, all of  
23 those other things that then come into play. So it's  
24 part of that process and judgment. So you know,  
25 personally I think it's important that you put them in

1 the right cluster area and then, after that, if the  
2 driver has to drive the 100 yards out of their way,  
3 they'll find a way to get to that station.

4 MS. BARONAS: Thank you very much, Matt, for  
5 your input. So other questions or comments from people  
6 here? Yes, please. Please identify yourself first for  
7 the record, thank you.

8 MR. ELLIS: Steve Ellis with American Honda.  
9 Damian at Bay Area, I appreciate your good thoughts and  
10 your presentation. One thing I was tuned in on, though,  
11 was a thought that use patterns needed to be studied and  
12 mention that possibly hybrids, NGVs, and plug-in  
13 vehicles may see similarities here. So I don't mean to  
14 state the obvious, but I want to provide caution also  
15 that, you know, when we think about hybrids, you know,  
16 across the vehicles, there's a common thread possibly  
17 between the purchaser of these vehicles, but where they  
18 differentiate is, you know, let's remember that hybrids  
19 for the most part have run on gasoline, hence haven't  
20 been dependent in infrastructure. NGVs in many ways can  
21 more closely mimic what we're looking at was hydrogen  
22 fuel cell vehicles because possibly some limited range,  
23 or definitely limited infrastructure, but plug-in  
24 electric vehicles have a full function for short range  
25 commute patterns, but one differentiating point of a

1 hydrogen fuel cell vehicle is this full function with  
2 long range and fast refueling. And I think that's an  
3 important point that needs to be considered. So in  
4 essence, a person with a sufficient infrastructure can  
5 wake up on a Saturday morning on a spur of the moment  
6 decision and make a long trip and use the vehicle just  
7 as they would their gasoline vehicle. So those use  
8 patterns can differentiate significantly. And the last  
9 part is that all three of these vehicles have, at some  
10 time or another, or even today, benefitted from an HOV  
11 sticker non-financial incentive, which actually does  
12 have a very very strong influence on the use pattern of  
13 those types of vehicles, and we've lived in that space  
14 ourselves significantly. That was the extent of my  
15 comment.

16 MS. BARONAS: Okay, thank you for that. Thank  
17 you very much. And Damian, I just wanted to call on you  
18 on WebEx to see if you had comments or would like to  
19 participate in the Q&A session.

20 MR. BREEN: Yeah, well, what I would say in  
21 response to that particular point is often the use  
22 patterns of the vehicle themselves, it was more the  
23 people who drive it, and that's where we were going for,  
24 by putting that up there, we see the folks who would  
25 drive those particular types of vehicles as probably



1 being from the, you know, possibly from the same  
2 demographic, they would have had prior experience using  
3 alternative fuel vehicles, and they would be most likely  
4 the folks who would adopt these vehicles the fastest.  
5 So I don't want folks to focus too much on the actual,  
6 you know, one alternative fuel technology vs. the other,  
7 the intent there is, okay, and the people who drive  
8 these vehicles, where do they go? What are their  
9 commute patterns? How would they use these vehicles?  
10 Assuming, you know, based on the work that we've seen so  
11 far, that it would be mostly these early adopter types,  
12 and that at least initially this vehicle would more than  
13 likely be adopted by some of the same folks. That's the  
14 only point I wanted to make.

15 MS. BARONAS: Thank you for that, Damian. I  
16 have a question for Matt. Could you bring up Dr.  
17 Miyasato's Powerpoint, please? He has a process there.  
18 Matt, you talked about left-side, right-side, you said  
19 it was front-end, back-end, and I was -- what I took  
20 away from that slide was that the process you saw had on  
21 the left certain features, and then you said something  
22 about, well, if the OEM letter -- I may have this right,  
23 maybe not -- if the OEM letter does not exist, you move  
24 over to the right-hand side. So my loaded question is,  
25 if we had both left and right together, would the

1 process by definition actually be more robust than one  
2 or the other?

3 DR. MIYASATO: Yeah, certainly the point that  
4 I was trying to make, and that's a good question, and I  
5 apologize for the complexity and the confusion of the  
6 slide, but the point was that you need to have -- so the  
7 two main components that I think you need to have is you  
8 need to have some indicator of market demand, and that's  
9 what you're going to get from the OEMs, and so -- and in  
10 that market demand, there's another granular piece that  
11 you need to dig into and that is what is a priority  
12 ranking for those specific clusters. So you can do that  
13 either of several ways, one is you could ask for that  
14 upfront, and say, you know, Bill Elrick and the Fuel  
15 Cell Partnership, please work with the OEM group and, of  
16 the clusters, develop up to where that priority lay. Of  
17 course, that priority is going to be in the South Coast  
18 AMQD, but in which specific cities and locations? And  
19 how would you rank those? And that may be a difficult  
20 task because they all have different market segments and  
21 visions. So the way I think the Energy Commission had  
22 done it previously is you asked the station providers to  
23 get a letter from the OEM saying, yes, they are willing  
24 to utilize that station. So that could be another  
25 process, but that may be more messy, I'm not sure how

1    that all works, except in the previous NOPA, and if  
2    those are both in the too hard pile, maybe you do it  
3    after you have received the awards, you do a geographic  
4    map of where you're proposals came in, with no  
5    indication of who is providing the station, and say, "Go  
6    ahead and rank these. Here's what we've got, which ones  
7    do you like?" And that can be an anonymous, you know,  
8    blind survey or something of that effect. So I'm just  
9    brainstorming loud here on potential processes used to  
10   get that market demand information.

11           MR. MCKINNEY: So, Jean, I have a follow-up  
12   question.

13           MS. BARONAS: There's a question also,  
14   gentlemen --

15           MR. MCKINNEY: May I ask a follow-up --

16           MS. BARONAS: Oh, sure. Of course.

17           MR. MCKINNEY: So, Matt, it sounds like --  
18   Jim McKinney here -- it sounds like you're suggesting  
19   that there may be a very different approach to what  
20   we've done traditionally in all our solicitations; but  
21   after we get the proposals in, we typically go into a  
22   black box, you know, we cut off all communication with  
23   outside parties and stakeholders to kind of preserve to  
24   make sure we have an equal playing field, everybody is  
25   treated equitably. It sounds like you're suggesting

1 something very different, which is to have a lot of  
2 different input from different parties, whether it's  
3 other government agencies, or automakers, or other  
4 parties, kind of similar to what Mr. Staples was  
5 suggesting with the Technical Advisory Committees. So  
6 is that what you're envisioning?

7 DR. MIYASATO: I think there's two different  
8 things here. So, one is a technical review panel by  
9 other sister government agencies, I think that's  
10 something -- we do that on almost every proposal, RFP  
11 that we issue, we'll have a technical review panel by  
12 potential co-funders, and other government agencies,  
13 technical experts that review just the technical  
14 portions of the proposals. And there's a scoring  
15 criteria that is outlined in the solicitation, they  
16 adhere to that, and then they convene and make scoring -  
17 - or score the different proposals. I think that's  
18 something that you should do because that gives you  
19 wider breadth of oversight on the whole process and  
20 getting input from many different stakeholders, not just  
21 the Energy Commission, and I think it's valuable.

22 The other process is something that I'm  
23 suggesting only as a manner, or a means to get automaker  
24 input, so if you can't do it on the front end, which is  
25 probably the more traditional way, is get a ranking of

1 priorities by community, then perhaps there's a  
2 different way to do that, and I don't even know if it's  
3 possible, but if you can do a blind survey and say, you  
4 know, you're doing surveys with the OEMs now, do a  
5 similar survey and say, "Here are -- these are potential  
6 sites," there's no information, there's just a dot on a  
7 map, for example, and let them select it. And then you  
8 can rank it that way. Again, that's only for location  
9 specific station identification, it's not for winning  
10 the proposal, they've got to meet all the other  
11 criteria, cost-effectiveness, cost-share, etc. So I'm  
12 suggesting that, I don't know if it's possible, but it's  
13 an option.

14 MR. MCKINNEY: Yeah, no, it's really  
15 interesting and, so, let me clarify that the Energy  
16 Commission and our program staff, we regularly solicit  
17 the views of, say, people from the Air Resources Board,  
18 our PIER Program, the technology experts there,  
19 CalRecycle on Biofuels, and we did have an outside  
20 contractor, Tetra Tech, who provides those technology  
21 assessments on our proposals. So that part, yeah we  
22 already -- that's a good practice and we're using that,  
23 but I really appreciate your observations here and your  
24 suggestions.

25 DR. MIYASATO: Well, Jim, so let me just make

1 a final comment on that. I think it's important that --  
2 so I realize the value of having a consultant do that,  
3 but there are also -- they also may be siloed in some  
4 respect because they're working under the Energy  
5 Commission's task order. So what I'm recommending is  
6 you take outside government agencies to be on the panel,  
7 and that could be those that have no ties to any of the  
8 proposals; so what we regularly do is ask the National  
9 Renewable Energy Lab experts, Department of Energy  
10 experts, we ask our colleagues at ARB, and then we have  
11 -- of course, we also keep AQMD staff on the panel, but  
12 we're getting at this wide vision with perhaps more  
13 experience than we can offer as our own staff, to this  
14 process, and I think that's something that you should  
15 consider. And, again, I'm offering that we would be  
16 happy to help.

17 MS. BARONAS: Please, go ahead. You've been  
18 so patient. Identify yourself.

19 MR. SHEARS: John Shears with the Center for  
20 Energy Efficiency and Renewable Technologies. I think  
21 Drs. Nicholas and Brown are going to touch on this in  
22 their presentations, but I just wanted to raise the  
23 issue that my understanding is, in terms of trying to  
24 site the stations, there's going to be a quasi dynamic  
25 aspect to that because the challenge is, you know, to

1 get the 60 to 100 stations out there so that we have  
2 coverage, you know that's relatively convenient to the  
3 customers until the fuel volumes in the market is robust  
4 enough that it's self-sustaining and then it becomes  
5 about capacity. So in order for the stations to have a  
6 greater chance of getting to self-sustaining volumes,  
7 the challenge is, of course, of siting them so that  
8 they're not unnecessarily competing with themselves as  
9 the market is developing. So, as new stations are  
10 selected and sited, that will require some adjustment to  
11 where, you know, the next adjacent station could be  
12 located.

13           So I just wanted to highlight, you know, I  
14 think Dr. Miyasato's suggestion offers some elegant ways  
15 of trying to address this, but there's also a challenge  
16 of having to deal with this sort of quasi-dynamic aspect  
17 of the market as we try to build the market, and so I  
18 just wanted to highlight and also maybe provide an  
19 opportunity for Drs. Nicholas and Brown to sort of also  
20 comment on how that might work, given Dr. Miyasato's  
21 proposal.

22           DR. NICHOLAS: Yeah, I'll go through some --  
23 this is Michael Nicholas -- I'll come at some of that in  
24 the presentation, but that's a good point, is that one  
25 station affects the other stations, so if you site one,

1 then maybe don't site the other, even though they both  
2 may be good, but they might be somewhat mutually  
3 exclusive, so that's an important point.

4 DR. BROWN: Just to follow-up, this is Tim  
5 Brown, and I think this speaks to Jim's question of  
6 precision, I think the more stations that are built, and  
7 precision is more and more important. The first few,  
8 the first handful, you can put them practically anywhere  
9 and they're going to have a good location, but the third  
10 one, fourth one, and fifth one, as you get closer and  
11 closer to saturation, if you will, each station becomes  
12 more and more important, and I'll talk about that in my  
13 presentation.

14 MS. BARONAS: Thank you for that. Alex.

15 MR. KEROS: Hi. Alex Keros with GM. Jim, it  
16 sounds like you're going to pitch that question to the  
17 other panels, as well, later today? Okay, so I'll hold  
18 my response. This question is actually for Matt. Just  
19 a clarifying point. You had noted in your presentation  
20 priority of regions, and I think I know what you mean,  
21 but for the benefit of everybody here, are you  
22 suggesting, for example, focus on South Coast first,  
23 fill in all the stations there, move on to the next  
24 region --

25 DR. MIYASATO: No, not necessarily, but



1 clearly it should be reflective of the two-third, one-  
2 third split that the surveys are suggesting.

3 MR. KEROS: Sure.

4 DR. MIYASATO: So, yeah, don't exclude Damian  
5 for the sake of the South Coast, but clearly you're  
6 going to want to have more stations to the region that  
7 the vehicles are rolling out first.

8 MR. KEROS: Yeah. It's certainly an iterative  
9 process, I thought that was the case, but I just --

10 DR. MIYASATO: It's not serial, right.

11 MR. KEROS: Thanks.

12 MR. BREEN: I would add, Alex, that probably  
13 it won't be possible to kind of do it in that fashion.  
14 I would expect that both ourselves and the South Coast  
15 will probably have our own supporting grant programs, at  
16 least in some fashion that will roll out concurrently,  
17 so stations would have to be built probably in all areas  
18 at the same time.

19 MR. KEROS: Yeah, let me be clear. General  
20 Motors wouldn't support building out one region and then  
21 going to another, they do need to be rolled out  
22 simultaneously and chosen appropriately.

23 MS. BARONAS: Thank you, Alex. I have a  
24 question for all three presenters on the topic of  
25 coverage and capacity. A few -- two presenters out of

1 the three mentioned this and I'm just curious about the  
2 reality of the scalability of some of these devices. I  
3 mean, so if you have the right coverage and capacity a  
4 little lower, and then you could have plans for  
5 scalability in making more capacity, all of that sounds  
6 good hypothetically, but how real -- how real is that?  
7 And how do you incorporate that into your planning?

8 MR. BREEN: Well, if I may start, in terms of  
9 our experience in deploying alternative fuel  
10 infrastructure, generally you have funding and you have  
11 an opportunity, so were I to look to the future and  
12 realize that there will be a limit on obviously the  
13 capacity of each station, but generally to the limit of  
14 funding, you want to build it as much in advance of the  
15 market as you possibly can. So from our perspective, we  
16 wouldn't want to go for a lower volume station that  
17 might have a cheaper cost based on the fact that, you  
18 know, what that does is, in the future, essentially we  
19 end up with maybe a second or third ask, and as you site  
20 these things, and as you go through the process with  
21 CEQA, and the permitting, and you know, training and  
22 bringing local officials up to speed and doing all of  
23 that, you probably want to do that, at least in terms of  
24 these initial stations, as efficiently as possible which  
25 means that if you can only do it once, that's probably

1 the pathway you want to take.

2 MS. BARONAS: Thank you, Damian. Any other  
3 comments from the speakers?

4 DR. MIYASATO: Yes. You know, this has been a  
5 topic of discussion for a long time within the  
6 Partnership and also the Hydrogen Infrastructure Trust  
7 as we looked at trying to come up with a number of  
8 stations to roll out through the rest of the state, and  
9 I probably should leave it to the Fuel Cell Partnership,  
10 to the OEMs, to comment on that, but I want to push back  
11 a little bit on Damian; I think it's a compromise, you  
12 need to put it in the solicitation, make it scalable,  
13 you know, provide the opportunity to upgrade and you get  
14 more points in the score, some other fashion of reward,  
15 then, for that ability, and then hold them to it as you  
16 contract it. But if you don't have the coverage  
17 throughout the state, the rest of the communities,  
18 again, you're going to limit the ability for the market  
19 to expand. So I think it's a compromise you're going to  
20 have to deal with and that's where you use the tools  
21 that are at your disposal at the University of  
22 California's representatives here, as well as the input  
23 from all the stakeholders.

24 MR. ACHELNIK: And this is Gerhard Achtnik.  
25 I would just add on a little bit, is that it isn't a one

1 answer fits all, too, because depending on where you're  
2 looking to locate your station, then what might be too  
3 small in a high density area might just be the perfect  
4 size for the outlier or the connector station, and you  
5 know, I mean, one of the things to develop is your sort  
6 of minimum, and that minimum is you wouldn't consider  
7 anything smaller than practical, so scalability sort of  
8 varies a little bit, not every station -- you can't  
9 expect every station to be able to expand from 200 to  
10 5,000 kilograms easily, so it's not an absolute answer.

11 MR. BREEN: And I would add that that's kind  
12 of more the point I was making, you want to set a  
13 minimum -- in terms of the scalability, that's the point  
14 I was trying to make, you want to have a minimum set  
15 point. And if you are going to go through all of this  
16 work, you want to make sure you know what that minimum  
17 is. And Gerhard makes a good point for the clusters  
18 versus the linked stations; based on the usage there,  
19 you might be able to get away with a lower minimum, but  
20 again, essentially that's the point I wanted to make is,  
21 you know, if you're going to go through it, make sure  
22 that that minimum is high enough to support the vehicles  
23 that you're projecting.

24 MS. BARONAS: Well, thank you very much,  
25 everyone. We are on schedule, happy to say that. And

1 so I would like to proceed with Tim Brown, University of  
2 California, Irvine.

3 DR. BROWN: Thank you. I am Tim Brown from  
4 University of California, Irvine. I'm going to talk  
5 about our strategic plan to optimize locations of  
6 fueling stations in California, and this is work that's  
7 been ongoing with many of the people in the room,  
8 especially with the automakers, and I'll talk about that  
9 here. The CEC asked me to address two questions, what  
10 do you find is optimal hydrogen station location, as  
11 well as what's the best approach to selecting station  
12 sites? And I'm going to address these throughout the  
13 presentation.

14 First, I want to give a very brief history of  
15 California hydrogen infrastructure planning. I think  
16 we're all familiar with the California Hydrogen Highway  
17 Blueprint Plan that was adopted in 2005. This plan  
18 called for between 50 and 100 stations for Phase 1  
19 deployment and they showed some very detailed maps of  
20 station sites as though it was clear that these sites  
21 were located as they may be sited, they were not  
22 actually a detailed analysis as to where these go.

23 Next up was the California Fuel Cell  
24 Partnership Action Plan, which was released in 2009, it  
25 showed similar sorts of maps, also called for between 50

1 and 100 stations by 2017 as initial deployment of fuel  
2 cell vehicles. And these station locations were much  
3 more accurate in that they were based on OEM input on  
4 deployment plans, as well as some capacity calculations,  
5 though the locations themselves were not as specific,  
6 there were these sort of fuzzy dots, giving general  
7 locations, but not specific street corners.

8           In 2010, we published a methodology that we  
9 developed on station infrastructure, and we did a case  
10 study of Irvine, and specifically this was to optimize  
11 investments in hydrogen infrastructure. And our goal  
12 was to find a happy medium between a great coverage of  
13 stations and a minimum investment. We're trying to find  
14 the most frugal network that would satisfy needs and  
15 lower investment.

16           In 2011, Dr. Stephens presented this work at  
17 the National Hydrogen Association Conference for a total  
18 Southern California analysis, not just Irvine, and now  
19 in 2012, we have the analysis essentially complete for  
20 the entire State of California. And it's important to  
21 note that throughout this work, since the very  
22 beginning, we've worked closely with automakers and that  
23 collaboration has really increased recently and it's  
24 intimately coupled between our research and what the  
25 automakers have helped us perform.

1           So to focus on this network of 68 stations, we  
2   worked closely with six automakers shown here to develop  
3   the network required for sufficient coverage for  
4   commercial launch of vehicles. And, again, this goes  
5   back to the coverage versus capacity question, and we're  
6   looking at coverage as what is needed to sell the first  
7   car, what does the customer need to have in place to  
8   feel confident buying this vehicle without many concerns  
9   for fueling? So the results I'm going to present are  
10  based on automaker data, market data, technology  
11  insights, as well as some analysis work from our STREET  
12  tool, which was spatially and temporally resolved energy  
13  and emissions -- energy and environmental tool. And  
14  let's talk a little bit more about that.

15           STREET was developed at our program at U.C.  
16  Irvine, it's a systematic and highly detailed van use-  
17  based methodology to evaluate fuel infrastructure.  
18  We're happy to be working with the CEC to utilize this  
19  tool for a variety of fuels, analyze some of the 118  
20  program, but here I'm specifically talking about  
21  hydrogen, of course. The tool integrates a number of  
22  inputs, including GIS Data, Geographic Information  
23  System data, land use, traffic behavior, future vehicle  
24  projections and market information, and we get a variety  
25  of outputs, including greenhouse gas emissions, energy

1 impacts, air quality impacts, but here again, I want to  
2 focus on infrastructure rollout.

3           The goal with the automaker group to develop  
4 this station plan was to prepare California for the  
5 commercial deployment of fuel cell electric vehicles.  
6 And we see three parts to this network; we must  
7 establish a robust network within the cluster areas,  
8 which I'll define in a moment, we need to see new  
9 cluster areas to begin to grow the network, and we want  
10 to provide connector destination stations throughout  
11 California.

12           So, to talk about the network within the  
13 clusters, first we had to define the cluster regions.  
14 This map shows proprietary data we've collected from a  
15 number of automakers on where they see fuel cell vehicle  
16 demand, specifically for Southern California. And this  
17 is given by Zip Code. Again, we've collected this data  
18 from automakers sort of agglomerated into something here  
19 that hopefully is not showing anybody's confidential  
20 data. We can overlap this with residential land use in  
21 Southern California to understand exactly where people  
22 live within these regions. And if we zoom in a bit, we  
23 can find three broad regions outlined here in red, which  
24 we call Santa Monica - West L.A. Region, Torrance and  
25 Coastal Cities, and Coastal and Southern Orange County,



1 where we see the highest interest, potential interest,  
2 in fuel cell vehicles.

3 We've done this analysis for the entire state  
4 and we come up with five of these initial cluster  
5 regions, the three I just mentioned, as well as two in  
6 Northern California, the San Francisco South Bay and the  
7 Berkeley area. I'm going to use Santa Monica and West  
8 L.A. as an example to walk through the process of how we  
9 site infrastructure within these regions.

10 So here in the Santa Monica cluster outlined  
11 in red, and it's actually -- it's larger than the city  
12 proper of Santa Monica, it's where kind of Santa Monica  
13 and West L.A., it's a broader area. We've worked down  
14 the roadway network within this area into a series of  
15 links and nodes, links representing street segments, and  
16 nodes representing intersections, and then we overlay  
17 the actual existing gasoline stations, in this case, in  
18 this region there's 126 gasoline stations. And through  
19 the computer algorithm, we can determine the driving  
20 distance -- driving time from any area within this --  
21 from any location within this area to a gasoline  
22 station, and it's about four minutes. And actually,  
23 surprisingly, that's consistent throughout California,  
24 throughout urban areas, whether it's Santa Monica, or  
25 Irvine, or Berkeley, it's about four minutes to get to a

1 gasoline station. So we needed a nice baseline and we  
2 know people were comfortable with the level of  
3 infrastructure of gasoline, so it's something to shoot  
4 for with hydrogen.

5           We then go a step further and say, okay, we  
6 know 126 stations is too many, and we know in many areas  
7 there are gasoline stations located across from one  
8 another, three or four in an intersection and we know  
9 that's too many. How many do we really need to  
10 reproduce this four-minute coverage? And for this  
11 region, it turned out to be 16. We ran an optimization  
12 algorithm to locate this number, and 16 strategically  
13 placed hydrogen stations can reproduce the four-minute  
14 coverage in Santa Monica. If I plot that on a graph  
15 here, we can see that our little bar over there  
16 represents four minutes driving time on the vertical  
17 axis, 16 hydrogen stations.

18           We envision that being sometime beyond 2017,  
19 we don't expect or can't expect to have the same service  
20 coverage for hydrogen as gasoline in the initial early  
21 years, we'd like to, that would be great, but that's too  
22 much to ask. We can also plot where we are today in  
23 Santa Monica, there's one station and you can get to it  
24 from anywhere in this region within 26 minutes, and we  
25 know that's not good enough, so we need to find

1 somewhere in between.

2           If we look back at the 2017 or beyond  
3 solution, the 16 stations, we see that 16 out of 126  
4 stations represents 13 percent of the infrastructure of  
5 gasoline within this region. You say, "Well, how does  
6 this compare to other analysis?" Well, looking at some  
7 work from U.C. Davis from back in the '80s, where they  
8 looked at diesel vehicles and the refueling  
9 infrastructure for diesel vehicles, and survey results  
10 show that basically, if 10 percent of the fueling  
11 outlets served diesel fuel, then the diesel customers  
12 didn't have any concerns about finding fuel. So this is  
13 a nice confirmation -- 10 percent, 13 percent, we're in  
14 the ballpark of what survey results showed for actual,  
15 at the time, alternative fuel infrastructure.

16           We could also plot here the stations that the  
17 CEC has already funded in this area for the previous  
18 funding allocation, three additional stations, brings  
19 the driving time down to 15 minutes, and accounts for  
20 three percent of the total stations in Santa Monica  
21 serving hydrogen. Well, how far do we need to go? Is  
22 this far enough? Or do we need to go more in this area?  
23 Now we can look at some work from Marc Melaina and Mike  
24 Nicholas, actually, he's speaking next, previously who  
25 did some analysis of various regions showing that about

1 five percent of the stations needed to have alternative  
2 fuel, if properly located, to meet customer needs. So,  
3 let's go a little further and, with four additional  
4 stations in the Santa Monica region, we can get down to  
5 six-minute coverage and that represents six percent of  
6 the stations in the area. And you can see here this  
7 curve should be coming, there it is, showing that the  
8 eight stations in this region is a pretty nice  
9 compromise, it reaches six-minute travel time, route  
10 produces this six percent, or roughly five percent,  
11 which is theoretically needed, and you can see that, to  
12 go from one station to four stations is a dramatic  
13 improvement in travel time, four stations, eight  
14 minutes, you get a nice improvement. But to go from  
15 eight stations out to 16 stations, to do just two  
16 minutes improvement, takes quite a few stations, so we  
17 see this is a sort of sweet spot in the analysis and,  
18 again, we find the same trend in every region we look  
19 at.

20 We can look at this visually to get a graphic  
21 representation of what's going on here by looking at the  
22 service coverage within the region. Here, we see the  
23 red, blue and green coverage, representing two, four,  
24 and six minutes. This is one existing station in the  
25 region, it has very nice coverage, but you can see

1   there's definitely some spots that are missing, that  
2   aren't covered well. We can compare this to some other  
3   rollouts, we add the three new CEC stations, we can get  
4   better coverage, and then we go a step further and add  
5   what we are proposing here to get eight stations to  
6   completely cover all of the residential area within  
7   Santa Monica, the Santa Monica region, with a six-minute  
8   coverage.

9           It's important to note that this is a robust  
10   methodology. We show here -- this speaks directly to  
11   the question that John Shears brought up -- here we see  
12   three different configurations of eight stations, each  
13   of these plots, there's eight stations in Santa Monica,  
14   all representing six-minute coverage, but each at  
15   different locations. So the optimization algorithm that  
16   we used actually spits out multiple solution sets, and  
17   this is nice because this allows for the realities of  
18   station siting -- we can't come in and dictate that a  
19   hydrogen station must go on a particular street corner,  
20   and that that gasoline owner must do this. So, by  
21   having a flexible solution set, we can account for real  
22   things such as station contracting, and permitting, and  
23   various land owners, and station branding, and all these  
24   other aspects which occur when you need to site a real  
25   station.

1           One other important point here is that the  
2 algorithm, the mathematical part of the model, is only  
3 one piece, it presents sort of a rough draft and that is  
4 refined with close cooperation with automakers and their  
5 input. Shown here is the Palos Verdes Peninsula, and I  
6 have medium household income. You see there are some  
7 very nice household incomes out there, which are likely  
8 early adopters of these fuel cell vehicles, so we would  
9 want to target that region. And as a matter of fact,  
10 the model output does exactly that, there it is, and you  
11 can see here again the two, four and six-minute coverage  
12 of that region well covers where these high income  
13 families are. But as we speak with automakers, we  
14 realized that these people all have to drive essentially  
15 one way to get off the peninsula, so we're better served  
16 by moving that station up, it covers a larger area that  
17 way, and we still in effect capture that population that  
18 is out on the peninsula. So there are a lot of  
19 additional factors that go into this modeling that  
20 working with the OEMs directly can provide, it's more  
21 than just mathematical.

22           So by applying this method within each of  
23 these cluster regions, these are the five regions, we've  
24 come up with this matrix -- require eight stations in  
25 Santa Monica, eight in Torrance in the beach cities, 13

1 in Orange County, four in the Berkeley area, and 12 in  
2 the South Bay. And you can see here what is existing or  
3 planned through CEC funding, or ARB funding, and how  
4 many additional stations are required to meet the six-  
5 minute travel time.

6           The next step is to understand what stations  
7 are needed to seed the new clusters and to really  
8 solidify the regional network. You can look here at  
9 Southern California as an example, again, we've done  
10 this through the entire state, and again I'm showing  
11 household median income as a surrogate for a number of  
12 things, we've looked at household income, we've looked  
13 at vehicle populations, we've looked at some proprietary  
14 sales data from automakers. This one, I can show. I  
15 have the three main regions outlined, but you can start  
16 to see some other regions which look like nice markets.  
17 We have the San Fernando Valley Region where we're  
18 proposing two additional stations, Pasadena for three  
19 stations, the Anaheim area for one station, and Long  
20 Beach for one additional station. And when adding those  
21 to the matrix, we get a total of 17 additional stations  
22 throughout the state, including Sacramento, San Diego,  
23 and some areas in the Bay Area.

24           And last but not least are the connector and  
25 destination stations. And this work was largely based

1 on automaker input as to where current customers are  
2 driving, where they want to go with these fuel cell  
3 cars, and how we need to connect the state to make these  
4 full function vehicles and not simply urban vehicles.

5           And here we add six additional stations, Napa,  
6 Sonoma, Lake Tahoe, Santa Barbara, Palm Springs, and  
7 Kettleman City, and really, with the exception of the  
8 Kettleman City station, each of these can be itself a  
9 cluster, and this is a definite market for additional  
10 vehicles. So here's a chart showing six additional  
11 destinations.

12           Here's a map showing the total network, 22 in  
13 Northern California, 40 in Southern California to make  
14 Matt Miyasato happy, and six destination connector  
15 stations. Though, I think the split between Northern  
16 California and Southern California is more based on  
17 population and population density, as opposed to actual  
18 demand or a split between the automakers, the density  
19 within the Bay Area is certainly much higher than in  
20 Southern California, and so it requires fewer stations  
21 to reach the same population.

22           The next step in this is to determine the  
23 rollout of the stations; sure, we want to get to 68 by  
24 the end of 2015 to see this market, but how are these  
25 stepped out? I show here the sort of nine stations that



1 were existing or planned prior to CEC's involvement in  
2 hydrogen, and we see that these stations within a six-  
3 minute coverage covered 2.7 million people, and they  
4 guarantee a drive time within target regions of 24  
5 minutes. If we add the CEC stations, seven additional  
6 new sites, I think there were nine stations total in  
7 Southern California they funded, but seven new sites, it  
8 brings the total almost to 4 million people, and the 25  
9 percent of the total population within this Southern  
10 California area, which is about 15.5 million people. So  
11 these 16 stations total will reach four million people  
12 within six minutes, and it can offer drive time within  
13 the cluster regions to any station of 15 minutes.

14 We then worked with automakers, basically  
15 again the automaker input, to determine what the next  
16 priority stations were, and what the priority stations  
17 were after that, and how do we ramp up to the 68. And I  
18 can show a proposed raw no. 1 gets us to 4.7 million  
19 people, adding another seven stations in Southern  
20 California is equivalent to stations being added in  
21 Northern California, which gets us down to a travel time  
22 of 9.4 minutes. Another round of stations gets us to  
23 nearly six million people covered in 7.3 minutes, and  
24 then, last but not least, the final round of stations  
25 takes us down to six minutes coverage within the

1 regions, and covering a total of 6.1 million people,  
2 nearly 40 percent of this entire Southern California  
3 Basin within a six-minute travel time.

4 And here is just an iChart showing that  
5 rollout for each region, how many stations are existing,  
6 funded, or proposed, as well as the phased rollout of  
7 these stations to reach our total of 68, ideally, at the  
8 end of 2015.

9 I want to acknowledge the numerous partners  
10 we've had in this work, the Department of Energy, the  
11 California Energy Commission, the ARB, South Coast Area  
12 -- AQMD, let me say it correctly, the San Joaquin Air  
13 Pollution Control District, the Fuel Cell Partnership,  
14 all of the automakers, as well as energy and gas  
15 companies have worked with us at one point or another in  
16 the development of our STREET tool. So, with that,  
17 thank you.

18 MS. BARONAS: Thank you very much, Dr. Brown.  
19 And our next speaker is Michael Nicholas, University of  
20 California at Davis.

21 DR. NICHOLAS: All right, thank you. So this  
22 is a great discussion today. People kind of coalesce  
23 around some common themes, and I'll try to add kind of  
24 my two-cents worth and perhaps take a less programmatic  
25 approach, but look more at the foundations of kind of

1    what -- add to the discussion that way.

2                   As Tim said, this sort of discussion around  
3   hydrogen station siting has been going on for a couple  
4   years, and I think what I'm going to do is actually go  
5   to my extra slides, first you get a preview of all my  
6   slides, but looking at what has been done in the past  
7   and let's see, so this is a study we did in 2005, and  
8   Tim was talking about percentages of stations, and I  
9   thought I'd just highlight a couple things. So we did a  
10   study of just general fuel availability, so for gasoline  
11   stations, how close are people to the closest station on  
12   average, and so we did L.A., San Francisco, San Diego,  
13   and Sacramento. And you see that it is somewhat  
14   different for the more dense regions and has to do with  
15   the road network and the clustering of population in  
16   each center, and so you can look at it in several  
17   different ways, like three minutes, four minutes, seven  
18   minutes, so if you wanted a seven-minute drive time to  
19   your closest station, assuming you wanted to equalize it  
20   across areas, you would need .8 percent of stations in  
21   L.A., one percent -- all the way up to six percent in  
22   Sacramento. So the point is -- over three minutes,  
23   there's another example, seven percent in L.A., and 16  
24   percent in Sacramento. And if you were to look at the  
25   numbers, this is what it would be as a percentage, so

1 for seven minutes, L.A. would be 26, you know, for a  
2 total of 39 in the state if you were looking at seven  
3 minutes, and you can look at equalizing it.

4           So this is one way to look at it and this is -  
5 - one of the requests was to look at what sort of papers  
6 to look at, and so this is available at TRB2005. And so  
7 that's where we started awhile ago, looking at kind of  
8 region-wide availability -- and sorry for going through  
9 the slides like this -- so, as I said, I was going to  
10 just look at the basic goals, what are we talking about?  
11 What do we want -- what are we trying to accomplish with  
12 infrastructure placement? So, first and foremost, we  
13 want to increase the purchases of these vehicles, we  
14 want to make them more attractive to the customers in  
15 the near term and the long term. And then, once they  
16 have the vehicles, we want to increase -- use those  
17 vehicles to encourage them they're more useful and more  
18 convenient than their gasoline vehicles, so if they do  
19 drive to San Francisco, which is maybe not so often,  
20 they can do it. So it's a good thing to have -- to  
21 increase the use of them.

22           So what questions need to be asked for these  
23 to look at the infrastructure siting? So, who buys the  
24 cars? Who buys cars, in general? And who buys advanced  
25 technology vehicles? So you want to get to these

1 customers. So that's a basic question. And what is --  
2 you wanted to find what is the relationship between  
3 purchasing and hydrogen infrastructure. So, if you site  
4 a station, what does that mean in terms of someone's  
5 purchase decision? And what is the relationship between  
6 infrastructure and use, looking at these very very basic  
7 questions? So right now, we're -- this is kind of a  
8 different way to look at it. We want to find out who  
9 wants to buy these vehicles. There's people who, you  
10 know, they're hybrid owners and they're looking for high  
11 technology vehicles, and then who can buy these  
12 vehicles. So they have to have money, they have to be  
13 new car buyers, you're not going to get the guy who is  
14 buying a \$2,000 used car to buy a hydrogen vehicle, it  
15 doesn't matter if he wants to, it's just do they have  
16 the ability to. And right now, who can refuel easily is  
17 not there, so we need to move this closer and have some  
18 intersection between who wants to buy, who can buy, and  
19 who can refuel easily. And so this who can refuel  
20 easily is what we're talking about today. So one factor  
21 is, is it close to home, is it close to my frequent  
22 routes, and is it close to my desired destinations?

23           So this is a proposed decision framework, or  
24 just what we take as basic assumptions, so we assume  
25 that there's a latent market for hydrogen vehicles, even

1 without everybody out there who wants to buy these  
2 vehicles, and we take that as a given, you can argue  
3 that, and maybe you have to be aware of the vehicle to  
4 want to buy it, but, yeah, we're assuming there's a  
5 market out there, otherwise we wouldn't be doing this  
6 and that the ease of refueling increases the likelihood  
7 of the fuel cell vehicle purchase, so either all on your  
8 route, or near your home, and that a prerequisite for  
9 that -- this is what we would argue -- is that you need  
10 an anchor station, one that you know that you can  
11 dependably use. So if I'm going to buy a vehicle, I  
12 want to know that somewhere that's convenient for me is  
13 where it needs to be for me, even if you consider the  
14 vehicle  
15 -- right now, there aren't very many stations, so there  
16 aren't very many people considering hydrogen vehicles.  
17 And then the network of stations does make a difference.  
18 As Tim alluded to, there's a network effect and there's  
19 a coverage issue, which does increase the value of or  
20 attractions of the fuel cell vehicle, so not only is it  
21 next to my house and I can go 300 miles round trip from  
22 my house, where else can I go on this, regardless of how  
23 often I go there? And so the attraction is related to  
24 the frequency, so within L.A., you may pass a certain  
25 route and, "Oh, that would be useful, I can see myself

1 running out or forgetting," or something that's more  
2 aspirational, where the attractiveness is related to the  
3 ability to expand what is possible, and that does mean a  
4 lot to people. And other factors -- this is something  
5 that hasn't really been brought up -- other factors such  
6 as the vehicle price and hydrogen price will affect the  
7 desirability, so if you give away cars for half price,  
8 you'll end up with a lot more market and you need fewer  
9 stations to reach that market; but if it's equal to the  
10 price of gas, then you have to put more stations out  
11 there to reach more people, or to reach that market.

12           So looking at who can buy, that question and  
13 that framework I put up there, who can buy, looking at -  
14 - we think that new car buyers are probably the most  
15 people who can buy, they're generally higher income, or  
16 they like to go into the dealership, and these are the  
17 people that are probably a target market. But looking  
18 at who buys cars, it's really only 33 percent of  
19 households that buy new cars, at least this is in the  
20 last five years, if you go back 10 years, it decreases a  
21 little bit, but you wanted to find who your market is,  
22 and then there's this kind of hyperactive market and we  
23 are the six percent, so that's six percent of the  
24 households, they purchase 33 percent of the cars in the  
25 state. So these are the new car buyers probably who

1 you're going to be looking for to buy these fuel cell  
2 vehicles.

3           So who wants to buy it? So we're doing some  
4 work on the Nissan *Leaf*, we surveyed about 1,000 people  
5 in California, and looked at who bought these cars  
6 versus new car buyers, how were they different from new  
7 car buyers? And so you see that new car buyers  
8 generally have slightly higher incomes than the general  
9 population of California, but *Leaf* buyers, if you look  
10 at this as a CDF plot, this is possibly around the 10  
11 percent level, so 90 percent of households earn more  
12 than \$90,000, or \$85,000, so that's your market above  
13 \$85,000 if you're looking for -- if you assume that  
14 these are the same people, and as Steve mentioned, they  
15 may not be the exact same people, but I think they might  
16 live in the same area, or they have the ability to buy  
17 these vehicles.

18           So these are your people willing to take a  
19 risk on something that may or may not work, or they're  
20 not sure, so it's kind of like maybe an extra thing or  
21 something. But basically this is the intersection of  
22 who can buy and who wants to buy.

23           So where do they live? This is the *Leaf*  
24 example, so basically you can see that they live  
25 basically in the big cities, so you've got Sacramento,



1 San Francisco, Los Angeles and San Diego, and then you  
2 see there is some demand out here, but not really all  
3 that much. You see some along the coast, and in  
4 Northern California, there's not really all that much  
5 *Leaf* demand. So where are the new car buyers now? I'm  
6 very sorry, but this is probably hard to see, but I'll  
7 just point out that San Francisco, Los Angeles, San  
8 Diego is the same place as where the new car buyers  
9 live, and this is the density of vehicle sales per year,  
10 and vehicles per square kilometer. And if we zoom in to  
11 a little bit closer view, this is Los Angeles, and I've  
12 highlighted in red kind of the more cars per mile. And  
13 if you're a Leaf -- if you're selling a *Leaf*, it doesn't  
14 really matter if you're looking for number of buyers per  
15 mile because you basically have your infrastructure at  
16 home, but with hydrogen, you have to get as close as  
17 possible to those who want to buy the cars, and so this  
18 density of car buyers does make a difference if you  
19 assume that the difference from home does make a  
20 difference to who buys the car, or who thinks the car is  
21 right for them.

22           So, and overlaid on this is some of the old  
23 California Fuel Cell Partnership regions and these have  
24 been -- again, another thing to look at to see here is  
25 that, outside of these potential areas which have been

1 redefined several times, but there is market; for  
2 example, there's nothing really here, this area around  
3 here has a lot of potential and, as Tim pointed out, it  
4 does kind of go up to Anaheim and you see that there's a  
5 lot of potential market out there. So these are maybe  
6 not your first sites, but as you expand your market,  
7 this might be where you need to go.

8           So if you're looking at how do you put this  
9 together, or if you have a willing person, what kind of  
10 infrastructure do they want? And so we did a pilot  
11 study and this is certainly not statistically  
12 significant, and we did -- it was 20 respondents, and we  
13 asked them where they would like refueling  
14 infrastructure independent of where there was a hydrogen  
15 vehicle, or some sort of -- it was basically a liquid  
16 fuel with long range, similar to gasoline, and so just  
17 looking at the infrastructure question, where would they  
18 like infrastructure, and these were people from Davis,  
19 where did they say they wanted infrastructure? So they  
20 said they wanted one near their house, some people said  
21 Sacramento, but a lot of people wanted to connect to the  
22 Bay Area, and then you have these aspirational stations  
23 like Tahoe and, very interesting, Kettleman City came up  
24 and, so, I would fully support that idea to put one in  
25 Kettleman City because people said, "That's about half

1 way, that's where I would need it," and people say, "I  
2 go to Los Angeles sometimes," where the area of  
3 agreement is for people in Davis, though, is basically  
4 this area from Tahoe, Davis, San Francisco Bay Area, and  
5 so there's one they want for their house, and then the  
6 next one they choose is like 20 miles away, and then 60  
7 miles away, and then they expand out and then they start  
8 filling in kind of these -- there may be out of your six  
9 choice, actually, I can kind of look at that -- no, I  
10 don't have that down here -- but they start filling in  
11 the network. So they may make it so that they can do  
12 all the stuff they want to do to expand it, and then  
13 they fill in for convenience is kind of the pattern we  
14 see.

15           So we said, "Well, what does it mean? What  
16 does just one station mean to the consumer?" And we  
17 told them there was no benefits to this vehicle other  
18 than the fact that it was cheaper, and so the purchase  
19 price would have to be around 40 to 50 percent, would  
20 have to be half price for you to accept a car that you  
21 only had one station that you could use in the entire  
22 state, but there still is some value, and it highlights  
23 the fact that there are other factors besides like  
24 vehicle price and hydrogen price that will affect how  
25 many stations you need, and where you need to put them,

1 and what your potential market is.

2           So this -- I'm probably going through this too  
3 fast because there's about six different themes, but as  
4 you increase the number, we let them put up to 10  
5 stations and you see that, for some people, 10 stations  
6 where they can tailor, that was enough for some people  
7 to get to 100 percent usability for like comparable with  
8 your gasoline car. So there's 10,000 in the state and  
9 you could claim that you only need 10 stations in the  
10 state for this one person for that to be how many do you  
11 need, and that's .001 percent or something. But we  
12 can't -- we have to site them for more than one person,  
13 and so what is the best compromise for all people is  
14 what we're looking at.

15           But looking at this idea, when people start  
16 with their home station and they build out, it kind of  
17 leads to another way we think about hydrogen stations,  
18 like where you need one that you can depend on, and then  
19 you need to be able to get to where you need to go. And  
20 importantly, this network does have value, even though  
21 it's not the one you're going to be using all the time,  
22 so up to 50 percent of vehicle value.

23           So this is illustrative, but it doesn't really  
24 have any scale behind it, but you can see that you need  
25 lots of -- even if there was only one station, you would

1    need network stations for someone to feel comfortable  
2    about driving a hydrogen fuel cell vehicle.

3                   So how do we define what the anchor station  
4    could be? So we think that there's some relationship  
5    from the distance of your house to the station, or from  
6    your path, like Tim pointed out, Palos Verdes, everyone  
7    has to go out a certain path, and that is good enough  
8    because that's where the gasoline is now, that's good  
9    enough for people to feel comfortable, even though it's  
10   five to seven minutes away. So there's an element of  
11   path that I'm just ignoring here, and this is more just  
12   kind of a though exercise. But we took this, sort of  
13   what Tim mentioned, Kitamura and Sperling, and saw where  
14   do people refuel with gasoline now? And this is the  
15   percentage. So around 60 percent of people refueled  
16   within five minutes of their house, zero to five  
17   minutes, that's 60 percent of people refueling, and this  
18   is the on-site survey that was done on a site, it says,  
19   "How far are you from your house?" And this is what  
20   they answered, and so there's some drop-off in usage and  
21   people generally refuel near their house. So you could  
22   say that -- if you did say that this is how you would  
23   define the market, you would say that if a station were  
24   20 minutes away, then you would only have 10 percent of  
25   people interested in your vehicle, so there's some

1 distance -- I think that's a bit optimistic, so I just  
2 through simply just cutting it in half, I just changed  
3 those assumptions. Anyway, this is not purchase  
4 behavior. But if you said that perhaps 10 percent of  
5 people are interested, or 20 percent of people are  
6 interested if the station is 10 minutes away, that  
7 sounds a little more realistic to me and that, if you  
8 were two and a half minutes away, that would mean 60  
9 percent of people were interested, for which  
10 infrastructure is not a barrier; this is ignoring those  
11 network effects I talked about -- assuming there is a  
12 network out there, how close does your anchor station  
13 have to be to your house? And there's some relationship  
14 to distance, we think.

15           So, well, how much might one station do? And  
16 this is looking at Santa Monica. So also, we're  
17 interested in market. We know how many households there  
18 are in California, there's about a million vehicle sales  
19 per year in California, and I showed that perhaps  
20 there's slightly higher income, this is 75K+ per year  
21 adjusted to today's numbers, so that's about \$92,000, so  
22 \$90K+ per year market in California, out of all the cars  
23 you sell in California, or maybe if this is your target  
24 market, you've only got this much to work with, about  
25 613,000 -- why do I have decimal places there -- but

1 613,000. And so if you look at a place like Santa  
2 Monica, well, what are you talking about? So how many  
3 people live in this small area that you potentially  
4 could sell a fuel cell vehicle or two per year, and  
5 you've got about 4,000 cars sold per year in Santa  
6 Monica, and then how many of those 4,000 could you reach  
7 with one station? So you could reach around 3,000,  
8 looking at that previously adjusted number if you're  
9 assuming there's some relationship between distance from  
10 home to your nearest station, or your anchor station.  
11 So one station could get up to 70 percent. And I'll  
12 clearly admit that this is just a thought exercise, and  
13 these are the research as far as what is that  
14 relationship as far as purchase network, I suppose,  
15 comfortable with the network and that distance from  
16 home, or your path.

17           So one station in Santa Monica could provide,  
18 you know, decreasing utility to people out here, but  
19 still there might be some people for whom that's  
20 sufficient. And so, looking at those numbers, you reach  
21 about a 70 percent. So to John Shears' comment about  
22 dynamicism [sic], yeah, if there were two stations in  
23 Santa Monica, you'd probably want at least two for  
24 redundancy, but you know, does the third one go in Santa  
25 Monica? Or does it go somewhere else? I would say that

1 you would have to look at something like this and figure  
2 this out a little more carefully and perhaps it's better  
3 to expand, especially initially, to reach the maximum  
4 market for which these anchor stations are sufficient.  
5 So this is, again, just going along this thought  
6 exercise.

7           And really, what is the problem you're looking  
8 at? If you wanted to sell 20,000 vehicles, here's the  
9 iso-line for the conservative one-half estimate, so at  
10 any point on here, give those estimates, you could sell  
11 20,000 vehicles. So if 60 percent of your market was  
12 just waiting for fuel cell vehicles, if you had people  
13 so excited that they were going to buy the fuel cell  
14 vehicle as soon as it came out, all they need is a  
15 station, then you would only need -- in L.A., you would  
16 only need, oh, I don't know, five to seven stations.  
17 But if you're predisposed market is only, let's say, 40  
18 percent, then you would need -- here's the example I put  
19 on there, you would need 12 stations to capture that  
20 market. But if only 20 percent of the market was  
21 interested here, then you would have to see you need  
22 more stations, so to reach that market, assuming there  
23 is this relationship between distance from home to the  
24 nearest station. So where are your potential markets?  
25 So this is just looking at how many vehicle sales are



1   there -- you can't just make people buy cars, people get  
2   in accidents, that's why they need a car, or they have a  
3   change in their life, that's when they need a car, you  
4   need a new car, there has to be reason and there's a  
5   cycle to these things.

6               So this is some work we did with some of the  
7   automakers and Shell and Chevron, looking at this  
8   cluster idea and this goes to kind of the anchor in  
9   network idea that we're talking about, and there was --  
10   this is 12 clusters identified by the old survey.  
11   Again, there's new clusters, but what it will illustrate  
12   is looking at  
13   -- there's network and there's your anchor, and  
14   assuming these are anchor areas, what do you need to do?  
15   So we measured convenience in two different ways, home  
16   to their nearest station, and diversion time, so looking  
17   at your travel patterns, how close do you need to be to  
18   your general travel patterns on average to site  
19   stations.

20              So just -- well, I don't know if I need to go  
21   through this, but there's different types of stations,  
22   anchor stations, there are home stations, and then there  
23   are local stations, and these connector stations, and  
24   then, well, I'll just -- we've kind of gone over the  
25   connector destination type discussion already. But if

1 you were just looking at anchor stations, how close  
2 would these be on average to people's houses? So you  
3 just define the population here. This is not done with  
4 sales numbers, but you'd say -- you get about four  
5 minutes on average from home to the nearest station, but  
6 you'd have to divert and it would be on average about  
7 5.6 minutes diversion time. So this is what it looks  
8 like for all eight clusters and you see that Irvine is,  
9 as Tim mentioned, higher than all the others, and that  
10 there are some places that have better fuel access than  
11 other places. So these were 12 areas defined by that  
12 survey and they all have some tote around one to two  
13 minutes, using the network I used, it's an unloaded  
14 network, and so it might be slightly fashioned to the  
15 stuff Tim used. But if you want to see where do  
16 people from these clusters drive, and what sort of  
17 network they might want, you can site stations based on  
18 diversion time, and you see these are in white, so you  
19 take the home anchor stations as given, and where do  
20 people pass by the most, and what is the best  
21 arrangement of people for whom you're siting -- you're  
22 siting the network vs. their anchor station, so what  
23 might they find valuable? So we can look at the traffic  
24 distribution from only these customers. And I think the  
25 gentleman from Bay Area Quality Management District kind

1 of highlighted this finding where those people go and  
2 then serving those people. You can see the diversion  
3 time goes down by adding stations out in the network.  
4 Some of these actually end up in potential cluster  
5 areas. So how do people actually re-fuel? So, again,  
6 this is a little more back to the basics, you can find  
7 it in journal transport geography, but do people  
8 actually go to their nearest station? Or is there some  
9 sort of network effects? And these are -- you can see  
10 there's two different scenarios here where you have  
11 people -- you know, there's the freeway here, and do  
12 they travel to their nearest station? Or is it more  
13 like this? Is it in the direction of travel where  
14 there's some relationship to the direction of travel and  
15 to the nearest station like that Palos Verdes example,  
16 and it turns out, anywhere along the path of freeway is  
17 acceptable in most cases, and the bottom example is how  
18 people refuel. This is just for gasoline -- sorry, this  
19 is a gasoline study looking at population distributions,  
20 traffic distributions, and how people would refuel with  
21 gasoline. So one thing to notice, some very general  
22 things, is what is the influence of freeways. So based  
23 on distance from the freeway, first of all, we see the  
24 population -- people don't live next to the freeway in  
25 the same proportions that they drive next to the

1   freeways, this is an intensity measure, and this red  
2   line here is the population density versus distance to  
3   the freeway. So it falls off, there are more people  
4   near the freeway. But you look at the gasoline  
5   intensity per square mile here and most gasoline is  
6   pumped near the freeway. And I think, looking at total  
7   percentages, this is about 50 percent of all gasoline is  
8   pumped within one quarter mile of the freeway.

9               So there is some effect there and through this  
10   paper I was looking at what is the effect of these  
11   travel paths and VMT, so VMT matches up pretty well and,  
12   actually, if you plot the travel path from the home to  
13   the nearest freeway entrance, that matches up pretty  
14   well, too.

15              So again, you can also go back to basics and  
16   look at where is all the fuel sold in L.A., and again,  
17   there's a lot of fuel sold in kind of these places where  
18   there's lots of cars and a lot of new cars, and a lot of  
19   population density, so these are potentially also good  
20   places and places to look. And also here you see this  
21   relationship to the freeway, you see all this gas, there  
22   must be something there, you know, an agglomeration of  
23   demand. So along the freeway is one of those things you  
24   can look for which might raise one higher than the  
25   other.

1           So what is the optimal approach? First, you  
2   have to find the predisposed customers, and this is very  
3   basic, not as specific as Gerhard went through, but more  
4   kind of a framework, so you find those customers who  
5   want to buy the vehicles, who can buy the vehicles, so  
6   you look at hybrid sales, EV sales, that might tell you  
7   something about how adventurous people are, and then OEM  
8   marketing input is very important. I know Honda has run  
9   a survey that says, "Are you interested in our fuel cell  
10   vehicle? And where do you live? Would you like more  
11   information?" And they have a lot of information and a  
12   lot of input to give to these siting decisions. So,  
13   site them as close as possible to their commute or  
14   shopping paths. So you could, as a general rule, say  
15   the nearest freeway entrance or large road entrance, a  
16   lot of times they aren't really freeways, they're  
17   highways or some other large capacity road. So once you  
18   find out where these people live, assuming that's a  
19   prerequisite, then you fill in the regional holes,  
20   looking at connector stations like I showed; and if you  
21   plot the paths of these people, and then also with an  
22   eye towards making those connector stations for the  
23   initial customers also anchor stations for somebody  
24   else, so there's dual duty possibilities, and then  
25   there's some like Kettleman City in Tahoe that maybe

1 don't have that function, you just don't expect it, but  
2 it does have an effect on how valuable the car is.

3           So then you would run the model to identify  
4 the travel paths of the potential customers, and then  
5 see where those holes are. And then, again, connecting  
6 regions together with interregional connector and  
7 destination stations. This could be done -- it's a  
8 little bit harder to look at based on traffic, you might  
9 even have to survey it for these aspirational stations,  
10 or they're pretty obvious, people like to go to Tahoe,  
11 people like to go to Yosemite, people like to go to Las  
12 Vegas, it's not potentially all that hard, but you might  
13 miss a couple places if you don't ask people.

14           So some conclusions. Kind of going through  
15 the same sort of things, but anchor station is a  
16 prerequisite, and where that anchor is, you know, it  
17 could be at your work, that could be the one you plan to  
18 use most of the time. Most people would probably have  
19 one that they would like, or a set of ones like, "I'm  
20 going to use this half the time and this half the time."  
21 Anchor stations should be cited to attract potential  
22 buyers, and this is the main thing I would have to say,  
23 is what is your goal? Your goal is to sell cars, and I  
24 would say a secondary goal is to increase the use of the  
25 cars, but you want to get those cars out there, what

1 convinces people to get those -- to buy those cars? And  
2 if gasoline stations -- if anchor stations are like  
3 gasoline stations, and I'm making a little bit of a jump  
4 here, but if you take this to be true, then they would  
5 be sited on the path and home or freeway, or other  
6 frequent path. Again, it's not always this freeway  
7 context that I highlighted, it's just easier to  
8 demonstrate. And all else being equal, the closer to  
9 home is better, but if you have it on a frequent path  
10 and it may not be such a penalty to be farther away.  
11 One thing to think about, potential buyers near a  
12 station are limited, you have to look at people who are  
13 buying new cars, and there's only so many cars sold in  
14 California, and a station may have to build up demand  
15 over time just because you need to catch the cycle. And  
16 you also may need to site -- you know, go outside these  
17 initial clusters relatively quickly to get the best bang  
18 for your buck.

19           So the market will develop over several years,  
20 as I said, just because of the way cars are bought. The  
21 number of stations necessary is not absolute because it  
22 does depend on this market price, both of hydrogen and  
23 the vehicles, and so it is somewhat variable. There are  
24 some things that are outside of your control. So the  
25 aspirational stations, as I showed, it did add value for

1 the customers, and so how do you get the return on  
2 investment? I don't know, people may not use the one in  
3 Kettleman City, but there are certainly a lot there, and  
4 so there's some places you might be able to identify  
5 like Las Vegas, and Yosemite is a place I mentioned.  
6 And redundancy is important, we found this out, this is  
7 one of the big learnings from the first rollout of  
8 stations, is having a second station does help out how a  
9 lot of people think of one station, but they probably  
10 would like to have two. So when you develop an area, or  
11 you find an area, one station means two, and that could  
12 define the next (quote unquote) "cluster" or mini-  
13 cluster. And those stations should be some distance  
14 apart, and so this might be another criteria that you  
15 could look at for siting, so there's some network  
16 effects and, you know, people -- the confidence people  
17 have. And that does need a little more research. So I  
18 think that's all I've got. Thanks.

19 MS. BARONAS: Okay, so thank you both, Tim and  
20 Michael. So I'd like to open it up to a 20-minute  
21 question and answer session, and first allow the people  
22 on WebEx to make comments, or ask questions.

23 MR. POWERS: Yes, I have a question.

24 MS. BARONAS: Please identify yourself and  
25 give us your question.



1           MR. POWERS: I unmuted myself. If you can  
2   mute everybody else, there might be not quite as much  
3   background.

4           MS. BARONAS: Okay, would the people on WebEx  
5   kindly mute their phones? Thank you. Please go ahead,  
6   sir.

7           MR. POWERS: Okay, thank you. This is Charles  
8   Powers from Sinclair Research. Let me quickly state the  
9   reason for my question, and my question. Matt Miyasato  
10  made the point that we need a willing operator in order  
11  to locate a station and that certainly has been the case  
12  with other alternative fuel stations like the alcohols  
13  and natural gas where we've sometimes had to locate  
14  stations in less than ideal locations because those were  
15  the locations where we could find a willing operator,  
16  and that seems to be the case more specifically for  
17  hydrogen based on the response from the petroleum  
18  companies and the station owners to the pending ARB  
19  Clean Fuels Outlet Regulation. I think it's safe to say  
20  most gasoline station owners and operators are not at  
21  all eager to install hydrogen facilities. And so my  
22  question is, first, I was very pleased to see in Tim  
23  Brown's modeling that he's taking these practical  
24  matters into consideration, so I'd like to ask if he  
25  could expand a little more specifically on how he's

1 modeled the availability of sites and for Dr. Nicholas,  
2 has your modeling taken these practical matters into  
3 consideration? And if so, how? Thank you.

4 DR. BROWN: Sure. Thank you for the question.  
5 This is Tim. Just to address one comment you made about  
6 station owners, station owners are generally private  
7 individuals and aren't necessarily associated with the  
8 branding on the stations, so you're right that the large  
9 oil companies have some issues with hydrogen right now,  
10 but it's not correlated to the fact that, you know,  
11 individual owners are still interested on their own  
12 individual bases, or not interested on an individual  
13 basis, regardless of what perhaps the branding on the  
14 station does. But regardless, we all know that we can't  
15 dictate where these stations go. Our model certainly  
16 outputs a specific street corner, and that's nice, but  
17 we've found luckily, somewhat of a coincidence, that we  
18 can move that location across the street or down the  
19 block and this would re-optimize and still maintain the  
20 same number of stations within the region. For example,  
21 the Santa Monica or the Orange County, 13 stations there  
22 provide the 6 million of coverage. Certainly, it  
23 matters which 13, but we can find a number of solutions  
24 where 13 works. So, by doing that, we can work with  
25 whatever stations are proposed and understand if that

1 will fit into one of these solution sets and essentially  
2 there are enough locations that it does, and we can do  
3 that, we can take into account the permitting issues,  
4 the actual contractual issues between equipment  
5 providers, or hydrogen providers, and station owners.  
6 Or, if appropriate, you know, Greenfield sites that  
7 aren't existing gasoline stations, so I think it's  
8 fortuitous that the modeling suggests that this sort of  
9 number of optimizations can be configured a number of  
10 ways.

11 DR. NICHOLAS: Yeah, I would agree with Tim,  
12 we've run different kinds of scenarios and the number  
13 really does say -- number versus the output of like  
14 average travel time to the nearest station does stay  
15 pretty constant, so there's a lot of solution sets that  
16 work, and we assume fully that not every -- there's not  
17 going to be an optimal site, and so the question  
18 becomes, when you put it in the non-optimal site, what  
19 does that mean for the rest of the network? It does  
20 have an effect and you analyze, you go forward from  
21 that. You can analyze how much better it would be --  
22 you can analyze two different station options and say,  
23 "Okay, this is a non-optimal site," they're all non-  
24 optimal, and then this is, but which non-optimal site is  
25 better. And so, yeah, it's just about getting the

1 outputs. There's a target numbers, which is the best  
2 you can do, and then it's always going to be slightly  
3 different than that, which is fine, but probably pretty  
4 close.

5 MS. BARONAS: Thank you very much. This is  
6 Jean Baronas. I just want to make sure I heard the  
7 gentleman's name. Is it Charles Powers from Sinclair  
8 Research? Is that correct?

9 MR. POWERS: That's correct.

10 MS. BARONAS: Okay, thank you.

11 MR. STAPLES: Hello? I have a comment on  
12 that.

13 MS. BARONAS: Okay, please identify yourself.

14 MR. STAPLES: Yeah, this is Paul Staples with  
15 Hydrogen Industries. I have found that it's really very  
16 relative to the station owners, themselves. I've been  
17 contacting station owners for the last two and a half  
18 years, spoken to over 100 station owners. I found that  
19 it's closer to about 50 percent are willing to listen to  
20 what I have to say, that's not bad. After that, I  
21 figure about 20 percent of those are willing to  
22 consider. So I would have to say it really is on an  
23 individual basis. A lot of these guys are not happy  
24 with the oil company overload. They really just don't  
25 like being bullied around and pushed around, which is

1 what it is, and they end up taking the heat from the  
2 customer around gas prices. So they're willing to  
3 consider something, as long as they don't end up being  
4 in the same situation that they are in with the oil  
5 companies, all right, where they have control over their  
6 prices, they have control over how they do business, and  
7 that's really what I think the case comes down to. So,  
8 yeah, the oil companies are not interested in doing it  
9 and that's probably a reason, I mean, let's face it,  
10 what did what's his name say -- with Valero Oil -- "You  
11 want us to fund our own demise?" Well, I thank them for  
12 that compliment that our plan is going to eliminate  
13 petroleum in such a short time, that they don't want to  
14 participate. Fine, don't participate. We can do it,  
15 then you'll end up having to come to us later, all  
16 right? Which I'm perfectly happy to deal with and I  
17 think that most of us should be, right? Because they  
18 will come eventually, they'll have to, or they'll lose  
19 business, it's as simple as that. So I don't see the  
20 problem with dealing with individual gas station owners,  
21 it's like herding cats, but it's attractive, I think.  
22 Thank you.

23 MS. BARONAS: Thank you very much, Mr.  
24 Staples. I'd like to open it up to the people in the  
25 room, and if any of the other presenters have comments

1 and questions for this set of panelists. Please.

2 MR. SLEIMAN: This is Ghassan Sleiman from  
3 Hydrogenics, USA. And we operate stations for a  
4 multitude of OEMs in the California region. My question  
5 is to Tim. Tim, that six-minute model in Santa Monica,  
6 is that in traffic or outside of traffic?

7 DR. BROWN: Yeah, the six minutes is actually  
8 without traffic, it's a free flow travel, same as I  
9 think what Mike was using. And so, certainly, when we  
10 say six minutes in Santa Monica during rush hour, it's  
11 not really six minutes. But we justify that by saying  
12 that our four minute travel time for gasoline is also  
13 not really in traffic, so our baseline of four minutes  
14 for gasoline is free flow travel patterns, not  
15 accounting for traffic, so our goal of hydrogen six  
16 minutes is under the same conditions. To calculate the  
17 travel time with traffic patterns, of course, it varies  
18 by the time of day and region. I mean, it's very  
19 important, but I think we capture that in Santa Monica,  
20 for example, where you see the station density there is  
21 a little higher than in some of the other regions. So  
22 our baseline of gasoline and our solution of hydrogen  
23 are under the same conditions.

24 MR. SLEIMAN: Okay. One of the issues is that  
25 we operate, you know, a multitude -- again, lots of

1 stations, and one of the problems that we find is that  
2 every hydrogen station has maybe one pump, while a  
3 gasoline station has five, six, seven pumps. And when a  
4 station goes down, you know, the guy who makes a lot of  
5 money comes up, can't find hydrogen, and does not want  
6 to drive 10 minutes to the next station. So the six  
7 minutes, I would like you to consider maybe having them,  
8 yes, adjacent to each other, two stations at the same  
9 corner. That way, we don't get to that situation. And  
10 every OEM will have a technology issue at one point, so  
11 if you locate the same technology at each corner, and  
12 there's a problem with that technology, then that whole  
13 region is not going to be serviced. That's the comment  
14 that I wanted to make to CEC.

15 DR. BROWN: Is it all right if I just follow-  
16 up on that? We operate a station in Irvine and it's  
17 really, until recently, it was the only station in the  
18 area and if we ever have any issues, and the OEMs will  
19 attest, it's a major hurdle for them. So I agree that  
20 the liability and redundancy needs to be built in to  
21 some extent.

22 MR. SLEIMAN: Yeah, and recently a new station  
23 was built next to your station and that's going to  
24 alleviate the pressure off your station.

25 DR. BROWN: You're involved in that one,

1 correct?

2 MR. SLEIMAN: Yes.

3 DR. BROWN: So we're competitors, then. I'm  
4 only joking because we used to claim that our station  
5 was the most heavily used in the world, which I believe  
6 it was, but probably not for long.

7 MR. SLEIMAN: Yeah, you're probably right.  
8 Thank you.

9 MS. BARONAS: Please, Joan.

10 MS. OGDEN: Hi. This is Joan Ogden with U.C.  
11 Davis. And I just wanted to make a comment, sort of  
12 following along with what the last speaker said, and  
13 this is based on a study that we did at U.C. Davis with  
14 a lot of input from some of the auto companies and the  
15 oil companies, about two or three years ago. And one of  
16 the biggest siting of things that everybody desired was,  
17 in a given cluster area, let's say a city area like  
18 Irvine, or some of the other areas that have been  
19 identified by the partnership surveys, you really want  
20 to have more than one station, so you want to have two  
21 and maybe three for this redundancy reason and backup  
22 reason. That being said, I think there's a balance  
23 also, how many stations you want to put in a cluster,  
24 and it really has to do with what kind of travel time  
25 metric you choose, and I think there's an interesting



1 contrast between the Irvine studies, the Davis studies  
2 there, and that the Irvine studies were looking for a  
3 maximum travel time, if I understand it right, Tim, and  
4 correct me if I'm not, and didn't want anybody to have  
5 to travel more than, you know, the number you choose --  
6 six minutes. In the Davis studies, we took an average  
7 travel time, so the philosophy there was that, within a  
8 cluster, you have enough stations there, you know, two  
9 or three for redundancy, but then you have a travel time  
10 where you look at an average travel time, some folks  
11 live a little further away from a station and some  
12 closer, so if you have an average of three minutes, some  
13 people travel one minute, some travel five, kind of like  
14 what we might have more with gasoline. So I think  
15 there's no one definitive answer, but that's something  
16 to weigh as to how many stations to put in one area  
17 versus branching out into other clusters, you know, say  
18 filling in more of those pieces on the map that showed  
19 the dark red, you know, that were good possible early  
20 adopter sites. So I think that's something to look at.  
21 Interestingly, too, although Mike was really focused on  
22 what the underlying reasons were for why consumers would  
23 choose fuel cells, and so on, I think the other thing  
24 that is interesting is we came out with two sort of  
25 differing sets of assumptions in the Irvine model and

1 our model with roughly the same number of stations  
2 statewide that would be required for what, in judgment  
3 and in consult with lots of different groups, came out  
4 to be a reasonable travel time. Thanks.

5 MS. BARONAS: Please, sir.

6 MR. ELLIS: Steve Ellis with American Honda.  
7 So two brief comments, one, definitely, Michael, I  
8 appreciate your bottom line and that is one station  
9 equals two. For years, I've been saying one station  
10 doesn't make a market, and yet we've had to live with  
11 that, just as John mentioned and you've acknowledged.  
12 But also, I'd like to clarify something based on an  
13 earlier comment I made to Damian and that you, Michael,  
14 had referenced, and that is I think there was confusion  
15 in my comment about hybrids, NTVs and plug-in vehicles.  
16 My emphasis on that point was on the use patterns, not  
17 as to whether these are potential market customers for  
18 the vehicles. So, to be very clear, absolutely I  
19 believe that these are potential customers for hydrogen  
20 fuel cell vehicles, but the use patterns are  
21 significantly different and my concern there was, if  
22 this were studied, as was mentioned, it has the  
23 potential to lead astray as it relates to the siting of  
24 the stations, that was my key point. I just wanted to  
25 be very clear on that.

1 MS. BARONAS: Alex.

2 MR. KEROS: Alex with GM. And this actually  
3 sort of touches Jim, on your sort of precision point.  
4 And one, a huge compliment to the work that Davis and  
5 Irvine do, it really sets the fundamental stage of how  
6 to look at this issue. And Joan is spot on, it's  
7 amazing every time we study this issue, we sort of land  
8 ourselves at the same answer. So it's nice to feel  
9 comfortable that we're all getting to the same location.  
10 And we've talked about this, but average time to a  
11 station with traffic, not free flowing, these are all  
12 really important factors as a tool in the process, and I  
13 will use the 405 and Santa Monica Blvd. intersection,  
14 and if anybody in this room is going to work on hydrogen  
15 station siting, that's the intersection to go to, to  
16 understand the precision question because if we lent  
17 ourselves specifically to the models, we would find a  
18 completely different answer than if we went there. And  
19 anybody knows that's -- I've got to watch my words,  
20 right -- nobody crosses that 405 line, people going  
21 west, people going east on Santa Monica Blvd., you seem  
22 to be pulled into a whirlpool of waiting to get to the  
23 freeway forever, it's frustrating, customers are getting  
24 to the freeway and then getting on a freeway that's  
25 already congested. You see all of these issues. And I

1 think if we were talking average time, or maximum time,  
2 we might site the stations differently. But if you were  
3 to ask somebody like me at the highest level, where do  
4 you want stations, I want one station on one side of the  
5 freeway and I want one station on the other side of the  
6 freeway. That would not be maximizing anything, and it  
7 wouldn't be optimizing anything, and so a lot of -- just  
8 a reminder, and we've heard this a couple times, is the  
9 siting of the station and the tools that we can use with  
10 Davis and Irvine are really important, but understanding  
11 those idiosyncrasies of a specific site location really  
12 helps. And I think, to date, what's happened is the  
13 OEMs have acted as the proxy to that analysis and taking  
14 it quite seriously, and perhaps we can explore today how  
15 is it not just the OEMs, it's others, and how do we pull  
16 these tools into the long term planning and short term  
17 planning.

18 DR. NICHOLAS: I appreciate your comments,  
19 Alex and, yeah, you're right to a certain degree, but  
20 also, it's kind of like Yogi Berra said, "It's so  
21 crowded, nobody goes there anymore," so obviously some  
22 people are going there if it's so crowded, so it's going  
23 to be passing on somebody's route. But if that were  
24 your only station, yeah, that might be a good thing to  
25 look at because if you were forced to go there, that's

1 different than, you know, you may be forced for another  
2 reason, but every time you wanted to refuel, it could  
3 get grating. So some more analysis would need to be  
4 done exactly where people refuel in Santa Monica, and  
5 then, yeah, adjusting the models for slower travel time,  
6 you can potentially address some of those things, but  
7 maybe your comments are more towards like on-the-ground  
8 is extremely important, which I wholeheartedly agree,  
9 and you have to look at these sites, you can't just  
10 depend on the models, but they can give some guidance.

11 MS. BARONAS: Do you think you had a chance to  
12 respond to the other --

13 DR. NICHOLAS: Oh, I don't know if what Steve  
14 was getting at as far as like -- are you talking about  
15 siting of electric vehicle infrastructure versus  
16 hydrogen?

17 MR. ELLIS: No, it's just the simple -- I had  
18 made a comment to Damian in reference to his comments  
19 about studying the use patterns of certain vehicle type  
20 drivers and what he had identified was hybrids, NTVs,  
21 and plug-in electric vehicles. Yet his response and  
22 then your comment made reference to whether these are  
23 potential buyers for fuel cell electric vehicles, so I  
24 think that's where the disconnect occurred. So I simply  
25 wanted to clarify that I absolutely acknowledge that

1 these are potential buyers for the cars, but that  
2 studying their use patterns can lead maybe astray simply  
3 because the use patterns of those three vehicle types  
4 are significantly different. The last point I did make  
5 to Damian, and I think this is a point that we all have  
6 to consider, and that is that there is this external  
7 factor of the HOV sticker that has a significant bearing  
8 on the usage of those vehicles, and we've seen that as  
9 one class of vehicle lost the use of that sticker, which  
10 caused people's actions to shift, so this is an  
11 important point. And, again, I want to keep the  
12 emphasis on as it relates to the siting of stations.

13 DR. NICHOLAS: And I think that goes to the  
14 marketability where that gap can be made up by the HOV  
15 sticker because it's worth less because you have fewer  
16 stations, but there's another part of the value so you  
17 could potentially add that to the marketability, and  
18 then that's one factor along with station location.

19 MS. BARONAS: Thank you, everyone. That was  
20 very informative and, Jim, do you have a question?  
21 Comments? Okay, go ahead.

22 MR. MCKINNEY: Yes, ma'am, may I please?

23 MS. BARONAS: Yes, sir.

24 MR. MCKINNEY: This is great, this is why we  
25 hired you, Jean, so thank you for being a great

1 moderator. So one of the things that the Commission  
2 wanted to better understand with this morning's  
3 presentations, and specifically with the modeling work  
4 that has been presented by both U.C. Irvine and U.C.  
5 Davis, so one of the things we're exploring is the  
6 utility of these tools to help us make kind of our final  
7 decisions, ultimate decisions as we go forward, and so  
8 one of the things that I'm trying to understand and  
9 another theme here, is how do we get the OEM input, the  
10 OEM confidential market data, all that experience, how  
11 do we get that input into our process. So historically,  
12 and I think this started with ARB, I don't know if South  
13 Coast did this, as well, but it was the latter from the  
14 OEMs that really served to convey that communication,  
15 those preferences, those rankings. And one of the  
16 things that I'd like to understand better, both Tim and  
17 Mike and Joan, is how might the STREET model, or the  
18 U.C. Davis modeling work, you know, serve as an  
19 alternative approach or as a proxy, or another means of  
20 kind of combining all the great demographic data, the  
21 traffic data, with the market survey results and the  
22 preferences from the different kind of customer classes,  
23 from the automakers, how might those tools serve that  
24 function?

25 DR. BROWN: I think we're well-positioned to

1 serve that function, as I mentioned, we're working  
2 closely with the automakers and it's a bit like herding  
3 cats, but we've done our best and I think there's a  
4 level of trust there between our modeling as a tool that  
5 helps the automakers, it provides a nice baseline for  
6 them, as well as we very much appreciate their feedback  
7 and input. And through that, we've developed this plan,  
8 which I think is pretty robust and pretty well accepted  
9 by the automakers and stakeholders, it provides a nice  
10 foundation for where these stations need to go and how  
11 they roll out. So I think that's sort of in place  
12 already. Whether that becomes part of a solicitation  
13 and takes the place of OEM support letters, I'm not sure  
14 that answer is clear, if OEMs would want to sort of give  
15 up that opportunity to participate themselves, but, if  
16 so, I think we work well as a group. The other part  
17 would be, in our ability to help evaluate sites that  
18 were proposed, and I think we can do that to some  
19 extent, certainly location is one criteria and it's sort  
20 of a go, no go criteria, as long as it's in the right  
21 location, that moves it to the next point of evaluation,  
22 and I can see us giving some sort of scoring criteria  
23 based on location of one location vs. another, but it  
24 would be difficult to make that the sole selection, it  
25 would be silly to do that. Certainly, if there's a site



1 one way on a freeway intersection, and another way on a  
2 freeway, one will be nominally better than another based  
3 solely on geography, but then you have to move on to all  
4 the other considerations, you know, cost, performance,  
5 experience, and trust of the project team, those sort of  
6 things. So I think we -- the street modeling and the  
7 collaboration we've built, could be a nice input to the  
8 proposal process, as well as perhaps part of the  
9 proposal evaluation. But as far as taking the place of  
10 OEM support letters, I'm not sure that's something I  
11 could make the decision on.

12 DR. NICHOLAS: Yeah, I would just add that we  
13 do a lot of work with the automakers, as well, and have  
14 worked on the hydrogen projects in the past, and so,  
15 yeah, their input is always extremely valuable because  
16 there are some of these intangibles that you can get  
17 through automaker input that you can't get through  
18 modeling, and so I think it's good to involve that in  
19 the modeling, as far as a proxy, it still seems  
20 important to get kind of more a direct connection  
21 instead of having this -- so it can help with the  
22 modeling, all the input, but also a more direct  
23 connection between, okay, this is good, this is good, in  
24 the process, is I think a fairly effective idea and, so,  
25 as far as substituting one for the other, I'm not sure -

1 - so, if there is value in just a more direct interface.

2 That's my opinion. Joan?

3 MS. OGDEN: Maybe I'll just add a couple of  
4 comments, too. I think that the modeling, the modeling  
5 that we're doing and the modeling that UCI is doing,  
6 gives some really interesting kind of first cut ideas at  
7 where stations might be placed, do you want a cluster,  
8 how many do you want to put, how many connectors do you  
9 need? We look at a lot of questions like that and get a  
10 pretty good idea what ballpark we're in, and then it  
11 really does get to, I think, more what's on the ground  
12 and understanding what those possibilities are.

13 One other thing I think where Davis could help  
14 with some of that, too, is sort of -- and we've been  
15 interacting with the Fuel Cell Partnership as they've  
16 done the Roadmap, is looking at over time, as you build  
17 more stations, and you go from an initial concern, more  
18 with coverage, you know, having enough out there so the  
19 first people who buy the cars to capacity, where you're  
20 getting up to 30,000, 50,000 vehicles and more, at that  
21 point you're starting to look at fairly larger stations  
22 and, so, I think there looking at the ground becomes  
23 even more important if you're putting a larger station,  
24 perhaps, rather than a single pump in an existing  
25 station or something. So that's certainly -- we've done

1 a lot of looking at that, and looking in addition to the  
2 station siting, I think the economics starts to become a  
3 part of that, too, you know, a question like do you want  
4 to build more smaller stations, or do you want to build  
5 fewer larger stations, which may give you a lower cost  
6 to hydrogen. So I think we can help with some of that.

7 MR. ELRICK: If I can, Bill Elrick, California  
8 Fuel Cell Partnership. I think to the question of the  
9 U.C. presentations and what they can do, and Joan just  
10 said it, the U.C. research models, etc., provide one of  
11 the first funnels to probably the PON development side,  
12 and this afternoon we'll talk about the Roadmap, which I  
13 hope might be another tool on developing where the PON  
14 should start to point people, and that's the first  
15 funneling of information. And I think you have a lot of  
16 that information, it's out there, it's public, it's  
17 refined constantly to get better and better every year.  
18 Going a step further than that, I think something that  
19 Matt at AQMD had mentioned, looking at what's next after  
20 solicitations are out and the bids come in, how do you  
21 define the site-by-site preferences? This is where I  
22 think we heard a lot of cautionary information of it's  
23 an accuracy versus precision discussion because some of  
24 this will be a balancing effect of many different  
25 criteria, and I think it will be and hopefully the OEMs

1 will speak to this later, but important maybe to  
2 consider, instead of the letter writing rule that  
3 they've had in the past, which puts them in the front,  
4 but not seeing what the proposals actually are, they're  
5 wading through an expectation of what might be coming to  
6 CEC for review, but not an actual review of what's  
7 presented. As far as locations, I think that's a very  
8 good suggestion to look at -- to have them in as part of  
9 that advisory role, to provide that because they each  
10 have a different approach, a different market, different  
11 information, and it's not one, but the collective need  
12 of all of them, and so bringing them in and, you know,  
13 if they're getting their information through these  
14 models in the front end, and it shapes the picture, then  
15 in having them on the back end is a way to provide more  
16 specific input and, as you get to that point, I think it  
17 will be very valuable and I would just suggest looking  
18 at that.

19 MS. BARONAS: I precede you. Okay. He's my  
20 boss, I just wanted to point that out. Okay --

21 MR. STAPLES: May I have one more statement,  
22 is that possible?

23 MS. BARONAS: Absolutely.

24 MR. STAPLES: And real quick.

25 MS. BARONAS: Okay. Please identify yourself

1 first, though.

2 MR. STAPLES: Absolutely. Paul Staples with  
3 Hydrogen Industries, again. At first, Dr. Woody Clark  
4 is a team member of ours and he made a recommendation,  
5 and I wasn't sure it would work, it might be a problem,  
6 but now that I hear more about this, especially the  
7 permitting agencies being an issue, as well, and getting  
8 these stations out, it might not be a bad idea to bring  
9 the communities in. If you can get them to get past the  
10 nimby attitudes -- okay -- or, "give it to me and not to  
11 them" -- and get them to play a role, I think that might  
12 pave the way for permitting a lot easier, if they were  
13 in the process, involved in the process of selecting  
14 locations. Because they have a lot more local  
15 knowledge, as well, as to the area that they can bring  
16 to bear to make this case. So I have to think that  
17 maybe that wasn't a bad idea, he's a lot smarter than I  
18 thought he was and, of course, I know he's very smart,  
19 but I do think that that might make things a little bit  
20 easier if you can get past that nimby attitude of a  
21 local community and think on a statewide basis, as well,  
22 I think you'd do a lot better with the permitting if  
23 they're involved in the process.

24 MS. BARONAS: Thank you very much for your  
25 comments. And so, to keep on schedule, I'd like to

1 conclude this session and turn this over to Jim  
2 McKinney. He's going to give us a wrap-up of the entire  
3 morning. Thank you.

4 MR. MCKINNEY: Well, I guess first I'd like to  
5 be a little self-congratulatory and also a bit  
6 apologetic, this is the kind of interactive dialogue  
7 that we were seeking, and I'm really pleased with that  
8 and just thank you so much to everybody who has  
9 presented thus far and those of you who are going to  
10 present this afternoon. This is the format we use for  
11 our Advisory Committee, and we find it serves us very  
12 well. So I deeply deeply appreciate everybody's input  
13 this morning, so far.

14 And to try to summarize some of the themes  
15 that I've seen today, I think one is, you know, you  
16 guys, Energy Commission, don't start from scratch.  
17 There's tremendous knowledge, experience, expertise,  
18 capacities out there in the private sector, the  
19 government sector, and the academic sectors, so really  
20 leverage that existing information, build on the good  
21 work that's been done, and perhaps read in between the  
22 lines, you know, fine tune as appropriate going forward.  
23 And so, again, I think some of this is great refreshers  
24 in terms of the clusters, the demographics, the sales  
25 projection data, the work of the partnership and the

1 Roadmap, and the real world stuff; so, Matt, I really  
2 appreciate, I think, both you and Damian bringing in  
3 kind of those on-the-ground real world considerations,  
4 whether it's in terms of permitting, or local traffic  
5 patterns, or just local regional expertise.

6           One of the things that struck me was the  
7 suggestions from many parties about expanding the  
8 network of advisors and, again, I think we're doing  
9 that, getting a good first start at that today, but some  
10 configuration, some variation on the technical advisory  
11 committee, so I think both Paul Staples, Matt Miyasato,  
12 several have raised some version of this concept of  
13 bringing in more parties to advise us as we go forward.

14           And, again, I think Matt and John Shears and  
15 some others have said very clearly, you know, don't  
16 forget the station operators; we don't, we think about  
17 them often and, again, we'll hear from them later today  
18 and that's both the station developers and operators.

19           And you know, this kind of leads me to some of  
20 the tensions or the challenges that we face here, so one  
21 is kind of the tension between coverage and the  
22 economics of station viability. So I've heard, you  
23 know, I think both kind of the academic groups and maybe  
24 the car companies say, you know, coverage is key,  
25 coverage is great, the more station that you can get the

1 better, the more stations you can early the better. And  
2 then there's the hard reality of economic viability and  
3 how many stations can a given locale support. You know,  
4 we're funding up to 70 percent of capital costs due to  
5 some, I think, well reasoned asks from some part of the  
6 station developer community, and work that we've seen  
7 from the partnership, we've started to contribute some  
8 O&M funding, contributions to this, and I think that's  
9 an economic reality and I really want to hear more about  
10 this from the station operators and developers as we get  
11 into this. So it's not a new theme, it's not a new  
12 tension, but I think it's really one that we have to be  
13 mindful of going forward.

14           And kind of in concert with that, you know,  
15 when I learned Economics in school, I mean, you kind of  
16 have these perfect assumptions, you have perfect  
17 markets, you have sellers, and you have purchasers, so  
18 in this case we actually have two groups of sellers, we  
19 have station developers who have to develop a station  
20 and then sell a fuel product, we have the car companies  
21 who have to develop a product that people are going to  
22 want to buy, sell that, and then we have the consumers  
23 who are going to buy both the fuel and the vehicle, and  
24 hopefully live happily ever after in their high  
25 performing, low pollution emitting vehicles. And so,



1 again, that's kind of perfect economic theory and we  
2 have to work in with that, you know, academic modeling,  
3 and again, kind of our government decision process. And  
4 kind of going back to the notion of your kind of  
5 multiple advisors, maybe we can have the OEMs and some  
6 others advise us kind of before and after. Government  
7 does have a role here because there's so much government  
8 money at stake and it's just critical that we invest  
9 that as wisely and efficiently as possible, so we really  
10 don't want stranded assets, we don't want to fund a  
11 station that would be under-performing primarily because  
12 of the opportunity costs, you know, if we had put that  
13 money someplace else, had a higher performing station,  
14 that would have been a more efficient use of these scare  
15 public monies.

16 Part of the challenge for us internally is  
17 that what our Attorneys want and our Grant Officers  
18 want, is to get everything in the front door in a  
19 beautifully written proposal, and then just shut the  
20 door and cease all communication with that, so that's  
21 another tension that we have to work through internally  
22 as we look at some of the, I think, very interesting  
23 suggestions from some parties on how we might improve  
24 our process.

25 So I think that's all I have to say. I don't

1 know, Jean, would you like to add anything?

2 MS. BARONAS: Yes, I would just want to  
3 comment about internal, time is also of the essence, and  
4 we have timeframes whereby we have to make the decisions  
5 and, I think, I mean, I as a Manager feel this a lot,  
6 and so the question becomes, so how do you maybe write a  
7 new process like Matt is talking about, and many of you,  
8 but then remember that, you know, we have deadlines for  
9 the expenditures and investments, and so that's a real  
10 part of our world, so please be mindful of that as we  
11 talk more. Thank you. And, Matt, do you have --

12 DR. MIYASATO: I do, thank you. Matt  
13 Miyasato, South Coast AQMD. I want to clarify my  
14 comments. I was not suggesting that the CEC increase  
15 the bureaucracy by making formal advisory groups, my  
16 comment was really in terms of reviewing the proposals,  
17 that it's a technical advisory ad hoc group that comes  
18 together to help the Energy Commission score the  
19 proposals. So that's one comment, so I'm not suggesting  
20 making up an MSRC technical advisory group, or a larger  
21 more bureaucratic process, quite the contrary. I want  
22 you to streamline it so you can get through it quickly  
23 and put stations in the ground.

24 The second comment is, I think I just want to  
25 echo what Joan said, and Bill, and others, you use the

1 tools that are available to make your judgments, but  
2 don't put the judgments in the hands of the tools, so  
3 don't give away your flexibility to award stations based  
4 on the viability of the other components of the  
5 proposal, that is cost-effectiveness, the proponents,  
6 the station operators, all of those things are very  
7 important. So, for example, I kept thinking you get two  
8 proposals and, gee, one is seven minutes away, free  
9 flowing traffic time, we're not going to consider that,  
10 right? So you need to consider other things besides  
11 these metrics that are being suggested, so that's just  
12 one part of your toolkit, don't hang your hat on just  
13 one simple -- some metric -- because there's other  
14 factors involved.

15 MR. STAPLES: Thank you.

16 MS. BARONAS: Jim, go ahead, please.

17 MR. MCKINNEY: Yeah, thanks for that, Matt.  
18 That's a good reminder. Yeah, and I think the last  
19 thing that I am thinking about there at this phase is  
20 going back to what Alex said about, you know, be careful  
21 about how we prioritize and we really do want to build  
22 these markets, both in Northern California, Southern  
23 California, and through all the regions; so one thing  
24 that we've kind of kicked around internally, as opposed  
25 to having, you know, one open solicitation, come one,

1    come all, you know, let's let the market develop the  
2    best proposals. Perhaps one thing that we could do is  
3    segregate these by region and say, you know, we're going  
4    to allocate money, whatever the proportion is, I don't  
5    know yet, but that we could allocate money or evaluate  
6    proposals on a regional basis, on a cluster basis, so  
7    that might be another way at getting at the coverage  
8    issue and a good distribution of stations early on. So  
9    I'll just put that out. If you guys think that's  
10   interesting, or too simplistic, just let us know as we  
11   go through the day.

12               MS. BARONAS: Thank you for that. So it's  
13   getting near lunchtime and we have a busy afternoon,  
14   we've allotted one hour for lunch, so would you kindly  
15   be ready to return and to talk at 1:00 p.m.? Thank you.

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

17                       (Reconvene at 1:05 p.m.)

18               MS. BARONAS: Damian and Mr. Staples, are you  
19   both on the WebEx?

20               MR. BREEN: Yes, I am.

21               MS. BARONAS: Okay, thank you very much.

22               MR. STAPLES: Paul Staples is here.

23               MS. BARONAS: Okay, Paul, thank you very much.

24   (Pause) Okay, so if we could get started again, please,  
25   because we have a tight schedule.

1           Hello, this is Jean Baronas. I'd like to call  
2   this session together for the afternoon. Okay, so it  
3   looks like the critical mass is here, so we're going to  
4   get started. And so the afternoon, really, when you  
5   think about it, if you remember what we learned in the  
6   morning and apply it in the afternoon, then maybe at the  
7   end of the day, the next steps will be very very very  
8   meaningful. So please keep in mind next steps at the  
9   end are desired, okay? So if you want to keep a list  
10  of steps and then we can read them out near the end,  
11  that would be great, as we go through this, that would  
12  be very much appreciated.

13           And so, starting out this afternoon with the  
14  presentation by the California Fuel Cell Partnership by  
15  Bill Elrick.

16           MR. ELRICK: Okay. Can you hear me fine on  
17  the microphone?

18           MS. BARONAS: So if WebEx people could please  
19  mute their phones, that would be good. Thank you.

20           MR. ELRICK: Okay, great. The coveted spot of  
21  after lunch. Before I start, I just want to thank the  
22  Energy Commission, the staff, everyone for having this.  
23  I really look at this as the continuum we're constantly  
24  refining and improving the process, and so far I think  
25  we've heard a lot of good things today that just support

1 that ongoing effort. So thank you for having me.

2           To start, the California Fuel Cell Partnership  
3 is 32 organizations working together to commercialize  
4 fuel cell vehicles and hydrogen infrastructure. We work  
5 together on the important activities that we can better  
6 accomplish as a group, instead of as individuals alone.  
7 Some of these activities, to build a market, include  
8 first responder training, technical interface evaluation  
9 such as HVAS, coordinating with National Labs and  
10 Universities, community outreach, and planning a  
11 coordinated deployment of vehicles and stations. So our  
12 members have placed nearly 500 fuel cell vehicles in  
13 California with over 200 of these on the road today.  
14 These vehicles are used regularly, every day by  
15 customers for business and personal travel. They fuel  
16 at about eight public hydrogen stations and, while there  
17 are more hydrogen stations than this in California, just  
18 referencing those that we consider publicly accessible  
19 to all drivers, and provide a retail experience. In  
20 addition, 14 new stations are currently under  
21 development in California, co-funded by CEC, ARB and  
22 others, which will result in about 20 stations, public  
23 hydrogen stations, by late next year.

24           So we saw this earlier, these are the results  
25 of the automaker fuel cell vehicle survey conducted just

1 a couple years ago, the results indicate the automakers  
2 plan to significantly increase production between 2015  
3 and 2017, which is consistent with the announcements  
4 made by several of the automakers here in the room, and  
5 we'll hear more about this later.

6           The question is, how many stations is enough  
7 to launch the market for fuel cell vehicles? The Fuel  
8 Cell Partnership recently published -- or previously  
9 published -- an action plan in which we identified the  
10 early market communities, we saw these, Orange County,  
11 Santa Monica, West L.A., San Francisco Bay Area, etc.,  
12 and you can see that the stations that are open or in  
13 development are starting to fill in these clusters.  
14 Over the past two years, the partnership has worked to  
15 develop a Roadmap that goes beyond these first clusters,  
16 and describes a statewide network that will give  
17 customers the confidence they need to purchase or lease  
18 the fuel cell vehicle, knowing that they can use these  
19 in the same way they use the regular car today.

20           Our members brought over 10 years of  
21 experience placing cars with customers and building and  
22 operating hydrogen stations in California to this  
23 discussion. Automakers also brought their proprietary  
24 customer marketing information, we consulted with  
25 network development experts at U.C. Davis; over the past

1 years, the automakers have engaged U.C. Irvine and its  
2 STREET model to more closely examine those clusters, to  
3 determine the number of stations necessary to ensure the  
4 proper coverage for customers within these communities.

5           So, what we've learned. Over a decade of  
6 deploying vehicles in station demonstration programs and  
7 studying other fuels like natural gas, we learned a few  
8 things about how and when people want to fuel. First,  
9 we know that people will not buy these cars until the  
10 stations are available. This should end the chicken and  
11 egg discussion; we know the stations need to come first.

12           Thanks to the work by U.C. Davis, as well as  
13 the OEMs' own market information, we know that people  
14 tend to fill their cars near their home and near their  
15 work, but that's not enough. They also want to know  
16 that they can get fuel in the places that they like to  
17 visit and, as we heard, destinations. We know that the  
18 stations must be customer friendly, that means well lit,  
19 under the canopy, easy to operate, and not filling the  
20 family sedan next to a transit bus or a garbage truck.  
21 And, thanks to modeling from U.C. Irvine, we know that  
22 six minutes is the maximum time that people consider it  
23 convenient for traveling within those clusters. This  
24 combined research gives us a good idea where these  
25 stations need to launch within the commercial market.



1           Earlier, we heard some of these details that  
2   helped define the robust network of hydrogen stations  
3   needed within each cluster by the number and the  
4   location of fueling opportunities. Each station added  
5   to the cluster reduces travel time and improves  
6   accessibility to stations, as described earlier by UCI,  
7   and by focusing on the initial market needs; or, on the  
8   left side of the tipping point, provides the greatest  
9   return on this public investment. The Roadmap outlines  
10  the path to reach this tipping point to enable us to  
11  move towards the right in a full commercial market.

12           So to reach this tipping point, the Roadmap  
13  identifies the need for 68 stations statewide, with most  
14  of them in the identified five early market clusters.  
15  Thanks to State funding through the CEC in the previous  
16  PON, as well as AQMD, ARB and others, many more public  
17  access stations are in the works. Along with these  
18  existing stations, the AB 118 funding being discussed  
19  today should get us nearly half the stations needed, as  
20  Jim pointed out in the opening. It's very good  
21  progress, but this still leaves a station deficit to our  
22  goal of 68 stations by the beginning of 2016.

23           So the initial network. This map, thanks to  
24  UCI STREET, Tim and their work, the modeling program  
25  presented earlier shows the optimal areas for the

1 initial hydrogen station network in California. It  
2 provides fuel for the first 20,000 fuel cell vehicle  
3 customers into five urban areas, with some redundancy in  
4 those clusters. It puts stations in connector areas  
5 that are also the seeds for the next clusters, and it  
6 provides stations in popular destinations like Tahoe and  
7 Santa Barbara, which will also likely prove to be early  
8 adopter communities.

9           Our combined research leads to the conclusion  
10 that this network will give customers the confidence to  
11 replace the gasoline vehicle with a fuel cell electric  
12 vehicle.

13           The Roadmap also includes a financial analysis  
14 on how to fund the 68 stations. The funding commitment  
15 is needed to provide confidence to automakers, station  
16 developers, and the customer, that the basic network can  
17 be successfully established and, therefore, continue to  
18 grow into a developed market. The analysis led by EIN  
19 quantifies the funding needed by looking at both a  
20 traditional cost share incentive approach, as well as a  
21 new cash flow model. With both approaches ending in a  
22 similar additional funding needs identification, it  
23 allows us to consider multiple scenarios for successful  
24 funding. The financial analysis also includes operating  
25 and maintenance costs for both the existing and new

1 stations, to keep this network stable as it grows from  
2 an early market position.

3           Now, there is an effort outside of the  
4 California Fuel Cell Partnership to identify the State,  
5 Federal, and private funds to reach the \$65 million  
6 funding goal. Since this effort is outside of the  
7 partnership, I do not have all of the details, but the  
8 current plan includes multiple funding sources. The  
9 idea for support from CEC here in this PON is consistent  
10 with previous Investment Plans, and if you'd like  
11 additional details, then please let me know and I can  
12 make sure that that group contacts you directly.

13           So 68 stations strategically placed in  
14 California will provide the coverage needed to launch  
15 this new vehicle market. It is not defined by the total  
16 capacity needed, as we discussed, to fuel those  
17 vehicles, and this is a departure from what we've been  
18 looking at in the past. Some stations will be used more  
19 than others, but they are all needed to give customers  
20 that confidence in the fueling network. Knowing the  
21 stations are coming, 68 stations also provides OEMs with  
22 enough confidence to forecast commercial volumes with  
23 vehicles, which will build confidence among the station  
24 providers, the equipment suppliers, and the fuel  
25 producers, so the market can begin to grow based on

1 normal business planning and investment.

2           So later today, we'll submit this Roadmap,  
3 we've been working a long time on this, and this is the  
4 first part of our plan, customer acceptance of vehicles  
5 includes the need for these fueling opportunities.  
6 We're also developing White Papers and business  
7 acceptance, financial stability, and meeting the  
8 government goals and regulations. Through this  
9 collaborative effort, the California Fuel Cell  
10 Partnership members will help identify a smooth path  
11 across the bridge to a consumer market. Thank you.

12           MS. BARONAS: Thank you very much, Bill. You  
13 finished early, that's great. So we have 15 minutes now  
14 to run a Q&A session, so if we could think about the  
15 Fuel Cell Partnership presentation within the context of  
16 what we talked about this morning. Let's open it up for  
17 some questions and answers, and let's start first with  
18 the people on WebEx.

19           MR. STAPLES: Paul Staples again, Hydrogen  
20 Industries.

21           MS. BARONAS: Okay, Paul. Go ahead.

22           MR. STAPLES: Yeah. Well, first of all, it's  
23 nice to finally get someone to echo something I've been  
24 saying, which is that, yeah, the stations need to come  
25 first, they always needed to come first, okay? So it's

1 very important to get them out there even before the  
2 rollout happens because, if nothing else, it's public  
3 information, it's public comfort knowing that the  
4 fueling stations are going to be there when the vehicles  
5 do arrive. One of plans I have in mind is to basically  
6 put big signs out there, even before the stations start  
7 breaking ground, put a sign out there saying, "Hydrogen  
8 Fueling Coming Soon." Okay? And that's basically what  
9 needs to be done. Now, for success, though, I think  
10 your estimate of 68 stations is low, really, it is. I  
11 mean, you're going to need more like 100, okay, at  
12 least, for the rollout to be successful, at least 100,  
13 and then of course more coming as the rollout continues.  
14 Because it's all a matter of public awareness, okay? It  
15 really is, and there's nothing more public awareness  
16 than the station being there, saying "we have hydrogen  
17 for sale," okay? And that's going to do a lot for  
18 people to say, "Okay, well, maybe I can buy one of those  
19 fuel cell electric vehicles," okay, "Maybe it would be  
20 worth it to do it," okay? Save some money on a gas  
21 cost, on a cost per mile basis, as well as you have to  
22 keep the environment clean and know that, down the road,  
23 I'm going to have something other than gasoline that I  
24 need to buy, and that's really going to be the key right  
25 there. So certainly I welcome the idea that the

1 stations need to come first, that the chicken and egg  
2 thing is now settled, but also I think you need to  
3 consider readjusting those estimates on how many  
4 stations need to be there by 2015 to be successful. You  
5 need people to know that fueling is coming and fueling  
6 is there, okay? And that's another thing that the State  
7 could possibly do, is to put out more press releases  
8 saying hydrogen fueling stations are coming, they're  
9 planned. Okay? Be ready for it. And the automobile  
10 companies probably should start doing some advertising  
11 right now, as we speak. So that's all I have to say at  
12 this time, I'll have more later.

13 MS. BARONAS: Okay, thank you, Paul, for your  
14 insights and comments. Any other individuals on WebEx  
15 who would like to comment or ask questions of Bill  
16 Elrick? Okay, thank you. In the room, around the  
17 table, are there commenters, questions? Please go  
18 ahead, Tim.

19 DR. BROWN: Yeah, this is Tim Brown. I would  
20 just like to comment on Paul's statements about needing  
21 more than 68 stations. Bill can attest to this, that we  
22 spent hundreds of man hours, probably thousands, on this  
23 research, a number of years to develop the methodology  
24 and well over a year now working with the automakers to  
25 refine these numbers, so I'm curious, Paul, what your

1 assessment of needing more stations -- where that comes  
2 from, we'd all love to have thousands of stations, but  
3 the reality is that we think the 68 number is a very  
4 nice number and what is required. I don't think more  
5 than that is required, initially. And Mike, I don't  
6 know if you have additional things to add along those  
7 lines. I think some of your research would probably say  
8 68 is maybe too many.

9 DR. NICHOLAS: No, I think, well, I think it  
10 goes into the capacity discussion. I think 68 is a good  
11 number and the only thing I'd add is just, or to ask  
12 Bill or suggest in the plan, is just to maintain that  
13 flexibility to, as you place stations, to make  
14 adjustments in your assumptions as things go through,  
15 because I think the number is good, I might even say a  
16 little bit more depending on the size of the station.  
17 But, yeah, I think 68 is a good number, but if you're  
18 looking at perhaps smaller stations initially, then your  
19 number of stations might even go up.

20 MS. BARONAS: Okay, so if I could just assert  
21 myself here and recommend that we wait to hear about the  
22 background of the 100 station number from Mr. Staples  
23 when he has his presentation. Is that okay?

24 DR. BROWN: That's okay.

25 MR. STAPLES: I'll be glad to approach that

1 then.

2 MS. BARONAS: I'm sorry, what did you say?

3 MR. STAPLES: I'll be glad to talk about that  
4 then.

5 MS. BARONAS: Okay, thank you. Any other  
6 questions or comments for Bill Elrick? Please, Joan.

7 MS. OGDEN: Just one question. Bill, great  
8 job, your presentation. I just wanted to confirm that  
9 the 68 number is really looking at getting to that  
10 20,000 stage, right? And what you would need in a  
11 particular year, and then beyond that, of course, if you  
12 had vastly more fuel cells, of course you'd have more  
13 stations?

14 MR. ELRICK: Yes. This is really a pragmatic  
15 approach of using all the best information we have and  
16 being very judicious with the use of public funds, and  
17 the purpose is, yes, 100 stations would be nice, the  
18 automakers may say that's even low by a magnitude, but  
19 we have to be conscious of this balance between what we  
20 have, what we need, and the 68 is really how to launch  
21 that market, it's how to get us to that point where we  
22 can start to move away from public funding, move to a  
23 confidence level that customers are readily lining up  
24 versus more scratching their heads at the beginning.  
25 Sixty-eight is not a magic number, it is through a lot



1 of research and analysis, we will have to learn to  
2 deploy, to learn and adjust each year as we go because  
3 we could be off a little high, we could be off a little  
4 low, it's only in hindsight when we're going to go back  
5 and say what worked or didn't. It is, again, a constant  
6 improvement, but very confident that an awful lot of  
7 experience, time and resources went into get to what we  
8 think is a very pragmatic approach to being able to  
9 launch a successful market.

10 MS. BARONAS: Thank you for that. Yes,  
11 please.

12 MR. SLEIMAN: Ghassan, Hydrogenics USA. Bill,  
13 how many kilograms per day will these 68 produce in  
14 total?

15 MR. ELRICK: So the 68 is not a capacity  
16 discussion, it's really a discussion of coverage to get  
17 the amount of, I'll say, dots on a map that, placed in  
18 the right location, the customers will say yes to  
19 purchasing a vehicle, because right now one of the  
20 things we're learning is, as a potential customer walks  
21 into some of the dealerships and opportunities now to  
22 lease a vehicle, and when they ask -- to Mike's point,  
23 you know, where can I fuel? Can I fuel near my house?  
24 If the answer is yes, the conversation goes on. Can I  
25 fuel where I work? If the answer is yes, it goes on.

1 Can I go to the places I like to go? Tahoe, Santa  
2 Barbara, San Diego, another filter on if they're going  
3 to say yes or no, and so this is really to get to the  
4 point where we can answer for a great majority of people  
5 that will likely be the first adopters, "Yes, yes, and  
6 yes."

7 So, as far as capacity goes, we do look at the  
8 station capacity, we do look at an approach we heard  
9 earlier today which is, you know, some threshold of  
10 minimum capacity stations, but also looking at building  
11 some larger now in the right places, it will support  
12 capacity-wise 20,000 vehicles, maybe a little bit more,  
13 and it's a mix of stations from 100 kilograms to, I  
14 think, 400 kilograms. And as time goes on, we're  
15 looking at building that up, and once we get to the  
16 2015-2016 launch, you know, ever increasing that because  
17 it will quickly switch from a discussion about coverage  
18 and confidence to about capacity and economic sense for  
19 everyone involved.

20 MR. SLEIMAN: So the minimum is 100 or less  
21 per station --

22 MR. ELRICK: As a starting point.

23 MR. SLEIMAN: And when you say "large  
24 stations," you're saying 500? You said those two  
25 things, you said "small" and "large." Can you just give

1 some rough --

2 MR. KEROS: This is Alex with GM and I'll jump  
3 in and cover Bill since Ger and I, we were intimately  
4 involved in creating it, there is a variation -- you  
5 will see in the Roadmap it varies from actually 60  
6 kilograms a day with some of the existing installations  
7 that are going in, all the way up to 500; that is, I  
8 will say, average capacity across the board. Everybody  
9 in this room has to understand, when they read the  
10 Roadmap, there is the flexibility that Mike was talking  
11 about, is built into it.

12 MR. SLEIMAN: And my next question, you  
13 mentioned \$65 million additional funding. Is that from  
14 the CEC? Or is that total funding for --

15 MR. ELRICK: That's new additional funding.  
16 We looked at what now I'll say the \$29.7 as being what  
17 is really committed towards hydrogen now, so the \$65  
18 million is looking to get from where we are now, and we  
19 include that as part of it now, and roughly getting  
20 half-way there, we still have to develop that many more  
21 stations, and so that funding is for new stations and  
22 looking at O&M cost for the existing, recognizing we  
23 don't want to let go of those that are good and keep  
24 going in the years that will be lean at the beginning.

25 MR. SLEIMAN: So in total, how much

1 investment?

2 MR. ELRICK: \$65 million on top of the current  
3 investments, the \$29.7 million in the CEC PON. That's  
4 new monies that haven't been identified yet.

5 MR. SLEIMAN: And that's at some cost share  
6 percentage?

7 MR. ELRICK: Yes. That part is another group,  
8 it's not the Partnership, but looking at trying to  
9 further define -- you know, we've done the analysis to  
10 get to what we think represents the general number  
11 that's needed, and this other group is looking at the  
12 public and private funding, however that mix might  
13 happen.

14 MR. SLEIMAN: Okay, thank you.

15 MS. BARONAS: Thank you. Any other comments  
16 or questions? Anyone in the room? Hearing none, I have  
17 a question. So the 68 station tipping point, how does  
18 redundancy factor into this number?

19 MR. ELRICK: In the clusters, that's a really  
20 big part of it. We recognize that through a number of  
21 different analysis and research that has to be a part of  
22 it. In the emerging markets, the destinations and  
23 locations, there's a little less of that, and again,  
24 you'd want to have more redundancy than that. Some of  
25 those sites are only planned right now, at least in this

1 plan, one site in some of those communities, we really  
2 think redundancy is very important, but at the same  
3 time, if we build redundancy into every station, if  
4 every station becomes two, we would really up the  
5 numbers. So we know there's going to be some time  
6 where, pick a random point on the map, City X that has  
7 only planned on one station, that we want to get a  
8 second on in there, we're only planning for one now, but  
9 we would like to constantly be thinking that, after this  
10 plan starts to take off, we are coming in later with the  
11 second one as consumers start to purchase more cars in  
12 that area, as more people visit that area, redundancy  
13 needs to be built in, but we can't double them up every  
14 time right now.

15 MS. BARONAS: But a certain percentage is  
16 redundant?

17 MR. ELRICK: Oh, all the cluster stations  
18 really kind of involve that redundancy aspect, and so  
19 two-thirds of the stations in there are part of a  
20 redundancy network, at least, and Tim probably can speak  
21 more closely, but I think that's the ballpark.

22 DR. BROWN: That's probably fair, so  
23 redundancy in the clusters, the Berkeley, the South Bay,  
24 the Santa Monica, West L.A., Torrance, and Orange County  
25 regions, but also in some of these what we're calling

1 the new developing clusters, which is San Diego,  
2 Sacramento, San Fernando Valley, Pasadena, those areas  
3 will have redundancy built in, as well.

4 MR. KEROS: There's very few locations without  
5 redundancy, actually. I only think there are a handful.

6 MR. ACHELNIK: This is Gerhard. Redundancy in  
7 this case does not mean they're across the street from  
8 each other, it means they're within some reasonable  
9 travel distance, they might be five miles apart, but  
10 it's conceivable that, if somebody -- if one station is  
11 down, you could drive five miles, so they sort of serve  
12 different home markets, you could say, but they can back  
13 each other up.

14 MS. BARONAS: Thank you for that. So are  
15 there any other questions or comments here? Okay, so  
16 hearing none, let's move on to the next group of  
17 presenters. So we have John Tillman -- and I forgot to  
18 mention, I really don't know how to pronounce you all's  
19 names right, so please speak up if the name is way off  
20 because sometimes I may miss that. But is it John  
21 Tillman? Is that correct? Okay. From Daimler.

22 MR. TILLMAN: First, I just want to say thank  
23 you to the CEC, staff, for putting together this  
24 workshop. It's really important to Mercedes Benz and  
25 Daimler that we have the opportunity to discuss in this

1 forum where everyone can communicate what they're  
2 interested in and what their concerns are. I also want  
3 to say thank you to the previous presenters for actually  
4 making the case that the stations and the cars need to  
5 be where the customers are, those to the customers is  
6 critical, we need to put these stations where the cars  
7 are going to be, and the cars are going to be where the  
8 customers are.

9           It looks like we cut off a little bit of the  
10 presentation on the bottom, so I'll just move forward  
11 with this. Mercedes seems multiple technologies being  
12 necessary to fulfill customer needs and hydrogen fuel  
13 cells are one near term, zero emissions solution, that  
14 meets all of those needs.

15           Mercedes has been working on fuel cell  
16 technology for more than 20 years. The current vehicle  
17 implementations that we have are across all platforms,  
18 light-duty, medium- and heavy-duty. As you can imagine,  
19 we're very vested in fuel cell technologies and their  
20 success. The vehicles shown here are one example of  
21 cars we currently have on the market in California.

22           As of June 2012, we have delivered 44 fuel  
23 cell vehicles to customers with access to only five  
24 stations, however, even with these successful deliveries  
25 we currently have model year 2012 vehicles at select

1 dealerships, which we cannot deliver due to inadequate  
2 infrastructure and fuel. We are therefore disappointed  
3 at the current status of station deployment. Any  
4 further delay only adds to this lack of fuel  
5 availability.

6           This slide indicates in green all the stations  
7 that our customers are currently able to access on a  
8 regular basis. One station, in orange, limited access,  
9 West L.A., Santa Monica, because it only has 250  
10 megapascals of capability, 5000 PSI. Our cars are  
11 capable of 10,000 PSI. The other stations indicated in  
12 yellow are those that we cannot access, even though they  
13 exist, but can't access them for reasons of contract, or  
14 other issues that make us unable to actually give the  
15 customers access to those stations.

16           As of 2010, when we looked at our planning to  
17 bring the vehicles to market, there was an expectation  
18 that there would be, by this point, January 2012, 10  
19 additional stations currently available, and our market  
20 implementation of the fuel cell vehicles such as the  
21 ones that we cannot deliver, is reflective of that  
22 planning expectation.

23           Our current vehicle planning has to take into  
24 account the fuel availability, and that process will be  
25 affected by deficiencies in the station build out.



1 Keeping in mind the 68 station recommendation indicated  
2 by the CEC plan, we're therefore behind already. We --  
3 the 10 stations that we're short is one indication that  
4 we need to be farther along than we are. When we fund  
5 new stations, we also must keep in mind that existing  
6 stations will also need upgrades to handle the growing  
7 customer base. The Santa Monica Station, the 35 MPA, is  
8 an example of this.

9           And on to the specific questions that the CEC  
10 asked us to look at. What is the best station approach  
11 for selecting site locations, defining the optimal  
12 hydrogen station location, and what our recommendations  
13 would be to get our data into the CEC selection process.  
14 This UC Roadmap, the CaFCP Roadmap, identifies hydrogen  
15 station locations which are seen by the industry to have  
16 a very high value. Selecting station sites using these  
17 recommendations is a good starting point, but this  
18 information has been referred to by many other  
19 presenters before. So getting directly into the  
20 questions, specifically, what defines the optimal  
21 hydrogen station location? The ultimate hydrogen  
22 station location is often hard to determine and the  
23 method for determining the optimal location varies with  
24 each location. The process isn't black or white. But  
25 the optimal locations are often not even the same for

1 each OEM. We have a requirement to look at where our  
2 customers are, so we may not pick the same locations  
3 that are optimal for us, but we do believe that having  
4 the stations across a region is very important for our  
5 customers to see the fuel availability. So an open  
6 process where multiple parties and OEMs have input on  
7 the optimal location is critical.

8           The next question the CEC asked us to look at  
9 is how would we recommend getting our market data into  
10 the CEC selection process for the station location.  
11 Keeping with the idea that we're looking forward, not at  
12 the past processes, I won't talk about the past except  
13 to say that an OEM consensus and collaborative process,  
14 and the resulting aggregated market data is a highly  
15 successful way to determine the station locations, you  
16 have our input as part of that process.

17           Now onto the customer expectations. The  
18 customer, as I said before, is key. Regardless of the  
19 process by which station projects are selected, the  
20 stations themselves must meet the expectations of future  
21 fuel cell customers in order to be successful. The  
22 customer is the final metric for the successful  
23 implementation of fuel cell vehicles, therefore, station  
24 placement and usefulness must meet their expected needs.  
25 Thank you.

1 MS. BARONAS: Thank you, John. Alex, General  
2 Motors, Alex Keros.

3 MR. KEROS: Close.

4 MS. BARONAS: What is it, then?

5 MR. KEROS: I say "Ker□s," some people say  
6 Keros.

7 MS. BARONAS: Okay, Ker□s.

8 MR. KEROS: Good afternoon, everybody. So  
9 just real quick to sort of give a little bit of  
10 background and perspective, many of you know personally  
11 that I've been directly involved in the siting of  
12 stations for Project Driveway, which is GM's fleet of  
13 fuel cell vehicles, and I certainly appreciate Mercedes  
14 Benz's situation with trying to put out vehicles and  
15 trying to be successful doing that. And from my own  
16 experience in having to manage that, the stations have  
17 unfortunately been behind the timelines that, for a lack  
18 of a better term, have been promised. GM has actually  
19 had to go out, site, install, operate, and build  
20 stations, so the clear example that most people know  
21 about our experience is the Clean Energy LAX Station.  
22 As John hinted at, as well, we've had to go to some  
23 measures to be able to support our fellow OEMs, to be  
24 able to expand this market in that. So I understand  
25 it's the same across the board. We've also been in this

1 -- just as a reminder for everybody -- and I say GM, but  
2 I know most, if not all the OEMs have been involved in  
3 effectively every hydrogen solicitation since the ARB  
4 solicitations began back in -- maybe it's '07, but that  
5 it began. So there's been -- the word I use, there's an  
6 evolution of the process and that evolution, as I know  
7 below, has been positive, it's been beneficial, and more  
8 importantly, it's been necessary. So the truth of the  
9 matter is, how we've gotten this far to date through the  
10 solicitation process has worked for the most part, and  
11 to suggest that a complete reinvention of the wheel is  
12 necessary is something I'm not sure we would agree with;  
13 but we think tweaks, we think adaptations are going to  
14 happen this round. I'm not naïve to think it's going to  
15 have to happen in future rounds. So, as we work  
16 together through this effort and, as the words I've used  
17 previously, this is a team sport if there ever is one,  
18 and the OEMs can't do it on their own, the government  
19 can't do it on their own, station providers can't do it  
20 on their own, customers can't do it on their own, so we  
21 call really have to work together to make this happen.

22           People have said this, but I'm going to  
23 reiterate it, the Roadmap, the OEM's conversations in  
24 GM's perspective is we do not want to waste the State's  
25 money, bottom line, it does not help us, it doesn't

1 serve our purposes to have a station that is not being  
2 used, it doesn't help us trying to get customers out  
3 there, and it doesn't help us get cars out there, so  
4 anything across the board from ill-timed, to poorly  
5 located, to really under-performing sites, is a concern  
6 and the OEMs are very aware -- GM is very aware of this  
7 every time we lend our support to a particular station.

8           So this being said, and we've talked about it,  
9 so I don't want to reiterate it, but the Roadmap is a  
10 very good collective effort to explain how all of these  
11 pieces come together. It is one tool, and that's a  
12 message we've all said, but it is really one tool in the  
13 toolbox to then make this happen. It establishes the 68  
14 number, it establishes sort of the goals as we move  
15 forward, it reminds us that we need to be flexible as we  
16 do this, and it needs to be an iterative process. So  
17 let's not -- let's use that tool, I think, Jim, you said  
18 it very well, some of the tools are there, let's take  
19 advantage of them to execute and move forward. And the  
20 Roadmap does appreciate the tension between coverage and  
21 utilization, or economic viability. This 68 number, as  
22 you will see when the Roadmap is published here very  
23 soon, is trying to reconcile what our marketing guys  
24 want, which is thousands of stations, as well as what is  
25 necessary for the station providers to give it a good

1 go, if you will, to have the basis of it. There's been  
2 a lot of input on it, it really is the collaboration of  
3 many.

4 I want to explain a little bit of sort of -- I  
5 know we're not looking backwards, but I think it's fair  
6 to say how we sort of walked through this process, and  
7 the Roadmap is another step in the process since the  
8 solicitations began, but a lot of work has been done  
9 over and over again to prioritize. We, GM, and others  
10 have recognized ahead of a PON, ahead of every time we  
11 want to put money out there, how do we work together to  
12 make sure that money is spent efficiently and prudently.  
13 And, really, some of the tools that we've talked about,  
14 the work we've done with Davis, the work we've done with  
15 Irvine, there has been some of these actually blind  
16 surveys that have happened in our process, we've done it  
17 ahead of the PON to make sure that we were prepared  
18 because we didn't know when those dates were coming.  
19 We've done it individually, we've done it  
20 confidentially, as others have pointed -- John pointed  
21 out -- where you sell a Mercedes is not necessarily  
22 where you might sell another vehicle, you know, there's  
23 different perspectives. There's been feedback loops in  
24 that, meaning proprietary data has been given and the  
25 collective information has been provided to us for

1   sanity checks, if you will. And we've worked through  
2   it. And then, we've also worked through this  
3   iteratively, so I would hesitate to recommend a list of,  
4   number one, fund this station, all the way down to  
5   number six, fund this station, we have to make sure the  
6   process is flexible and adaptive each time. GM's data  
7   is in all of this. So when we ask about is the market  
8   data -- how do we get the market data? Market data has  
9   actually been used, it's put into the process, it's both  
10  put in formally in terms of handraiser data to folks  
11  like U.C. Irvine, and it's also put in informally when  
12  we get together and we start reconciling our efforts,  
13  405, good example.

14           Another example, and just for everybody's  
15  benefit, is I live in the other South Bay down in  
16  Torrance and Redondo Beach, and if we're trying to look  
17  at perfection, one might suggest, "Well, put two  
18  stations on PCH, in that area," right ? It's a high  
19  traffic area, it makes the most sense, put them a couple  
20  of miles apart from each other, but I think experience  
21  when you go out there will tell you, well, actually,  
22  Aviation Blvd. is a really high traffic throughput area,  
23  and maybe you want to put one on PCH and maybe one on  
24  Aviation, I don't think the models can rectify that, if  
25  you will, but we can as OEMs and local knowledge when we

1 go out to these sites, do those sort of things, as well  
2 as the group, I mean, this could be a collective effort  
3 if folks do want to participate. So, you know that  
4 model can't pick that corner, I said that previously, I  
5 think we need to remember that there's a lot of  
6 different elements that go into picking a location that  
7 don't just count on the location itself. I think Matt  
8 said that well, this morning, that these pieces all fit  
9 together and they do so in such a way that we get to the  
10 right answer, if you will, or the most appropriate  
11 answer. So my recommendations, GM recommendations,  
12 leverage what's happening already. We've said it, I  
13 appreciate the comment, Jim, let's stay on that track.  
14 Let's sort of take these steps and UCI is a good  
15 example, but there might be other third parties who can  
16 secure some data, do some digestion of the data, analyze  
17 it, and then come back to the OEMs and say, "Hey, how  
18 does this look? Does this make sense?" We have to have  
19 feedback loops in reconciling; if not, you're going to  
20 lose a really good piece of the fidelity of the effort.

21 I think the OEMs need to continue to help on  
22 the corner assessment. Unless we have a better model  
23 out there, I think the best available process for it is  
24 that corner assessment. I think the letters of support  
25 have been one mechanism, I think they've worked to date



1 in terms of the process behind it to make the effort  
2 holistic, if you will, from both what GM believes, as  
3 well as sort of reconciling a next steps. Others have  
4 said it and I'll say it again, I actually think, if the  
5 letters are inappropriate or undesirable, actually maybe  
6 even ahead of it, OEMs as advisors could be a really  
7 good benefit. If there's a clean room that the OEMs  
8 could go into, if you will, and participate in the  
9 evaluation of stations, in such a way that people feel  
10 comfortable, that it's transparent, I think it's  
11 valuable. That's happening right now, but the advisor  
12 role is actually happening to the station provider in  
13 terms of the letter of support. So it's a matter of  
14 where do you want it and who do you want the advice to  
15 go to. Do you want the advice to go to the station  
16 provider? Or do you want the advice to go directly to  
17 the CEC?

18 If nothing else, and we've said it before, I'm  
19 appreciative that this is the type of dialogue that the  
20 CEC wanted, but let's make sure the dialogue continues.  
21 As I said, this is a team sport, absolutely. We are not  
22 going to be successful without each other, so the OEMs,  
23 General Motors, continues to be supportive of one-on-one  
24 meetings with station providers and other stakeholders,  
25 we are absolutely supportive of one-on-one meetings with

1 California agencies, let's keep that dialogue open. If  
2 it needs to be in a workshop forum, let's do it, if we  
3 need -- because there is some sensitive data being  
4 exchanged, then we need to do it in a little bit more of  
5 a clean room, let's do it that way.

6 And I leave it, and we've said it, but  
7 location isn't the only consideration at the end of the  
8 day, and I know we're talking location today, but I  
9 guess I have the microphone and it's important to  
10 remember that all of these pieces fit together, station,  
11 access, performance, and how they relate to a particular  
12 location is going to be important and that's where I'm  
13 saying they have to be systematically reconciled. If  
14 you ask me what does a station look like in a cluster,  
15 I'm going to tell you something slightly different than  
16 a station that might be in Lake Tahoe, so we have to be  
17 able to have some flexibility in the systems, in the  
18 solicitations, so that we support all of those different  
19 perspectives moving forward. Thank you.

20 MS. BARONAS: Thank you, Alex. Steve Ellis  
21 from Honda.

22 MR. ELLIS: Good afternoon. My name is Steve  
23 Ellis. I'm the Manager of Fuel Cell Vehicle Sales and  
24 Marketing for American Honda. And I also want to start  
25 out by thanking CEC leadership and staff for the ongoing

1 good work that's been done over the years, and also, you  
2 know, this opportunity today to provide some valuable  
3 feedback through the process toward improving the PON.  
4 I want to cover a few areas here, one is that from  
5 Honda's standpoint we do have relevant infrastructure  
6 experience, both with the obvious hydrogen fuel cell  
7 electric vehicles, but also with other gaseous fuels  
8 such as our Civic GX natural gas vehicles that we've  
9 been selling in the market since 1998. We learn a lot  
10 through gaseous vehicle experience and interfacing with  
11 the stations, and those providers. It's a dedicated  
12 alternative fuel vehicle, simply meaning it is dependent  
13 and has been dependent on a very limited station  
14 network, but we've been part of the process of helping  
15 that network grow and ease the access for those  
16 customers, and also interfacing with fleets and consumer  
17 markets for that car.

18 On the fuel cell side, we did the first  
19 vehicle deliveries to fleets starting in 2002, literally  
20 under a two-year lease. These were not just loans,  
21 these were people that had to commit to operating these  
22 vehicles. And also, then, what was known then as the  
23 world's first retail customer deliveries, starting in  
24 2005, also under a two-year lease. But that gave us the  
25 confidence to move forward with the next step and that

1 is the FCX Clarity, and I think that's a vehicle that we  
2 went all out with, you could say, to really demonstrate  
3 the value and possibility of an all-electric, zero  
4 emission vehicle, with fast fueling and much greater  
5 range. We also, in doing that, though, had to outreach  
6 to find customers and we did that, hence seeking  
7 handraisers, and that was the first effort of its kind  
8 with fuel cell electric vehicles. We also established  
9 the first fuel cell vehicle dealership network and had  
10 to train those salespeople and service people to  
11 interface with our customers, also the first customer  
12 deliveries from dealerships, and these salespeople have  
13 to answer tough questions for vehicles and a fuel  
14 technology they've never had to do before in their life.  
15 And, again, these were deliveries under a three-year  
16 lease, once again representing our confidence in the  
17 technology.

18           And so what we got from that was real world  
19 retail customer experience and feedback. We're on the  
20 cusp of achieving our fourth year of customers behind  
21 the wheel with these vehicles, so that includes vehicle  
22 satisfaction, the things that you would expect, but more  
23 importantly, maybe hydrogen station interaction from  
24 both a customer convenience standpoint and their own  
25 satisfaction with their experience filling vehicles with

1 hydrogen.

2           And then, as we've heard earlier today in  
3 other presentations, vehicle use and commute patterns  
4 such as their destinations and their driving habits, so  
5 with that relevant experience, when we launched the car  
6 and we first announced -- I should say when we first  
7 announced that we would, we anticipated that the  
8 customers would have access to stations throughout  
9 Southern California, we had identified that as the  
10 market, and that's where we signed -- we told people  
11 that we were looking for handraisers, and that was in  
12 the Los Angeles Southern California market area. But  
13 what we ended up with is what you could call customers  
14 and vehicles chasing stations, so on the day we  
15 delivered our first car, we literally had a single  
16 station in the market, with very low capacity and, for  
17 example, a single dispenser hose, kind of guaranteeing  
18 that if one car was already there, the next person had  
19 to wait. So a lot of lessons were learned, we didn't  
20 have backup, we didn't have redundancy, hence there was  
21 a great risk of failure.

22           So we needed a new model, really what you  
23 would call stations designed for customers and markets.  
24 And to do that, we worked collaboratively through common  
25 goals with, as you've heard earlier again, U.C. Davis,

1 the ITS group, and U.C. Irvine, in what led to the  
2 STREET model, and identified common problems and shared  
3 those with other groups such as the Fuel Cell  
4 Partnership, and even other automakers, and shared  
5 learnings with funders of the station, such as ARB, CEC,  
6 here today, AQMD, and even Department of Energy and  
7 others. Yet, in all of that work, the guiding  
8 principles were to remain technology neutral; you could  
9 say it's too early to lock into a single technology of  
10 station type, to remain vendor, and supplier neutral,  
11 and really to focus on the needs of the customer. So  
12 the results of that, I think, is what we've seen now and  
13 you've seen presentations today, of what's been  
14 developed as a cluster, leading to a regional network,  
15 but also including the need for destinations. So the  
16 Fuel Cell Partnership Roadmap really does encompass all  
17 of that and, again, it really emphasizes the need for  
18 redundancy and backup, and even for destinations and  
19 connectors.

20           So to kind of look forward, this new model for  
21 infrastructure really does need to be a market oriented  
22 station location, it needs to take into consideration  
23 factors such as handraisers that we OEMs collect, market  
24 data, which is often proprietary information, timing of  
25 distance between stations, as we've heard through this

1 research, eventually getting to six minutes or less from  
2 their residents -- and, again, that's good research and  
3 experience that tells us that. But also, market factors  
4 such as income levels, demographic information, even  
5 technology intenders, and I think you all heard me, I  
6 was a little sensitive to a misunderstanding of a  
7 thought about the different vehicle technologies, so  
8 here's kind of that proof, that we recognize that hybrid  
9 electric vehicle drivers today, and CNG drivers, and  
10 battery electric drivers, are potential market customers  
11 for fuel cell electric vehicles, too. We've already  
12 experienced that, you could say. And then we need  
13 market considerations such as the major streets and  
14 thoroughfares, hence the coverage that is so important  
15 to allow a customer to even make that initial purchase  
16 decision, kind of that go, no go point. Customer focus  
17 stations, then, you know, of what's built, what we need  
18 is credit card access 24/7 access, and that's a must.  
19 And we know that today that's challenged by the Codes  
20 and Standards and DMS, but it's not "if," it's "when."  
21 Clean and well lit, easy, ingress and egress, and that  
22 does play to this question of location. Easy user  
23 interface such as pins and screens, multiple hoses and  
24 simultaneous refill capability, plus today, 350 and 700  
25 bar capability, with high quality fuels. And that's the

1 definition of a capacity.

2           So the current PON process that we've been  
3 dealing with and, again, others have said has been a  
4 continuum of improvement, that's the way I portray it to  
5 our Management, and we know that we're part of that  
6 process, and hence that it is basically sound, but  
7 obviously there's an opportunity for annual continuous  
8 improvement. And the Roadmap and those components that  
9 make that Roadmap really can provide additional  
10 guidance.

11           So I'm not going to go through all this, but  
12 there are, of course, certain expectations for stations,  
13 I think this is the kind of work we need to do  
14 collaboratively offline, you might say, but two key  
15 points here are really something that struck me in this  
16 last round of offers that may have been missing and that  
17 is that it's critical that we have multiple dispensers  
18 or at least hoses per station -- and this is critical --  
19 with independent control systems and user interface that  
20 will allow simultaneous use of each hose. We take for  
21 granted that, you know, if we pull up to a gasoline  
22 station, we don't have to wait for any of those other  
23 people to start using that dispenser, yet today that is  
24 the case with many of our stations, and what was  
25 frustrating to me, very frankly, was that we saw



1 proposals that were of, let's say, yesterday's design,  
2 not the design that we need for tomorrow. So that's a  
3 key point that I wanted to cover, and I think the bottom  
4 line here is that frequent consultation with OEMs will  
5 assure that these differences can be ironed out before  
6 construction begins, and that we really do represent the  
7 voice of the customer, and I think that has to be  
8 understood and appreciated.

9           So from a suggestion standpoint, starting with  
10 prioritization of these locations, it's clear that maybe  
11 some gaps exist between what we recommended as OEMs vs.  
12 what the awards provided, and I say it this way -- with  
13 a word that may sound harsh, but I think it represents a  
14 bit of that frustration -- and that is to please heed  
15 the suggestions and definitions in the OEM support  
16 letters. So, for example, when we say primary and  
17 secondary locations, that has to be understood and  
18 reflected in the outcome. And then heed the collective  
19 voice of automakers, hence we are the voice of the  
20 customer and this is one specific example that's really  
21 meaningful to us at Honda, and that is that -- and I'll  
22 put it this way -- that for the second year in a row,  
23 the award has not provided a San Diego either connector  
24 or destination. This is just not -- this is not just a  
25 frivolous request on our behalf, this is the result of

1 asking our customers where should these next stations  
2 be, and where do you want to go? So you know, I'm hard  
3 pressed to think that I might know better than my  
4 customers where they want to go and how they want to use  
5 their cars, and I would ask the same of you.

6           Then, to utilize third-party, and with  
7 apologies to U.C. Davis, this is, for example, UCI with  
8 the STREET "PLUS" model, when I say "PLUS," maybe for  
9 the first time I'm creating a new acronym here, which  
10 could be the Priority Location and Utilization  
11 Selection, hence, if we take STREET and add to it some  
12 additional inputs and values of data, possibly the  
13 output there could be an enhanced STREET model with  
14 consolidated OEM priority.

15           Prioritization of construction, I think this  
16 is really a critical point, and I can't stress enough  
17 that there's an urgency of immediate need that really  
18 does have an impact on our customers. And once again, I  
19 use this term -- to heed the collective voice of us  
20 automakers, and the example being Santa Monica. We  
21 delivered the world's first Clarity to a customer, Santa  
22 Monica, virtually this time four years ago. And to this  
23 day -- to this day -- 100 percent of the customers in  
24 that market have been solely dependent on a single hose  
25 limited capacity station. So you know, we are desperate

1 that, of the stations that have been awarded, we've been  
2 watching these dots on a map -- that's the term I'll use  
3 -- virtually fade in color before the first shovel has  
4 hit the ground for the construction, and that really is  
5 defined as we are one moment from failure in that  
6 market.

7           So in summary, I think a feedback process can  
8 be very valuable and I would ask that you implement a  
9 final check somehow to find a way through a procurement  
10 process, to confirm locations, irrespective of vendors  
11 or technology, that's not the goal here, it's really  
12 about the location and getting it right. And then we  
13 want to make this offer, which is to always question  
14 everything that you don't understand until you do  
15 understand it. And I'll have to add, not to a fault,  
16 not to the point where you're seeking perfection, don't  
17 let that "perfect" get in the way of the good. But at  
18 the same time, it's critical that basic concepts and, at  
19 the end of the day, what the needs of the customer are,  
20 really can be met through your efforts with funding  
21 efficiency. Okay, thank you very much. And I'd just  
22 add that behind this deck of slides are specific the  
23 questions that we were provided, and very specific  
24 answers to each one of those, but I think what I just  
25 covered really does answer those questions. Thank you.

1           MR. BARONAS: Thank you, Stephen. So is an  
2 individual for Hyundai here? No? And on WebEx, is  
3 there a representative from Hyundai here? Okay, hearing  
4 none, we'll move on to Nissan, Lance Atkins. Oh, okay,  
5 I've been asked to re-ask the question because the WebEx  
6 was on mute when I was talking. So, I'd like to ask, is  
7 there an individual from Hyundai Kia on the WebEx who  
8 can give a presentation today? Okay, hearing none, we  
9 will move on to Nissan and Lance Atkins. This is Jean,  
10 is someone trying to address our meeting today? Okay,  
11 thank you. So we will move on with Lance Atkins from  
12 Nissan.

13           MR. ATKINS: Good afternoon. I'm Lance  
14 Atkins, Principal Engineer with Nissan Technical  
15 Center's Zero Emission Research Department. I'm pleased  
16 that the CEC is delving into this arena and collecting  
17 this kind of information today, so I'm happy to provide  
18 a few thoughts and feedback to your questions.

19           So you asked what defines the optimal hydrogen  
20 station location and, quite frankly, from our point of  
21 view, that's the one that meets Nissan's unique  
22 demographics for our brand, the type of vehicle that  
23 we'll sell, the price range that we'll price that  
24 vehicle at, and it's the station network that supports  
25 those Nissan customer behaviors. Fueling -- where and

1 when they want to drive, and importantly, that those are  
2 stations that have customer-friendly performance and  
3 fuel delivery when a customer desires it, and those are  
4 critical issues for the stations that go into that  
5 network.

6 I state this kind of selfishly like this to  
7 point out that we, as individual OEMs, have different  
8 pieces of this puzzle and slightly different interests  
9 in this arena. So that begs the question sort of what's  
10 the best approach for selecting these site locations for  
11 stations, and I think, really, building upon the market-  
12 based approach of using the partnering between the  
13 station providers and the OEMs, which I think DOE first  
14 used in their Tech Val Program in 2003, and it's been  
15 used in the past solicitations here in California, has  
16 been a useful tool to bring us to where we are today in  
17 terms of understanding this as an industry.

18 You probably also want to limit what you need  
19 from individual OEM input, and we've learned in the past  
20 it kind of tends to lead to confusion because, I stated  
21 before, we each have a little bit different set of plans  
22 and priorities as part of this process. However, there  
23 is a tremendous amount of stuff that is very much  
24 available to be used, use the work and the tools that  
25 have been developed in the prior processes via our

1 individual OEM inputs to third parties like CaFCP and UC  
2 Irvine. This is aggregated, the individual OEM  
3 interests, into a single image. It allows us a uniform  
4 voice to speak with about what's needed and perhaps most  
5 importantly for all of us, it allows common areas of  
6 interest amongst the OEMs to be visible, where we can  
7 discuss them as a group, even study them academically,  
8 and it's really that activity that's led to the U.C.  
9 Irvine STREET analysis, and the CaFCP Roadmap.

10 In addition, you really want to foster,  
11 facilitate, and particularly participate in the  
12 communications and discussions that are needed to solve  
13 these site selection issues. Some examples of things  
14 that are continuing to be struggled with and figure out  
15 how to do this the best way possible, how do we  
16 communicate what the network needs, a station in a  
17 region, when there's several individual sites that  
18 providers would like to develop? How do we carry on the  
19 discussion of balancing fuel capacity and station  
20 performance compared to where that particular station is  
21 located in the network, the cost of providing those  
22 items, and the customer values that it provides? How do  
23 we solve our struggle with network development  
24 prioritization? How do we meet best the customer needs  
25 and what they desire, and yet account for the fact that

1 our actual site availability and timing are variable and  
2 changing?

3           So in terms of how the OEM market data fits  
4 into the CEC process, use CaFCP's Roadmap, use STREET to  
5 direct where the station site search is, those tools say  
6 a lot about where we need to find the stations. You may  
7 even want to consider using STREET tool to help evaluate  
8 the viability of those final site locations; just don't  
9 go so far as to try and make final decisions as if  
10 government was an OEM. You're still going to need some  
11 individual OEM group input in selecting those final  
12 viable sites because what our station providers are  
13 going to actually be able to deliver, contracts and  
14 space to install their stations, is probably going to  
15 vary from the academic ideal, and there's going to have  
16 to be some resolution and compromise amongst the  
17 industry for those anomalies, for how do we take what we  
18 have and make the best network possible, because at the  
19 end of the day, what we're all here to do is not create  
20 a miscellaneous collection of stations, we're here to  
21 create a single functional network that allows all of us  
22 OEMs to sell cars and compete with each other in the  
23 market, and gives our station providers a shot at  
24 growing this into a viable profitable business. I think  
25 Alex is absolutely right when he says, "This is a team

1 sport in this activity and there's a lot of iterative  
2 loops and discussions that are necessary for us all to  
3 succeed." So I thank you for your time and attention to  
4 these details. Thank you.

5 MS. BARONAS: Thank you, Lance. Moving on the  
6 agenda, is there a representative from Toyota to present  
7 today?

8 MR. FARNSWORTH: Yes. Good afternoon,  
9 everyone. My name is Jared Farnsworth. I'm an Engineer  
10 with Toyota, and I will be presenting on Toyota's image  
11 for hydrogen infrastructure in California. Now, there  
12 has been some really good discussion so far and a lot of  
13 different ideas that have been brought up, and hopefully  
14 we can add to that.

15 So first, I'm going to begin with some  
16 background on challenges and next steps for fuel cell  
17 vehicles. So Toyota, our target is to start commercial  
18 launch of a sedan-type fuel cell vehicle around 2015,  
19 and in this picture, we show our FCV-R concept, which we  
20 exhibited at the Toyota Motor Show in 2011. And with  
21 developing these vehicles and preparing for this launch,  
22 there's been some challenges that we've achieved, and  
23 some remaining challenges. Now, some challenges that  
24 we've been able to meet are a cruising range of  
25 approximately 800 kilometers. Another key one is



1 hydrogen refueling time of approximately three minutes.  
2 And then, also, low temperatures starting down to minus  
3 30 degrees Celsius. So we're able to achieve the  
4 requirements that our customers need in order to use  
5 these vehicles like they would their normal car.

6           Some remaining challenges are cost reduction,  
7 smaller and lighter vehicles, and the bottom is cut off  
8 there, but it's also fuel cell stack durability  
9 improvement. Now, for Toyota, we are confident that we  
10 can meet these remaining challenges as we prepare for  
11 our commercial launch of fuel cell vehicles in 2015.

12           Some additional background is about the number  
13 of stations that we will need in order to be able to  
14 launch a commercial market in 2015. Now, these figures  
15 were taken from the CaFCP's Hydrogen Infrastructure  
16 Roadmap. Now, there's already been a lot of discussion  
17 today about the background and the work that went into  
18 developing the number of stations that are needed, the  
19 clustering and the specific markets, and the general  
20 location for these stations, but the key point we want  
21 to take away is that we'll need 68 stations, will be  
22 needed by the beginning of 2016. So we've identified  
23 the number that we need, and we've identified the  
24 general locations for the stations, so that's good  
25 process and a lot of hard work and effort went into

1     that.

2                 So this is mentioned by several other speakers  
3     today, is that station performance and access is equally  
4     as important as coverage when we're considering  
5     developing this commercial market. The experience that  
6     the customer has must be consistent with conventional  
7     vehicles. And as Stephen and Alex talked about it, from  
8     a performance perspective, we need to be able to follow  
9     the current best practices for fueling, for example SAE  
10    J2601, and then fuel quality, SAE J2719, so we need to  
11    be able to fuel the vehicles and have confidence in the  
12    quality of the fuel that we use. Second, the stations  
13    need to be scalable up to 500 kilograms per day, average  
14    daily capacity. Now, that may not be the same for all  
15    the stations, especially destination stations or  
16    connector stations, but we need to design that  
17    scalability in order to be flexible as we implement this  
18    infrastructure network.

19                Next is that we need to be able to have peak  
20    consecutive fill rate of 12 vehicles in one hour, so  
21    it's important that, as vehicles pull in, we're not  
22    going to have to wait on the station itself to recover  
23    between fills, it needs to be what a customer would  
24    experience with a normal gasoline station.

25                Another important one for access is that we

1 need to have simultaneous fill capability where each  
2 dispenser nozzle is controlled by a dedicated user  
3 interface, so similar to what a customer's experience is  
4 now when they fuel their gasoline vehicle.

5 And also important is a retail point of sale  
6 transaction and there's one more bullet there that got  
7 cut off, but this is very key, is that there should not  
8 be any access agreements or user contracts in order to  
9 use the station. As some of the OEMs talked about,  
10 they're very limited on where they can fuel because  
11 there's those types of requirements. In this case, we  
12 want consumers to be able to drive up to the station and  
13 use it like they normally would.

14 So that brings us to -- okay, so we've  
15 identified how many stations we need, we've identified  
16 the general regions and locations where those stations  
17 need to be, now we need to look at how do we efficiently  
18 and effectively prioritize where those stations are  
19 built and in that rollout? So, earlier Matt from AQMD  
20 talked about after the PON, after the solicitation, how  
21 do we have a feedback process in getting a better image  
22 of a prioritization, we're also proposing let's look at,  
23 even before we finished the solicitation and process, in  
24 the middle of the solicitation development, we should  
25 have kind of an interactive and formally defined process

1 for prioritizing station locations. And so, in this  
2 image, the idea is that we'd use a third-party such as  
3 U.C. Irvine and their STREET modeling to import data  
4 from the OEMs and market data, then analyze that data  
5 and then aggregate the results to develop a prioritized  
6 station list that then can be fed directly into the  
7 California Energy Commission as they develop their  
8 solicitations. So, by doing this, we're able to improve  
9 the process and make it more efficient at the beginning,  
10 so to give us some clarity of what we're doing. Now,  
11 there's a lot of details that would go into this, but  
12 this is kind of a general overall idea of how we can  
13 improve this process and to clearly define roles and  
14 responsibilities within that process.

15 Now, as I mentioned earlier, station  
16 performance and access is equally as important as  
17 coverage when we're developing this network, so in order  
18 to feed the access criteria and performance criteria  
19 into the solicitation development process, we're  
20 proposing that OEMs in parallel with the prioritization  
21 activities would be able to feed the performance  
22 criteria into the California Energy Commission and the  
23 solicitation development.

24 So we feel that using this type of process --  
25 and like I said, there's a lot of details that would

1    need to be worked out -- but we have a very formalized  
2    and clearly defined roles and responsibilities to  
3    improve the solicitation development process and focus  
4    that process.  So that's it.  Here's a picture of our  
5    FCV-R concept.  As you can see on the bottom left photo,  
6    I've had some personal comments to me that it looks kind  
7    of like a whale, but I think it's a good-looking whale,  
8    so anyway, thank you for your time.

9               MS. BARONAS:  Okay, thank you.  Thank you,  
10   Jared.  So just as a time check, it's now 20 minutes of  
11   two, and we've set aside a 30-minute period for Q&A, and  
12   I was thinking we could decide to take a break after the  
13   30-minute Q&A, or we could move right into the station  
14   developer section, so generally what do people want to  
15   do?  Okay, a five-minute break now?  After Q&A, okay,  
16   you got it.  Okay, so I'd like to open it up to people  
17   on WebEx first, about the previous presentations from  
18   the automakers.  And of course, you can bring in some  
19   concepts that were brought up by presenters prior to  
20   that, too.  So is there anyone on the WebEx who would  
21   like to comment or ask questions of a presenter?

22              MR. STAPLES:  I wouldn't mind.  Paul Staples  
23   again.

24              MS. BARONAS:  Okay, Paul.  Please go ahead.

25              MR. STAPLES:  Yeah, in reference to the

1 previous presentations, let me make myself clear about  
2 my statement about there should be more stations. This  
3 is not -- it's more anecdotal evidence. What we do is  
4 I've been doing a lot of data mining with fueling  
5 station people, and working in the area also with a  
6 major company that sites fueling stations and sites them  
7 for a living, and you know, a big company, one of the  
8 largest in the country. And it's based on that, it's  
9 based on that common sense knowledge that you always  
10 need more than what you're planning. Okay? And I  
11 understand that goes from the standpoint of the -- in  
12 2016, most of the automobile companies are going to be  
13 rolling these things out, and I just think that they  
14 need more stations than what's being proposed, that's  
15 all, and it's just an observation, but that observation  
16 is based on 20 years worth of experience in the field  
17 and also as a person that drives. So that's just my  
18 sense, my feeling, my experience, and my instincts tell  
19 me that 68 -- although being that it will be enough to  
20 meet the cars that they plan to have on the road at that  
21 time, it's not what it's all about, it's about having  
22 enough out there so that people will see them and want  
23 to buy more than what you're just planning on putting  
24 out. If all you're doing is planning on putting enough  
25 stations out to meet the rollout numbers that they're

1 projecting, you're not really meeting the goal of what  
2 you're trying to do.

3 MS. BARONAS: Hello, this is Jean. First of  
4 all, Paul, thank you for your input, so noted. And is  
5 there another individual on WebEx who would like to  
6 raise a question or comment? Hearing none, we're going  
7 to focus our attention on the room here at the Energy  
8 Commission. So we heard quite a few presentations from  
9 automakers and also, prior to that, so please raise your  
10 hand if you've got questions of the presenters, the most  
11 recent presenters. Please.

12 MR. SLEIMAN: This is Ghassan from Hydrogenics  
13 USA. A question for Honda and Mercedes, John and  
14 Stephen, because you actually have dealt with paying  
15 customers for your vehicles, correct? What's your  
16 impression of their acceptable percentage of  
17 availability of the stations? And how far are they  
18 willing to wait or drive if the pump is being used,  
19 maintained, or just down?

20 MR. ELLIS: So I think we can't strive for  
21 anything less than 100 percent. I think, as I  
22 indicated, sometimes we may accept the experiences of  
23 the first few as indicative of what the rest of society  
24 will be willing to accept, and that can send us astray.  
25 So the leading edge, early adopters may be willing to

1 "put up with" -- is the term I'll use -- things  
2 differently than the rest. So we have to build for  
3 tomorrow, we have to listen carefully, so all of our  
4 customer mix, we have those that I would refer to as the  
5 advocates, that clearly they're not troubled if they had  
6 to drive 20 minutes out of their way for fuel, right?  
7 That's who they are. But that's not who we sought as  
8 customers, we wanted average John and Jane Doe people  
9 that would tell us the truth based on the fact that  
10 they're paying with their other wallet and they have  
11 high expectations. So I think, you know, the answer is  
12 as simple as close as you can get to mimicking the  
13 experience that people have today with gasoline  
14 vehicles, the sooner the better.

15 MR. SLEIMAN: No six-minute drive time?

16 MR. ELLIS: We support all the good work  
17 that's outlined under both U.C. Davis and U.C. Irvine's  
18 STREET modeling, and what's included in the Roadmap, so  
19 I think Mike said it very well, when he showed that  
20 there are, I'll say differences, in the opportunity for  
21 what I might call the "take rate," hence those that are  
22 willing to both show interest in the purchase of a  
23 vehicle, and those that actually do based on these type  
24 of variables, so the better it is, the better the  
25 changes. The question is what do we need, you know? So



1 at this time, we support exactly what the roadmap is  
2 showing. I hope that answers your question.

3 MR. TILLMAN: For Mercedes' side, I personally  
4 don't have -- I'm not fortunate enough to get access or  
5 interface with the customers daily, so I can't directly  
6 answer the question from experience. But I do know that  
7 the customers that we have had for our vehicles, I think  
8 they'd like to see more fuel, more stations, in general  
9 and I think that they probably see themselves as limited  
10 for some of the things that they want to do farther  
11 away. I'm not saying it's like a range anxiety issue,  
12 but the current number of stations doesn't allow them to  
13 do everything that they want to do. But I don't have  
14 any information as to what -- how many more stations, or  
15 where they'd like to see the stations put because I  
16 don't interact with them daily.

17 MR. SLEIMAN: What would you say the  
18 consequence is if somebody goes to a station, it's down,  
19 and they cannot get to the next station within the  
20 acceptable amount of time? Or can't fill because it's  
21 being maintained for an unacceptable amount of time?  
22 Are they going to park their cars and not drive them  
23 anymore? What would you say the consequence is?

24 MR. ELLIS: I don't know that there's a simple  
25 answer because you'd have to respect the individuality

1 of people. And you know, when your phone number, like  
2 my phone number, is in their cell phone as the first  
3 point of contact, you know, you're subject to getting  
4 that call that can include an expletive or two if things  
5 go wrong. We're lucky that, for the most part, that  
6 hasn't been the case. But we just have to seek in all  
7 cases, you know, keeping down time to a minimum and,  
8 more important, I think, is both the perception and the  
9 reality of response to problems. Customers will be very  
10 forgiving in the early stage when they see that things  
11 don't go right yet, they also see how hard people are  
12 working to correct it. And I think it's both frequency  
13 that has an impact on that, but also the quality with  
14 which the issue is resolved. So they'll be very  
15 forgiving, only to a point. And that tipping point will  
16 come, I'll say, fast and harsh if the frequency is  
17 beyond what they're willing to put up with. So you  
18 know, we can't build for the earliest adopter or the  
19 enthusiast that's willing to be put up with things  
20 different from the average retail consumer, we have to  
21 strive for that 100 percent gasoline-like experience.  
22 And I'll give one example where a hydrogen station, some  
23 changes were made, and our customers when they would  
24 reset the trip meter would see the range available to  
25 them on the display, and that was one way of determining

1 what we know of as the quality of fill, or the state of  
2 charge, well, with that change it altered that and they  
3 were seeing 20 miles less, and you know, for me to get a  
4 phone call and say, "Steve, I want my 20 miles back,"  
5 you know, that's telling. And we can take that type of  
6 thing for granted, we can take our gasoline cars and run  
7 them down to when the fuel light comes on, and some of  
8 us may fill within the first two miles, and some of us  
9 may drive 30 miles past that light, to but to hear a  
10 person say, "I want my 20 miles back" speaks highly to  
11 the impact of these type of changes, you see. So these  
12 are valuable lessons that we've already seen, so when we  
13 push -- you push the station operators to a high level,  
14 that's what's behind it.

15 MR. KEROS: This is Alex with GM. Just to  
16 mimic some words. So, first a disclaimer, of course  
17 Mercedes Benz and Honda customers are paying, but  
18 Project Driveway was non-paying customers for us, and  
19 the goal was throughput and learning, and certainly we  
20 purposely picked different personalities, different  
21 locations, different incomes, to get a varying level of  
22 understanding of the customer, and so Steve says it very  
23 well, missed fuels, or unable to fuel, having problems  
24 fueling, will result in midnight phone calls, one, to  
25 our team to deal with it, us, not the OEMs, and two, I

1 mean, these people are missing their appointments and  
2 their efforts in -- I'll give you a sensitivity around  
3 this -- we know these vehicles are going to be more  
4 expensive than their gasoline counterparts, which we  
5 just have some information from Mike that suggest the  
6 income level for those people are going to be elevated,  
7 likely. That means those people probably are going to  
8 value their own time more so than others, and will have  
9 a sensitivity to their own time when dealing with such.  
10 I'm sure that's reflected in other OEMs' deployments,  
11 testing, it certainly has with General Motors; so,  
12 paying or non-paying right now, customers are -- they  
13 are forgiving, but there are some that aren't.

14           And I'll give you some recent experience. Our  
15 community is still very closely knit, even though some  
16 of the folks have gotten out of the cars and one of the  
17 -- I'm going to use this word, I'm going to be direct --  
18 embarrassing points of what we're dealing with is the  
19 folks who are filling up with one station, or two  
20 stations in an area, come to us now and say, "Alex, I  
21 thought there was going to be more stations in the  
22 area," and these are the people who in 2007, 2008, and  
23 2009 for us, were our advocates, in many respects are  
24 the folks that are going to go out there and help lead  
25 the charge towards this evolution and bring on the

1 market. If they are looking at the scenes and don't see  
2 progress, they are indicative of what I would say the  
3 general customer might see, as well. So these are all  
4 points and we're all working together to get success,  
5 but we have to realize progress, getting to 68 and  
6 beyond 68, to Paul Staples' point, is very important and  
7 we have to have progressive steps over these years to  
8 get there.

9 MR. SLEIMAN: As a station developer, we need  
10 a number, so we need to strive to a number. We can  
11 strive to 100 percent, but we can be at 80 percent, so  
12 we need --

13 MR. KEROS: One hundred.

14 MR. SLEIMAN: Okay, down less than five  
15 minutes a day -- we need --

16 MR. KEROS: One hundred. If you're asking for  
17 the voice of the customer, Ghassan, you know what the  
18 answer is.

19 MR. SLEIMAN: And then the next number is, you  
20 know, when we propose stations in a cluster, they have  
21 to be next to each other, so to meet the six-minute  
22 time, we want your feedback in that proposal.

23 MR. TILLMAN: Let's assume down time, 120  
24 percent.

25 MR. SLEIMAN: Okay, thank you.

1 MS. BARONAS: Yes, please, Joan.

2 MS. OGDEN: Okay, thanks. Hi, Joan Ogden from  
3 U.C. Davis. Really fascinating set of presentations by  
4 all of the OEMs. I'm sort of hearing two things from  
5 you guys, and I just wanted to ask if I'm perceiving  
6 this right. One is that, you know, stations now and  
7 stations within the next couple of years, there are some  
8 things that could be done to get closer to 100 percent  
9 and to minimize the midnight phone calls, and so I hear  
10 that all of you want the next round of stations as they  
11 come in to take these things to town, I mean, things  
12 like having two hoses, and things like -- other things  
13 that would make there be redundancy or, close enough  
14 station so that if one station was down for any reason,  
15 you could go to another, and those kinds of thoughts.  
16 And then there's the other issue, it seems to me, is the  
17 getting to 68 because I'm sort of hearing 68 is the  
18 launch point if I heard your presentation right, Bill,  
19 it's not that 68 is going to cover the 50,000 or so  
20 vehicles that are going to be there in 2015 and 2017,  
21 it's getting to the point where there's enough of a  
22 signal that there will be other private industry funds  
23 that will flood in and will build those other stations  
24 beyond the 68, but at that point there will be a clear  
25 sign. And that's the other things you guys, of course,

1 want in order to move along the innovation. So is that  
2 fair to say? And could you comment on that?

3 MR. ELLIS: Thanks, Joan for the great  
4 understanding there and observation. I'll put it this  
5 way, and that is it's become apparent to me that it's a  
6 procurement issue. So, for example, when I give that  
7 example of customers needing to be able to pull up and  
8 not wait for someone else, you are already using the  
9 hose, well, they can hold the other dispenser hose in  
10 their hand, but they can't authorize it; for example,  
11 what we've learned is that, unless the PON contains that  
12 type of specification, that requirement, then it's an  
13 unfair competitive playing field whereby if one vendor  
14 says, "I'm going to do what they said and meet the needs  
15 of the customer and have multiple hose dispensers with  
16 independent control systems," they will experience a  
17 higher cost to their proposal than the one that doesn't,  
18 and that's a key aspect of this, that from a vendor  
19 competitor standpoint, we need that parity, we have to  
20 get these points right. And if that's been an omission  
21 of the past, today I'm asking for that to be changed,  
22 but that's, hence, the reason that I bring up this point  
23 about a continual improvement loop, and I apologize if I  
24 failed to say it, but if you look at a Demming-like  
25 principle of continuous improvement, a plan, do, check,

1 act, and repeat every year, that I think is what will  
2 bring to light these points, and then we have this  
3 continual improvement, we'll get where we need to go,  
4 and the stations of tomorrow will be better than the  
5 stations of yesterday. Okay?

6 MR. ECKHARDT: This is Steve Eckhardt with  
7 Linde. Yeah, Steve, the comment you made I think is a  
8 good one with respect to, you know, added performance  
9 features and on level playing grounds. As I understand  
10 it, there will probably be more discussion around this  
11 performance aspect and what the dispenser does next  
12 week. With respect to the comments about 100 percent  
13 uptime, as an aspirational goal, I agree, I think that's  
14 the kind of goal we have to have. I mean, in our  
15 industry, as a specification we, you know, getting  
16 oxygen to a hospital, that's 100 percent, there are some  
17 big consequences if you don't come through on that one.  
18 Whether or not you're implying that the spec is 100  
19 percent for these stations, I don't know, but would just  
20 say let's be careful if we're asking for 100 percent,  
21 but that station better be running literally 8,700 hours  
22 a year. Is that what we're asking for? Are we truly  
23 asking for -- because do you cars run 8,700 hours, so a  
24 breakdown -- so that we just need to be careful on that.

25 MR. KEROS: Well, Steve, 1) our cars have to



1 be running 100 percent of the time to rate, I mean,  
2 don't forget, the customer will hold us to that, right,  
3 I think we both agree; 2) as a station operator who --  
4 no, we can't put a car on the road that's less than 100  
5 percent --

6 MR. ECKHARDT: But a car doesn't run 100  
7 percent of the time, I mean, every once in a while a car  
8 doesn't start.

9 MR. KEROS: If customers stop buying that car  
10 or --

11 MR. ECKHARDT: If you had a car that ran 100  
12 percent of that time, you'd have a dual everything to  
13 make sure it ran all the time.

14 MR. KEROS: Yeah, in that -- here's my  
15 qualification to this point -- customer expectations are  
16 100 percent and that's for a car, that's for a station,  
17 that's for their phone, that's for anything. So for an  
18 OEM to represent anything less than that is going to be  
19 very difficult for, for example, General Motors to  
20 support. That being said, yes, I fully appreciate that  
21 you, Ghassan, and others who operate stations, are bound  
22 by technology constraints and procurement constraints,  
23 and those sort of things, so, to clarify, I am not  
24 advocating that any PON say 100 percent, but if you ask  
25 me what customer expectations are, I'm going to tell you

1 100 percent.

2 MR. ELLIS: Steve Ellis with Honda again.

3 And, Steve, that's a great point and we appreciate your  
4 proposing that additional type of question, but I'll  
5 give you a specific answer to your point there, and that  
6 is that, in the case of a car, if it sells, we have  
7 options. And I think that's the key difference, and  
8 that is whether it's the significant other in the  
9 household, and you say, "Hey, I'm taking your car  
10 because I'm in a rush, can you recover?" Or whether  
11 it's calling your neighbor, your friend and saying, "I  
12 need your help of renting a car," or taxicabs, you have  
13 options. What we haven't had are options on the  
14 hydrogen station side. Now, we know that will come  
15 tomorrow, but until that point, it's hard to seek  
16 anything less than 100 percent. In the real world,  
17 though, I'll add that I'm technical enough to understand  
18 that, in the station design, some of the stations will  
19 continue operating while a component has failed. For  
20 example, we've lived through that, like compressors  
21 fail, hey, the customer can still get fill; at the same  
22 time, we've seen stations where the design -- by design  
23 -- one component failure shut down the whole station, no  
24 one gets filled. That's a small technical nuance that I  
25 think is part of this phase where we learn and yet we

1 have to apply those learnings. So I just wanted to give  
2 that type of feedback as an example.

3 MS. BARONAS: Thank you for that. And, Jared,  
4 go ahead, please.

5 MR. FARNSWORTH: This is Jared with Toyota,  
6 and that's why we felt it was important to add a clear  
7 defined process for clearly stating what are those  
8 performance and access requirements being fed into the  
9 PON development. So, that way, if it's on the back side  
10 and then we said, "Oops, we should have defined that  
11 before."

12 MS. BARONAS: So this is Jean. May I ask a  
13 question? Are you pretty much...? Okay. So back to 68  
14 stations, and redundancy, and mean time between failure,  
15 is M mean time between failure integrated into the  
16 redundancy formula for the 68?

17 MR. ELRICK: I understand the question. The  
18 short answer is no, but I don't think mean -- that part  
19 of it isn't the redundancy in the 68 in the Roadmap, and  
20 that part of it is more numbers of stations and where  
21 they're located and where that redundancy is more  
22 critical than others --

23 MS. BARONAS: Okay.

24 MR. ELRICK: -- i.e., in clusters, keep going,  
25 then, say, a destination station, and actually that's

1 not critical in its own element, but it gets back to  
2 that balancing --

3 MS. BARONAS: Right. Okay. And then a  
4 question on the Demming concept and continual  
5 improvement. So, how could -- if the real world were  
6 pretty perfect, kind of perfect, sort of perfect, how  
7 could we have as an industry a feedback loop that would  
8 provide the continual improvement process that you've  
9 been asking about? What's a realistic way that's  
10 affordable, where the failure data, and on all levels,  
11 the cost, the performance, the SAE standards, everything  
12 gets integrated. Is it through an association process?  
13 I have no idea what you're imagining.

14 MR. ELLIS: Sure. And I know that, by nature  
15 of putting that into my deck of slides and making that  
16 request, that there has to be an action behind that.  
17 So, one is, I would say it's both formal and informal,  
18 and what I mean by that is that the station builders  
19 have what I'm going to call the information, the failure  
20 site issues that play out publicly, and then maybe  
21 there's some other stuff behind the scenes that doesn't.  
22 So some feedback loop from their side, from the auto  
23 side, we can provide that based on customers and things,  
24 but I think to answer your question, probably like the  
25 California Fuel Cell Partnership is a great venue to

1 let's say call those relevant players together, an all  
2 hands type of meeting where the process is laid out,  
3 whether it's twice a year, or whatever frequency is  
4 needed, to recognize both lessons learned over the last  
5 six months, what are the action items that need to be  
6 attended to, and then how that will play out, whether it  
7 is just internal, or whether it actually does need to  
8 then be externalized into a PON procurement document.

9 MS. BARONAS: Okay.

10 MR. ELLIS: That's just an idea.

11 MS. BARONAS: Thank you. And then, Jared, a  
12 question for you quickly. The performance integration  
13 into the PON process, you showed a loop down at the  
14 bottom of your slide going up to the right of the  
15 solicitation process. So doesn't that date the  
16 solicitation if you've got a performance standard that  
17 generally is met in the industry, let's say it's a low  
18 standard, and then those firms that can get more market  
19 share, but isn't it dating upon to require a certain  
20 performance level?

21 MR. FARNSWORTH: I think the performance  
22 requirements are based on what we know our customers  
23 will need. So I think, if we can meet those  
24 requirements, then I think it may date it, but it's what  
25 we will need.

1 MS. BARONAS: Okay, so -- yes?

2 MR. ELLIS: I would add, Jared, correct me if  
3 I'm wrong, that it's a great question and maybe the  
4 answer also is that we've been living with stations that  
5 have not met those performance levels up to this point,  
6 so we're still trying to get some of those to that, so I  
7 think that's a key point.

8 MR. FARNSWORTH: Yeah, and we're not stating a  
9 ceiling, we're stating what the minimum is.

10 MS. BARONAS: Right. I heard a presenter, I  
11 think it was John, talk about not meeting -- your higher  
12 performance and what you can find out there, and that's  
13 a dilemma. Yes, Jim McKinney, please. Oh, sorry, Bill.

14 MR. ELRICK: If I can jump in on that same  
15 topic, I think, to that point of is it dated is a good  
16 question, and I think the key is coming up with some of  
17 the minimums through a process as Jared had suggested,  
18 or others, that develop a minimum threshold knowing that  
19 these will be a few years from now, and at the same  
20 time, finding a little bit of balance, say, other  
21 incentives, to go a step further, anticipating what --  
22 in this case -- what the commercial standard needs to  
23 be; we don't know it, but considering there being extra  
24 incentives such as more funding for something that takes  
25 it beyond that minimum, so that it doesn't become a

1 disincentive, but actually a way to improve the network,  
2 the technology, and the customer experience in a way  
3 that both enables the minimum to be met and reach  
4 further into the future, as well as recognizing that, in  
5 some cases, you'll want to -- the minimum might be  
6 enough at another location, and you really want to  
7 maximize what your opportunity is.

8 MS. BARONAS: And that could be articulated --  
9 okay, Jim McKinney please.

10 MR. KEROS: Can I just add a quick detail in  
11 our example? In my mind, one of the challenges we face  
12 as an industry -- sorry, Jim -- one of the challenges we  
13 face as an industry --

14 MS. BARONAS: This was one time I didn't  
15 interrupt my managers, I actually feel good about --

16 MR. KEROS: -- but like, for example, metering  
17 of hydrogen, right, this is what I would consider  
18 probably a performance characteristic that we all have  
19 an interest, and a collective interest, in trying to  
20 move forward, but it's an expensive proposition and any  
21 bidder, for example, that throws that into their  
22 proposal is creating a higher hurdle for them due to the  
23 added cost. So, to me, a year ago I don't think I would  
24 have said, hey, make sure metering technologies are a  
25 part of it. So this is the feedback loop and the

1 learning that we go on that, hey, this is a piece of the  
2 industry that we all need to move forward. I think it's  
3 the exact type of thing that CEC wants to fund, they  
4 have in the past, right, with projects with DMS, but how  
5 do we integrate that into the performance  
6 characteristics of the proposals? I mean, to me that's  
7 a very clear example of how we move forward.

8 MS. BARONAS: Thanks for that. Jim McKinney,  
9 please.

10 MR. MCKINNEY: Yeah, thanks a lot, everybody.  
11 I've heard you guys get going when the car companies  
12 talked to the station developers, so I'm glad I got a  
13 little bit of a taste of that and I look forward to  
14 more. And thank you, gentlemen, for the presentations.  
15 This was really enlightening and very educational, and a  
16 lot of creativity and a lot of good information in  
17 there, so thank you very much.

18 I want to go back to question I kind of put  
19 out earlier, which is the relevance of precision. So  
20 we've been talking a lot about station specs,  
21 reliability performance, and I think that's one thing  
22 and we'll do that more over the next couple of  
23 workshops, but in terms of location, you know, the more  
24 precise something is, the more expensive it is, or more  
25 time consuming it is to get there. And I've kind of



1 heard some different things today, so earlier on I think  
2 I was hearing, and maybe this was from our colleagues in  
3 the Air Districts and the agencies, that getting the  
4 first couple in a cluster is good enough, that's pretty  
5 good, that's a good way to get the things going, and  
6 then the precision becomes more important as you start  
7 adding stations and you don't want to have them too  
8 close or too far apart, I think I was hearing that. And  
9 then, some of what I'm hearing this afternoon is that,  
10 you know, I think Alex used the word, kind of the street  
11 corner, but that's really important, kind of that  
12 intuitive feel, that gut feel, you know, how is the  
13 station used, what are the traffic patterns in there,  
14 how accessible is it? That's also very important. So  
15 I'm still thinking about, you know, how do we find the  
16 right balance in this precision thing. And I was  
17 particularly intrigued by what Jared put up from Toyota,  
18 which this sense of, you know, maybe there could be a  
19 lot of OEM input and collaboration, say through a third  
20 party, whether it's STREET, or some other, or the  
21 Partnership, or somebody else, and kind of creating a  
22 priority list. And perhaps that goes into the  
23 solicitation so that the Energy Commission will solicit  
24 and accept bids for stations within a certain distance  
25 of this list of priorities, and I think that's very

1 interesting. So I wanted to put those -- I want to make  
2 sure I understood that right and then I kind of wanted  
3 to put that question back out on the table, and also  
4 queue it up for the station developers in the next  
5 panel, the relevance of how right, how perfect does it  
6 have to be on these initial locations.

7 MR. KEROS: I think the data that you're  
8 looking for, Jim, first resides in the Roadmap, or it  
9 will, that's going to get delivered to the Energy  
10 Commission here soon, hopefully by the end of the day.  
11 We've been working hard to get it to you, trust me. I  
12 think I agree with everything and the feedback loops  
13 that you said, except for the last one, which is the  
14 distance away from that point. And I think Matt  
15 Miyasato had noted, and I don't want to speak on behalf  
16 of him, but he again said, if it's seven minutes away,  
17 or if it's 1.2 miles out of the loop, not one, we want  
18 to manage it. And I'll give you the reason why. One of  
19 the questions I've always asked of any proposal is, what  
20 is the station operator like? And for example, if we  
21 are looking really at two different corners, right, and  
22 in one corner there's an operator whose got 10 stations,  
23 wants to try this out, wants to make something happen,  
24 versus the other operator across the street who is  
25 reluctant, but sees this as a business opportunity,

1 personally, I feel like I could make that decision.  
2 But, if we're truly just going on location and we  
3 circle, they're equal, all things else -- so that's part  
4 of I think some of the information that personally I  
5 digest when trying to ascertain, you know, what's the  
6 level of precision necessary moving forward and, again,  
7 the example of two on PCH versus one on PCH, and one on  
8 Aviation, sorry for those that are not from the area  
9 that I am, but you know, I remember walking through  
10 there and actually very much looking at a map vis a vis  
11 what other stations were being proposed, what was  
12 already on the table, going, wow, that looks neat, look,  
13 the thoroughfares are going this way, the thoroughfares  
14 are going that way, we cover every axis into 405, you  
15 know, we cover all of these concepts, that's what I mean  
16 the model can't decide on that corner and there might be  
17 another station that looks perhaps a little bit more  
18 attractive. So, I get where you're going and I wish we  
19 had a checklist and a template and a tool that we could  
20 just -- trust us, it would make a lot of OEMs happy if  
21 we had that tool because it would be pretty darn easy to  
22 put the information in and spit it out, but sometimes  
23 the model will be spot on and sometimes the model won't,  
24 and we need all of the professional experience around  
25 this table to help decide on that level of precision.

1           MR. FARNSWORTH: This is Jared with Toyota,  
2   and that's part of why on that organization chart there  
3   we showed that you have the OEMs in different groups,  
4   communicating directly with STREET, or different models,  
5   to really nail down what those are, not relying on one  
6   or the other, but making it a collaborative process.

7           DR. BROWN: If I could add one thing to that.  
8   I mean, we, all of us around this table could have that  
9   discussion if we had come back from lunch and Alex was  
10  sitting in my chair, I'd go around and sit in his, we  
11  would make that change. It's sort of the same thing  
12  with the hydrogen stations. We're putting out this  
13  Roadmap with pretty specific placements in there, but if  
14  those street corners don't work out for whatever reason,  
15  or there's a much better project located three blocks  
16  away, I think those locations need to be evaluated with  
17  respect to the other criteria. It's just one factor,  
18  and it's an important factor, but it can't be the only  
19  deciding factor.

20          MS. BARONAS: Thank you for that. And,  
21  Michael, do you have some comments?

22          DR. NICHOLAS: Yes, actually this goes back to  
23  some comments that you guys made, and Alex answered it a  
24  little bit, so it could be a nuanced answer, but those  
25  people that the OEMs that have customers out there and

1 they're actually paying money for the vehicles, what --  
2 what I was hearing before, I think it was Steve who said  
3 it, is we have people waiting for the customers, but  
4 there's not enough capacity at these, even these  
5 suboptimal stations, like if there were higher  
6 throughput, we could do more. So, anyone who would like  
7 to volunteer information, what is kind of the waiting  
8 list? And even with our minimum number of stations,  
9 what's kind of the potential market there? And the  
10 second part of that is, how far away are they from their  
11 home? And what sort of dynamics do you look at when you  
12 look at customers? Do they -- what sort of criteria do  
13 they put on themselves and you put on them as being  
14 potential fuel cell customers? Is it six minutes? Is  
15 there anyone who is seven minutes? Or what's -- is  
16 there a take rate relationship? Or what -- as people  
17 who have put out these two real customers, what do you  
18 see?

19 MR. ELLIS: Well, Steve Ellis at Honda here,  
20 so I'm not the one that said I have cars waiting at  
21 dealers.

22 DR. NICHOLAS: Oh, okay.

23 MR. ELLIS: My version, and I have actually  
24 said this publicly for at least a year, even in I'll say  
25 these circles, hence in previous CEC meetings, is that

1 -- and I'll give Santa Monica as the example -- I  
2 couldn't have delivered more cars if I wanted to, and  
3 it's a pause, or comma, or whatever you want to say,  
4 without adding risk to the existing customers. So two  
5 reasons, 1) by putting more cars into that market, and  
6 that is the market we had identified, and that is the  
7 market we got handraisers for, one, we would overload  
8 the station capacity, we'd monitor that closely, we'd  
9 get feedback from Shell, they'd tell us if we're getting  
10 short fills because of that. We know there's peak times  
11 of fueling, Mondays and Fridays, that sets the bar for  
12 what that limit is. So, if we did, then we'd risk  
13 customer satisfaction --

14 DR. NICHOLAS: But, I mean, if there were  
15 let's say 1,000 kilograms at a station in Santa Monica,  
16 how many more Santa Monicans could you get?

17 MR. ELLIS: Right, and so where I was going to  
18 get to that is that's really more confidential and  
19 proprietary, that we wouldn't say in a public forum, but  
20 the simple point there is that, whether it's that  
21 station with its single hose, and that's the second part  
22 of that, and that is that, you know, we don't publicly  
23 tell all, so to speak, but I can tell you that we have  
24 faced challenges where, whether it's one of our  
25 customers, or another vehicle's, customers filling at

1 the station guarantees that the next person has to wait.  
2 So, you know, to answer that question, if I had put more  
3 cars into the market, then I start compromising those  
4 customers' satisfaction and that has an impact on the  
5 next thousand cars I may want to deploy. Do you see  
6 what I'm getting at? Because now the message from those  
7 people, as plays out in social media and other places,  
8 word of mouth, is negative. And we don't want to add to  
9 that.

10 MS. BARONAS: Okay, if I may interject, I'm  
11 sorry, I'm the Grim Timekeeper, and it's 3:00, so John,  
12 can you hold your comment?

13 MR. TILLMAN: If I have to.

14 MR. BARONAS: You don't have to, but it would  
15 be appreciated. And so, if we take a -- let me tell you  
16 the impact -- if we take a five-minute break, we'll be  
17 able to finish this on time. If we take a 10-minute  
18 break, we'll be five minutes later, so what would people  
19 like to do? Five minute break. Okay, so please come  
20 back at five after three.

21 (Recess at 3:03 p.m.)

22 (Reconvene at 3:12 p.m.)

23 MS. BARONAS: Okay, so it seems like we have  
24 critical mass again, so please take a seat and we'll  
25 continue. So are the people on WebEx, are you still

1 able to hear us?

2 MR. STAPLES: We can hear you, but can you  
3 hear me?

4 MS. BARONAS: Yes, I can hear you, yes, thank  
5 you. Okay, so moving on to the section of our agenda on  
6 station developers. So Ed Heydorn, Air Products and  
7 Chemicals, can you kick us off, please?

8 MR. HEYDORN: Yes, hello. Can you hear me?  
9 Hello?

10 MS. BARONAS: Yes, we can hear you.

11 MR. HEYDORN: Okay, thank you. If you could  
12 pull up my first slide.

13 MR. MCKINNEY: Hang on, Ed. We're queuing you  
14 up.

15 MR. HEYDORN: Great, thank you.

16 UNIDENTIFIED SPEAKER: What was your  
17 presentation titled?

18 MR. HEYDORN: It's No. 12. That's it, thank  
19 you. I'm Ed Heydorn, Business Development Manager with  
20 Air Products, and I'm pleased to be here today and thank  
21 the Commission for organizing this workshop to talk  
22 about approaches for selecting locations for hydrogen  
23 fueling stations. If you could move to the next slide.

24 So I'll be talking about station locations, I  
25 believe, and then -- I'm having trouble reading the



1 slide this way, I apologize -- well, first I'll talk  
2 about supply chain perspectives for hydrogen fueling  
3 stations, and then talk about siting criteria that I'd  
4 like to propose.

5 Is there anything we could do about the  
6 display? Or is that --

7 MR. MARGOLIS: It's showing up fine here. Are  
8 you having issues? What does it look like to you?

9 MR. HEYDORN: Okay, I'm having issues. I can  
10 talk through it, though. Thank you.

11 MS. BARONAS: So, Ed, here we see your slide  
12 just fine, it matches everything that you printed and  
13 it's fine. So --

14 MR. HEYDORN: Good, okay, thank you. This  
15 slide shows the various supply chain elements that could  
16 be used for production distribution, and then use of  
17 hydrogen in refueling stations. In terms of overall  
18 fueling station experience, Air Products is approaching  
19 one million total fueling events, we have an individual  
20 site that's now operating at 50,000 fueling events a  
21 year. So within that realm and in terms of some of the  
22 comments that were made earlier, there are projects that  
23 are being deployed in other fuel cell applications today  
24 that could be done with great speed, high reliability,  
25 and meet the requirements of the users. So it's not

1 something that has to be invented, it's just having to  
2 have that commercial throughput to be able to make that  
3 happen. Go to the next slide.

4 In terms that we'd like to think of, from an  
5 infrastructure perspective in terms of fueling, is that  
6 we look at infrastructure in terms of regions which can  
7 be supported by common modes of supply distribution and  
8 maintenance service. For example, it's not practical to  
9 put a maintenance technician on an airplane to go to  
10 another area and say that's a common region for support.

11 So in our view, and maybe this is a little bit  
12 different in terms of what the earlier discussions were  
13 talking about, for us, doing work in a single region  
14 allows us to be able to develop the database that we  
15 need to come up with the parameters that we require for  
16 the business case for hydrogen, which would be how to  
17 produce it, how to distribute it, how much it costs to  
18 install, and then how much it costs to serve that from a  
19 supply and maintenance standpoint. Our view is the 20  
20 stations within a given region would be adequate for us  
21 in order to be able to allow us to roll this to other  
22 regions, and obviously to continue to build capacity  
23 within a single region. I'm sorry, I'm still having  
24 trouble with the slides.

25 Right, and then there were other definitions

1 provided earlier on connector stations and destination  
2 stations. So we can move to the next slide.

3           So a key criteria for selecting stations is  
4 really -- and I think we've talked about this during the  
5 day, is to rely on the experience from the past. The  
6 DOE obviously has done a lot of work, there's a lot of  
7 work going on within an expert panel to the Department  
8 of Energy, also reports within the National Academy of  
9 Science, and the National Petroleum Council in its  
10 Future Fuels Study. These resources indicate that a key  
11 element to a successful rollout of this, or any  
12 infrastructure, it to try and take advantage of the  
13 existing elements of their spare capacity, for example.  
14 You know, production of hydrogen is probably half the  
15 cost of the overall supply chain on a dollars per KG per  
16 day basis. So trying to avoid reproducing that during  
17 these early stages of transition is really key. And  
18 obviously, the goal is to get to commercial deployment  
19 for stations and fuel cell vehicles. Next slide,  
20 please.

21           So as has been talked about today, the key is  
22 getting best information on where to put stations.  
23 We've heard about the automakers, they definitely have  
24 the best sources of information as to where they're able  
25 to sell cars. If you're not able to ultimately place

1 the stations where the cars are going to sell, then the  
2 stations will be underutilized and may not be able to  
3 stay open for a significant period of time.

4           You need to consider the cost of  
5 infrastructure in making decisions about deploying  
6 stations within communities and within clusters. And  
7 the statement there, "Build it and they will come," but  
8 that will not work for a station owner or operator  
9 perspective. We see a challenge within the current  
10 funding with AB 118 for a statewide rollout, it's  
11 something that, you know, if you're trying to get enough  
12 critical mass to prove a business case for  
13 infrastructure, going to multiple regions makes it more  
14 of a challenge, and it may be unsuccessful if you don't  
15 get to the critical mass to be able to get the answers  
16 on installation supply chain. And then operating  
17 support is needed for any of the early stations and  
18 certainly for stations that are not in the key  
19 community. I know that the work that's been talked  
20 about in terms of the Roadmap and other funding  
21 mechanisms is intended to try and address this, but it  
22 clearly makes it more difficult to put stations in  
23 locations that have no current demand for use of the  
24 fuel. Next slide, please.

25           In terms of how to optimize, other speakers

1 have talked about U.C. Irvine and U.C. Davis, Air  
2 Products has worked with both Universities and believe  
3 that both of their approaches have merit in terms of  
4 helping limit the investment in terms of number of  
5 stations in the early rollout. To us, it's more  
6 important to complete coverage before getting into any  
7 of the redundancy, or added capacity within a given  
8 cluster. You know, I don't think the automakers know  
9 precisely where cars are going to be sold, so putting  
10 multiple stations within one community may not provide  
11 the best service that they would allow the OEMs to be  
12 able to get a large number of vehicles out to a number  
13 of people.

14 Expandable stations, to us, are key to limit  
15 the early infrastructure for people providing these  
16 early dollars like the Energy Commission, the Air  
17 Districts, and the Air Resources Boards. And then to  
18 follow growth and demand, with demand as is done in our  
19 markets with any of our industrial gas applications.  
20 Can I have the next slide, please?

21 In terms of the docket, we had submitted  
22 information regarding some of the other topics that were  
23 included within the original workshop, the definitions,  
24 especially talking about structure of the solicitation,  
25 and I know there are other topics today that were raised

1 by Mr. McKinney and others, and we'd be glad to talk  
2 about those in future workshops. So I thank you for  
3 your time and thank you for the opportunity to speak  
4 today.

5 MS. BARONAS: Thank you, Ed. Appreciate your  
6 comments today. Now we move on to Dan Poppe of Hydrogen  
7 Frontier.

8 MR. POPPE: Hello, everybody. Thanks for  
9 allowing me to speak my mind here today. Sorry if I  
10 sound a little nervous, but a friend of mine told me  
11 that if you're a little nervous, just imagine everybody  
12 with just their underwear on. Jordan, it didn't work.  
13 So anyways, I didn't want to hash over a lot of  
14 information that a lot of you already know, I'd like to  
15 give my side of the ideas and interpretations of what I  
16 would like to see from a station owner and operator's  
17 perspective.

18 So what defines the optimal location for a  
19 station? We see it is, of course, the first is the  
20 demand, second is the scalability, the accessibility,  
21 mutual cost agreement, and distance from the other  
22 stations.

23 So for demand, a realistic expectation so far  
24 really hasn't shown itself, cars were going to be out  
25 earlier, there was going to be higher demand, we're not

1 seeing quite that demand. I don't really agree with  
2 having the PON set a limit on the capacity of each  
3 station, I think at this point we need stations whether  
4 -- whatever size they are. I think in the future these  
5 constraints of size and scalability are more of an  
6 issue. So as far as demand, the really only resource  
7 would be the car companies, you need to make sure we  
8 understand what their rollout plans are and provide for  
9 those.

10 As far as scalability, it goes back to the set  
11 size of stations, both in footprint for stations is very  
12 important. What we're seeing is a lot of concentration  
13 has been put on, "Oh, we need these stations right by  
14 the Interstate," if you went around and solicited a lot  
15 of these stations, you'll find out that most of these  
16 stations don't have a footprint and, when you get into  
17 permitting, you'll understand that, for every 200 square  
18 feet of retail space, you have to have one parking  
19 space, so now a lot of these locations have already  
20 taxed with the fact that they've opened up convenience  
21 stores and the parking spaces are no longer available,  
22 so now we have to move a little bit farther off of the  
23 main thoroughfares to actually find stations that  
24 actually can be large enough for the equipment and  
25 scalable to meet the future demand. And then the

1 expansion costs, again, have to be within that budget.

2           The ability to meet demand milestones again  
3 will depend on how many cars we're going to have and  
4 throughput, whether it be the morning rush hour, the  
5 evening rush hour, but I still think the 20 kilogram an  
6 hour is going to be low for a successful rollout of all  
7 cars. And then, again, the volume of hydrogen dispensed  
8 really is not going to matter so much in these early  
9 days. We need stations now, so you know, I like to see  
10 even 50 kilogram a day, just to get them out there. But  
11 as long as they can be scalable to grow into these  
12 larger needs down the road, that's part of our plan.

13           Accessibility, again, the closer you are to  
14 the thoroughfare, the better. But, again, there's other  
15 factors that come into that, like the station layout, is  
16 there enough room? Are you going to be able to get two  
17 pumps? Are you going to inhibit the gasoline sales with  
18 your hydrogen pump there? These things are critical to  
19 the station owners currently and that's probably one of  
20 the biggest complaints we have now is that they really  
21 don't see an income stream from hydrogen, and it's more  
22 of an ego thing for them to embrace this technology, and  
23 as long as it doesn't cut into their profits, your  
24 station layout, and dispenser location are pretty  
25 critical. Again, a lot of these stations are smaller



1 footprint, there's not going to be enough site for on-  
2 site generation, so we have tube trailer issues and  
3 those are becoming problems with some municipalities  
4 about having a tube trailer for an extended period of  
5 time, so there's a lot of things as far as accessibility  
6 is concerned that really factor into a station's  
7 location.

8 Mutual cost agreement, which is probably the  
9 hardest one to get to, the one to me that was most  
10 important was the lease duration. I know this program  
11 was for three years, funded by the CEC, but if you're  
12 going to put that infrastructure in, you want to be able  
13 to hold that station owner to the 20 years, or 10 years,  
14 at least a longer program where you can see some benefit  
15 of when you start developing the relationship with the  
16 car owners and the relationship with the station owner,  
17 you don't want to just be in there for three years.

18 And then the hardest one of all is the  
19 contract wording. There was a comment earlier from the  
20 car companies about access agreement, you know, when  
21 there's liability involved, there's attorneys involved,  
22 when there's attorneys involved, there's liability  
23 definitions, and I just don't know how we're going to  
24 get past this fueling agreement, I'm open to suggestions  
25 later, so contracting wording is really sensitive, you

1 know some station owners are great, no worries; other  
2 stations owners, you know they want everything in black  
3 and white, and his lawyer, his lawyer, his lawyer, and  
4 so contract wording is really -- I like to see that more  
5 a part of the PON process next time because, even though  
6 you have a station that will get funded, if nobody can  
7 fill there because of these agreements, then you spend a  
8 lot of money for nothing.

9           The other thing that also drives up the cost,  
10 of course, are permitting. And, you know, everybody  
11 says, "Oh, I only want to drive six miles to a station,"  
12 some municipalities really embrace hydrogen and those  
13 are the municipalities that have better permitting  
14 processes, so those things need to be taken into account  
15 for when you guys choose locations. Some cities,  
16 they're afraid of it, some cities say, "Oh, we're going  
17 to put your plans, you'll be the first one on top." So,  
18 again, just because it's six minutes away, I think we  
19 need to focus more on municipalities that are embracing  
20 the technology.

21           And then, distance from other stations. As  
22 the reliability grows, this distance is getting to  
23 become farther, of course, so there needs to be a  
24 minimum distance requirement. But, again, that local  
25 demand is going to determine how many stations in that

1 area. If the stations do 200 kilograms a day, then it  
2 might be worthwhile to put in another station near that  
3 one. So the things that we see as a factor in that  
4 demand would be, you know, what the speed of the fills  
5 is, what the duration of the fill is, so the faster the  
6 fill, they're more likely to go to that location. But  
7 to me, the biggest holdback is the number of back to  
8 back fills. Right now, it's not that much of an issue  
9 because we only see maybe two or three cars at a time,  
10 but a year from now and two years from now, we're going  
11 to see 20 cars in a row, and you don't want to be that  
12 fifth car, or that sixth car, so you know, the number of  
13 back to back fills is going to be probably the biggest  
14 deciding factor as far as distance from other stations.  
15 And then the volume of the station, again, it can be  
16 flexible, I'd like to see some of these first stations  
17 be maybe smaller so we can get them out there sooner,  
18 you know, I understand we're trying to get to what will  
19 be two or three years down the road, but two or three  
20 years down the road doesn't solve our problems we have  
21 today.

22           So the last one, selecting the locations for  
23 hydrogen infrastructure, again, as we grow in the future  
24 and stations grow, that market demand is going to  
25 dictate what stations are successful, what areas are

1 popular, and we need to listen to that demand. We need  
2 to be able to get with the OEMs and look at what the  
3 market demand is. The real liability, of course, is  
4 going to be an issue, and whoever can have the better  
5 functioning station, performing station, will win out.  
6 And then the ability of the station to increase driving  
7 distance is -- we don't categorize cluster stations,  
8 connector stations, we need them everywhere. We need,  
9 you know, as a car owner myself, we need to have the  
10 experience be more like a gasoline type of experience  
11 where we can go to San Diego, we can go to Santa  
12 Barbara, so you know, focusing on these cluster  
13 locations, I'm not so sure, is a great idea as much as  
14 we need to make it a broader experience, maybe better  
15 stations, farther apart. So that's pretty much it.  
16 Thank you.

17 MR. SLEIMAN: Jean, this is Ghassan. And Joe  
18 is having problems with the WebEx. Can we move him down  
19 if he doesn't respond? Joe from Hydrogenics.

20 MS. BARONAS: He may what?

21 MR. SLEIMAN: He's having problems with WebEx.

22 MS. BARONAS: He's having problems with WebEx?

23 MR. SLEIMAN: Maybe. So that was his last  
24 email, so could we move him down so he can respond?

25 MS. BARONAS: Yes, okay. Thank you for that.

1    Okay, so then Hydrogenics will be moved down in the  
2    agenda and we'll move down to Hygen Industries, Paul  
3    Staples.

4               MR. STAPLES:   Hi.   Can you hear me?   Am I  
5    speaking too loud when I speak on this thing?

6               MS. BARONAS:   A little bit too loud, but not  
7    really too loud.   One of those.

8               MR. STAPLES:   Okay, well, I'll try to modify  
9    it because, I apologize, I didn't hear anyone trying to  
10   signal me before, so my apologies for that.   Okay, well,  
11   anyway, thank you for this opportunity to present to  
12   you.   My name is Paul Staples, I'm Chairman and CEO of  
13   Hygen Industries.   We're a small consulting company that  
14   consults on hydrogen technology issues and project  
15   development, program development, you know, when I was  
16   Executive Director of Clean Air Now, James and I  
17   partnered to build the world's first commercially  
18   permitted solar hydrogen generating facility, fueling  
19   station, and a fleet of vehicles running on hydrogen  
20   back in 1994.   My partner right now, Rich Capra (ph), he  
21   may even be the audience, he designed the SunLine  
22   facility and also designed the installation at  
23   (indiscernible), and also did the installation on the  
24   Santa Monica project, which we helped to develop, and  
25   several others throughout the state, the United States,

1 and even North America, as they've been working in the  
2 industrial gas industry for quite some time. So we do  
3 have some knowledge in this area.

4 Well, you know, the idea of this presentation  
5 is to talk about locations and, well, location,  
6 location, location, as they say in real estate, is  
7 everything. However, I have to basically say that I'm  
8 kind of overwhelmed with all this data, it kind of, you  
9 know, makes you dizzy, right? And that's the title of  
10 my next slide. Please go to the next slide.

11 This isn't rocket science, folks. Show me  
12 someone who owns a vehicle in any one of these cities  
13 that we're planning on doing this, that lived there for  
14 years, and just ask them, "Where's the best areas?" And  
15 it's the most affluent areas because that's what this is  
16 all about, that's where the location is, okay? You  
17 cannot predict hydrogen fueling throughout when we don't  
18 have any, okay? So, I mean, anyone that has lived there  
19 for more than a year would be able to tell you. I lived  
20 in L.A. for 25 years, okay, I can tell you everyplace  
21 where these vehicles are going to do well. And it's the  
22 same ones that you guys came up with in the RFP, you  
23 know? So there really isn't -- it isn't rocket science,  
24 let's not over-analyze it, let's not try to overdo it,  
25 okay? Because that's what I think is happening here.

1 Everybody is afraid to move. Everybody has got  
2 liability. There's legal suits I have to deal with, why  
3 the EV is out there, why the automobiles are doing it,  
4 because -- they didn't chose to go down this road, it's  
5 because the cars are chosen for them. So this was an  
6 issue, okay, and they settled it by going in this  
7 direction, so from that standpoint, you know, this  
8 really is all about basically getting enough stations  
9 out there, and that's really it. Redundancy is no vice,  
10 okay? It's actually a very good thing. Now, you don't  
11 want one right across the street from each other -- not  
12 now, no, down the road, you betcha, but not right now.  
13 But if you have one a couple miles away, it's not that  
14 big of a deal, okay? So it only helps to build  
15 recognition and that's really the important part. If a  
16 preference is needed, always first off the bat should be  
17 whose got the cleanest technology. Second one is who  
18 has the best location between the two. And if they're  
19 more than a couple miles away, that should be fine,  
20 okay? It's not going to kill each other, it's only  
21 going to help in the sales, okay, of the vehicle. So  
22 different customers have a choice in case one of them  
23 goes down for repairs. The next slide, please.

24           So, again, it isn't rocket science, if you do  
25 need an expert, if you feel better, any private

1 consulting firm where there are no conflicts of  
2 interest, that specializes in locating, siting,  
3 building, and supplying station equipment, and traffic  
4 modeling, could easily provide data for locating  
5 stations. I'm working with one right now on this. So  
6 certainly, you couldn't do worse than requesting a  
7 station off of Montana Street in Santa Monica where  
8 there is no fueling stations, it's multi-million dollar  
9 mansions. So, I mean, and that's an example of someone  
10 who requested it that I've experienced. So this is the  
11 key, let's stop over-analyzing it and get down and get  
12 some stations out there, and that's it.

13 Now, one of the things that were brought up  
14 was the fact that permitting is backlogged. Maybe if we  
15 brought the communities in on the selection process,  
16 that might help. Bringing some of these communities in,  
17 especially some who are being hard asses, and keep them  
18 in the loop and they'll feel like they're part of it,  
19 because that, I think, is a very good idea. Dr. Clark  
20 made that point to me very clearly, I thought they were  
21 only bringing in nimbys, but if you can weed that out, I  
22 think it will be a great way to help expedite. So, you  
23 know, that's not in my presentation, but hear it now.  
24 Anyway, next slide.

25 Also, no changing what is laid out in the RFP



1 138, even a month or two weeks, because it takes a lot  
2 of time to recruit these folks, okay, it really does, I  
3 spent nearly two and a half years doing that, and if  
4 you're going to have a review committee, you can't be  
5 changing lines, you can't be moving back the lines when  
6 you're in the middle of the process, or a week or so out  
7 from the RPF, so never actually, and really, it should  
8 be locked in months before the RFP is to be released. I  
9 mean, even developed and input, because otherwise, we're  
10 thrown in chaos, okay? And we have to scrap all the  
11 proposals and that's months and years worth of work  
12 recruiting them, after there is word that it's been  
13 approved, and now you come up and now they change the  
14 line without enough time to recruit new ones. So that's  
15 another recommendation in reference to the selection  
16 process. It also angers the station owners when they  
17 even hear -- they spent time recruiting you and getting  
18 you all the information that you need, and then they get  
19 the boot, then it's hard to go back to them later. So,  
20 you know, next slide please.

21           So anyway, identify preferred areas in the  
22 RFP, already done in the last RFP, and they were good  
23 areas, go outside, community needs to be involved in the  
24 process at this juncture, unless of course, it's an  
25 independent, non-involved consultant like maybe SIEC, or

1 someone like that to basically do the technical review  
2 and make recommendation. And we'll talk about that at  
3 the next one when we deal with the specifics of the RFP.  
4 So next slide, please.

5 Yes, it's interesting, our research about how  
6 to optimize the selection potential, well, much of it,  
7 as I stated, already exists. I mean, Caltrans has it, a  
8 lot of information, so there's a lot of area, city  
9 governments, AQMD, I assure you, most of that  
10 information exists, it's not necessary to have  
11 proprietary confidential information to do it. Granted,  
12 the automobile companies should be involved, if their  
13 vehicles are selling, they're the ones that have to meet  
14 these things, but you don't need to depend on that  
15 alone, exclusively. I mean, there is no valid specific  
16 data for hydrogen fueling at this time, there's not  
17 enough stations out there, so if you don't have the  
18 infrastructure out there, or more than a couple hundred  
19 vehicles on the road, you know, I mean, they're just  
20 basically beta miles, you know, and a few demonstration  
21 facilities, that's basically what we have at this time,  
22 clearly not enough to make a proper valid analysis,  
23 okay? So that is what we're going to be doing now.  
24 We're going to learn all that, over this -- off of this  
25 effort right here, if we get enough stations out there,

1 and we'll know more later. But in the mean time, it's  
2 ridiculous to try to measure throughput of hydrogen  
3 vehicles and a fueling infrastructure at this time, when  
4 there's no specific significant data that exists at this  
5 time for hydrogen fueling vehicles, so you've got to go  
6 with the knowledge that you do have and that is  
7 throughput for regular gasoline stations because that's  
8 our customer, that's what we're going for. We're not  
9 going for the PEV, we're not going for the hybrid  
10 customer, we're going for the whole ball of wax on this,  
11 okay? So that's really the way we really need to  
12 approach this thing, that we are going to replace  
13 petroleum. Valero believes we'll replace them, that  
14 they will call for them to fund their own demise.  
15 That's the biggest compliment I've heard yet for  
16 hydrogen. But at any rate, that's just my outlook on  
17 this effort, you know, at this juncture. Next slide,  
18 please.

19           Okay, the definition of clusters, connector  
20 stations. I mean, you know, we've already been through  
21 that, the clusters should be expanded to other areas,  
22 not just where hydrogen is sold, into areas along major  
23 transportation routes and destination stations, as well.  
24 And the next cycle of vehicle sales and customer  
25 acceptance down the road. L.A. to San Francisco, it

1 would be very important to have a connector station  
2 between those stations. Kettleman City on 5, I don't  
3 think gets it, it really doesn't. You know, the only  
4 people you will have are those that are commuting from  
5 there, where at least if you do it on 101, you get local  
6 communities that will be buying them, as well. So you  
7 get double the effort there. You know, include areas  
8 like San Fernando Valley, Encino, Sherman Oaks, Woodland  
9 Hills, Burbank, Studio City, Pasadena, and Riverside, as  
10 well, because they all have very affluent areas and they  
11 will all buy them, even if they don't have a lot of  
12 hybrids at this point in time, they will buy these,  
13 okay? And I can assure you that, in those areas that  
14 you'll do some sales if you have stations there.  
15 Pacifica, Richmond, Berkeley and San Rafael and San  
16 Francisco, connector stations like Santa Rosa, Petaluma,  
17 San Luis Obispo, Santa Barbara, all along major highways  
18 and thoroughfares, and their freeway exits. Next slide,  
19 please.

20           So I mean, all the automakers, their input  
21 should be in the Investment Plan, absolutely, you know,  
22 that's already in place, as well as other stakeholders.  
23 You need more renewable stakeholders input. What I  
24 think you really need, too, get some renewable power  
25 producers in there because otherwise it sounds like

1 you're just going to go with fossil fuel generator and  
2 hydrogen, okay? That's the way it looks. You don't  
3 have them sitting in there, you don't have them on the  
4 committees, and you should. Other ideas for  
5 recommendations for hydrogen infrastructure siting,  
6 remove the requirement for an LOS, a Letter of Support,  
7 from an automaker or any other participating private  
8 entity to apply, okay? Too easy to exploit, too easy to  
9 be tempted by favoritism. Next slide. I think that's  
10 it. Well, there is more, but that's a good start and I  
11 certainly thank you for your time. I have a few other  
12 issues that I would love to define, and so if you have a  
13 few more minutes, I would be glad to move in on that,  
14 but I don't want to impose on you, unless you have a few  
15 extra minutes remaining.

16 MS. BARONAS: Thank you very much, Paul, for  
17 keeping to the schedule and for your contribution today.  
18 Thank you very much. So a couple loose ends here.  
19 Michael has reminded me of a question that is still on  
20 the table from the session prior to the break, and he  
21 said, since we came back on time, we should look at that  
22 question. So I have that here and we will address that.  
23 And so now, Hydrogenics, are you a go now? Are you  
24 ready?

25 MR. CARGNELLI: Yes, I'm ready.

1 MS. BARONAS: Okay, great. And then the other  
2 loose end, yes, Dan, it was under 10 minutes, I heard  
3 you ask that and then I was starting to talk to Ghassan  
4 here, so yes, thank you for keeping to a time schedule.

5 MR. STAPLES: No problem.

6 MR. CARGNELLIL: Hello?

7 MS. BARONAS: Yes, we hear you.

8 MR. CARGNELLI: Okay, thank you. So I can  
9 start now?

10 MS. BARONAS: Is this Joe Cargnelli?

11 MR. CARGNELLI: Yes, it is.

12 MS. BARONAS: Okay, great. Thank you. This  
13 is Jean, thank you for calling in. And, yes, we see  
14 your first slide. Please go ahead.

15 MR. CARGNELLI: Okay. Thank you, Jean. And  
16 we appreciate the opportunity today to present at this  
17 workshop and share our perspective with regards to  
18 selecting locations for hydrogen infrastructure. Next  
19 slide, please.

20 Hydrogenics is a hydrogen fuel cell and  
21 hydrogen generation company. We have over 2,000  
22 hydrogen products deployed in over 100 countries. We've  
23 delivered over 40 hydrogen vehicle fueling stations  
24 worldwide and we currently service 10 public hydrogen  
25 fueling stations in California. We are the world leader

1 in water electrolysis with over 60 years of experience  
2 in designing, manufacturing, installing industrial and  
3 commercial hydrogen system around the globe. For those  
4 of you that may not be familiar with electrolysis,  
5 essentially we take water and we use electricity to  
6 separate water into its two basic components, hydrogen  
7 and oxygen. Our corporate headquarters are located in  
8 Mississauga, Canada. Next slide, please.

9 With my presentation today, I plan to address  
10 the two questions that are listed on this slide, really  
11 from a renewable hydrogen electrolysis perspective,  
12 which I think has significant merits. Next slide,  
13 please.

14 In order to address, I guess, the question  
15 regarding optimal fueling station location, we really  
16 need, I guess, location criteria. We've tried to list  
17 some location criteria here that should be used in the  
18 decision making process, so supply chains for example,  
19 centralized and delivered model versus on-site hydrogen  
20 production, customer reach, you know, urban versus  
21 interstate links, certainly hydrogen price, carbon  
22 footprint, also very important, green or renewable  
23 hydrogen, and really how green is another criteria.  
24 Scalability, does the site have expansion capacity for  
25 future growth? Do the solutions for the sites have

1 expansion for future growth? And also, additional  
2 value. So when considering, for example, electrolysis  
3 as a solution for fueling stations, does the location  
4 site offer the potential to maximize the value of the  
5 solution? And I'll talk more about that in my  
6 presentation. So, for example, there could be  
7 additional value streams that can be provided when at  
8 certain locations when using electrolysis as a form of  
9 hydrogen delivery. Next slide, please.

10 In this slide, I'd like to illustrate, I  
11 guess, the two popular approaches for hydrogen fueling  
12 stations. At the top, we see the centralized SRM  
13 delivery model, which is a valid way to distribute  
14 hydrogen. Some sites, I guess, are challenged with the  
15 approach, or with this approach, because of the  
16 distances sometimes encountered between point of  
17 production and the point of use, while other sites  
18 struggle with large hydrogen transfer trucks going and  
19 coming from the site. The other alternative is on-site  
20 and, in my case, on-site electrolysis, also a proven  
21 alternative, and in the past, the major challenge for  
22 electrolysis has been the cost of hydrogen production.

23 So the challenge for electrolysis and site  
24 selection is really how to maximize the total value that  
25 the solution provides, and when selecting sites, we



1 really need to consider all of the value streams that,  
2 again, electrolysis will be able to bring to the group  
3 of stakeholders. Next slide, please.

4           With today's state-of-the-art electrolysis-  
5 based fueling stations, they really have, I guess, a  
6 real retail feel, they're highly compact in size. Many  
7 serve both vehicles and buses, to maximize usage, which  
8 we believe is a very good idea certainly in the early  
9 days, all of them have been proven to be safe, all of  
10 them, of course, meet safety standards, and many many  
11 are sited in dense urban centers, really to eliminate  
12 bulk gas delivery traffic.

13           The bottom left image that you see in the  
14 slide is a recently opened Hydrogenics electrolysis  
15 hydrogen fueling station located in Oslo, Norway. It  
16 serves both buses and cars and, again, the ribbon  
17 opening ceremony was a few weeks ago. In the middle is  
18 an image of Europe's largest urban electrolysis-based  
19 fueling station, also with our technology. Again, it  
20 serves both cars and buses. This station is owned by a  
21 large electric and gas utility, which is quite  
22 interesting, this is a trend that we're starting to see  
23 more and more, and in subsequent slides I'll explain why  
24 electric and gas utilities are interested in sites that  
25 can handle electrolysis.

1           On the right is a Shell hydrogen station  
2   located on Santa Monica Blvd. in Los Angeles, also with  
3   our technology, which has been in public operation since  
4   2004. Next slide, please.

5           The next slide that you see here really  
6   illustrates that electrolysis-based fueling stations can  
7   deliver the lowest carbon footprint hydrogen. Next  
8   slide, please.

9           Just a simple illustration, for those of you  
10   that maybe haven't seen what the basic components of an  
11   electrolyzer-based fueling station look like; on the  
12   left is the electrolyzer module, which is a  
13   containerized solution that, again, is scalable and  
14   deployable, and the middle image is a compression  
15   system, again, scalable and re-deployable. Next slide,  
16   please.

17           With this slide, I'd like to illustrate that  
18   electrolysis-based fueling stations actually can do more  
19   than just make hydrogen, so in the selection -- in the  
20   site selection criteria when you're looking at various  
21   technologies and looking at where electrolysis makes  
22   sense, I'm going to say that this is going to be a very  
23   critical part for electrolysis-based fueling stations,  
24   so what we're looking at is basically the operating  
25   signal of an electrolyzer, illustrating that an

1 electrolyzer is a very dynamic load. The graph shown is  
2 actually an electrolyzer being operated by a local  
3 Independent System Operator, or the Grid Operator. So  
4 while the electrolyzer was producing hydrogen for a  
5 fueling station, the electrolyzer was also performing an  
6 additional valuable ancillary grid service called  
7 Frequency Regulation, so today fossil fuel power plants  
8 are paid to perform this service; as we add more and  
9 more renewable energy to our power grid, more ancillary  
10 grid services are going to be required, and this is an  
11 excellent way to add an additional value stream to the  
12 fueling station. Electrolysis-based fueling stations  
13 have the ability to perform this valuable service and  
14 capture this value, so interesting characteristic and  
15 interesting to consider how that fits into the site  
16 selection process. Next slide, please.

17 I apologize, I just lost the screen here.  
18 Next slide. Can you tell me which slide you're on,  
19 please?

20 MS. BARONAS: Absolutely. Joe, so when you  
21 said you lost the screen, it was about the June 11th  
22 Workshop at the Energy Commission.

23 MR. CARGNELLI: Okay, and we've got one circle  
24 on the screen?

25 MS. BARONAS: Now you have your next slide up,

1    which are the two circles.  Should we go back one slide?

2                   MR. CARGNELLI:  Yeah, would you mind going  
3   back just one?

4                   MS. BARONAS:  Okay.

5                   MR. CARGNELLI:  So on the one circle.  Are you  
6   there now?

7                   NS. BARONAS:  Yes, we are.

8                   MR. CARGNELLI:  Okay.  So on June 11th, the  
9   California Energy Commission explored ways to minimize  
10  the issues and costs associated with greater renewable  
11  energy penetration.  Next slide, please.  So today, the  
12  California Energy Commission is looking for optimal  
13  hydrogen station locations and the best approach for  
14  selecting sites for these future stations.  Well, I'd  
15  like to pose a question.  What if you could address both  
16  challenges, so the challenge of solving renewable energy  
17  integration, and also solving the challenge and issues  
18  with selecting sites?  So today I'd like to say that we  
19  live in a world of energy silos, so the electrical power  
20  grid silo, the transportation energy silo, the natural  
21  gas energy silo, there's no communication between these  
22  energy silos, and today there's really no technology  
23  that can bridge these silos.  And I'd like you to sort  
24  of think about electrolysis as a bridging technology  
25  between these silos, the ability to move energy, for

1 example, from the power grid, the electrical power grid  
2 silo, into the transportation energy silo that I just  
3 discussed, so this would be vehicle fueling and, again,  
4 I'd like you to think about moving energy maybe from the  
5 electrical power grid into the natural gas grid silo.  
6 So when you think of fueling stations, they can have  
7 more value than simply fueling vehicles. Next slide,  
8 please.

9 Are we on the slide that starts with  
10 Distributed Power?

11 MS. BARONAS: Yes, we are.

12 MR. CARGNELLI: So with this slide, I'd like  
13 to mention that Hydrogenics is pioneering a concept  
14 called Power to Gas, which in our minds is one of the  
15 most innovative ways to store and transport large  
16 quantities of energy, or surplus energy. Essentially,  
17 Power to Gas is the process involving the use of excess  
18 electrical power to produce hydrogen by electrolyzing  
19 water. Now, the hydrogen gas can then be stored and  
20 used for vehicle fueling simply in vehicle fueling  
21 stations, or it can be comingled with the existing  
22 natural gas infrastructure network, or mainly the gas  
23 pipeline network. By feeding the excess electrical  
24 power as hydrogen gas into the natural gas grid, the  
25 stored energy is not restricted from the site of

1 generation. So separating generation and utilization  
2 offers grid operators more flexibility in terms of  
3 managing surplus power. So when you think of hydrogen  
4 fueling stations, again, there's an additional value  
5 stream here to other stakeholders that are participating  
6 in the selection of vehicle fueling station sites.  
7 Right? So, again, three value streams that I've talked  
8 about now, vehicle fueling, grid stabilization, and  
9 energy storage. Next slide, please.

10           So I guess, in summary, I'd like to say that  
11 California is extremely well positioned to capture all  
12 of the value that hydrogen via electrolysis can deliver.  
13 I listed some of the location criteria, everything from  
14 on-site supply chain, customer reach, delivery price,  
15 green hydrogen, scalability. I talked about additional  
16 value streams like Frequency Regulation, and energy  
17 storage. I maybe would like to sort of wrap up by  
18 saying that, in considering site locations, maybe a  
19 broader stakeholder group, or maybe a broader  
20 stakeholder group should be involved that can benefit  
21 from electrolysis-based fueling stations, for example,  
22 electric utilities, the local Independent System  
23 Operator, wind farm operators, gas and electric  
24 utilities. Now, these stakeholders would see ancillary  
25 benefits from electrolysis in addition to the fueling

1 benefit that electrolysis could provide. Also,  
2 involving a broader stakeholder group in pushing this  
3 technology out, would allow for the dividing of the  
4 investment and returns amongst multiple stakeholders and  
5 partners. And maybe in closing, I'd like to say that  
6 electrolysis-based hydrogen fueling stations can provide  
7 additional system benefits, system benefits across the  
8 board, that help solve some of the issues and costs  
9 associated with renewable energy penetration. And if we  
10 can bring the stakeholders together with the policy  
11 makers, we're going to be able to unlock hydrogen's true  
12 potential and solve the hydrogen price issue that's  
13 highlighted here in this slide with the yellow  
14 checkmark, and deliver the cleanest hydrogen. With  
15 that, I'd like to thank you for your time and the  
16 opportunity to speak this afternoon. Thank you.

17 MS. BARONAS: Thank you, Joe. Really  
18 appreciate your contribution so much.

19 MR. CARGNELLI: Thank you.

20 MS. BARONAS: Staying on schedule, we have  
21 Steve Eckhardt from Linde.

22 MR. ECKHARDT: Thanks for inviting me here on  
23 behalf of Linde to participate in this workshop. You  
24 know, so far I think this has been a great discussion, a  
25 lot of good debate, progressing us to ultimately a

1 better solution and looking forward to the discussions  
2 next week, as well. We remain very excited about  
3 progressing, getting hydrogen stations and fuel to those  
4 stations to meet the rollout needs of the fuel cell  
5 vehicles, and what I want to talk about today is, you  
6 know, some of those key discussion points that were  
7 brought up by the CEC.

8 MS. BARONAS: Linde Group, Worldwide, I think  
9 most of you are familiar with Linde Industrial Gas, this  
10 company, we've been in the hydrogen business for  
11 decades, we've been designing and building fueling  
12 stations for about 20 years, have deployed about 75  
13 fueling stations around the world, and have on the order  
14 of 300,000 or 400,000 fuelings between forklift trucks,  
15 cars, buses, and even ships.

16 So today, for a second here I want to talk  
17 about what are some things that we think about when we  
18 enter a market. Well, the first thing is what does the  
19 customer want, and then the second thing is, well, how  
20 do we cost-effectively meet those needs? And what's  
21 really critical, and what I think we need to keep in  
22 mind is we need to consider both the cost-effectiveness  
23 and meeting the customer needs. A lot of discussion  
24 around cost, a lot of discussion around making sure that  
25 we minimize the cost of getting this done. To the



1 extent that we go too far one way or the other, I think  
2 we do ourselves a big disservice. It's about doing  
3 things cost-effectively, but also meeting the needs of  
4 the end customer and that end customer, you always have  
5 to keep in mind, are the people that are going to be  
6 driving these cars and pulling up to those fueling  
7 stations every day.

8           Next, I want to spend just a few minutes  
9 talking about OEM involvement and the site selection  
10 process. The OEMs touch the customers every single day,  
11 they not only sell the cars to them, they not only do  
12 research on who is going to buy the cars, they maintain  
13 their cars, the OEMs are all over who is going to buy,  
14 whether it's a hybrid, or a CNG vehicle, or a fuel cell  
15 vehicle, the OEMs know very well who the customers are,  
16 where they live, and what their buying habits are.

17           Second point, if you think about the  
18 investment per station, you know, on the order of a  
19 million or two a piece for the State, a very critical  
20 decision, you know, you compare it to, say, charging  
21 stations, or E85 stations, that are also funded by the  
22 State. You know, those decisions are important, you  
23 want to get those in the right location. But those  
24 investments on a one-off basis is very small; each one  
25 of these investments is very big, and what that means is

1 we need to collectively, all the stakeholders, need to  
2 make sure that every single one of those investments  
3 goes in the right location, that that investment  
4 ultimately is used very well and ultimately turns into a  
5 site that can turn into a business for hydrogen fueling.

6           The third point, you know, aligning the fuel  
7 with the buyers, and to the extent that we do that, the  
8 OEMs will take a look at this and they'll take a look at  
9 those stations, and they will bring more and more cars  
10 to this market. It's a bit of a self-fulfilling  
11 prophecy; we put the stations where the customers are  
12 likely to be, the cars will come, and the customers will  
13 buy them. And a concern that we need to make sure that  
14 we don't create a reality out of is putting stations  
15 where customers may be few and far between, or there may  
16 be no customers for a number of years, our concern is  
17 that just drives the OEMs to consider other places to  
18 put their cars. You know, we're in a competition here  
19 and we want California to do very well in that  
20 competition. We want California to have a lot of fuel  
21 cell vehicles in the future. And the way to do that is  
22 to make sure these stations go into the right locations.  
23 And to the extent that we follow a process that does  
24 that, you will have a lot of station developers very  
25 excited and very interested and very engaged in bringing

1 stations out. On the flip side, of course, if the  
2 process is one that serves to put stations where maybe  
3 the customers may not be, you know, station developers  
4 are business people, and business people ultimately want  
5 to create a business, want to prove the business model,  
6 and if those stations ultimately look like they're going  
7 in places where the customers may not be, station  
8 developers may not be so interested in pursuing the  
9 process.

10           So some recommendations with respect to  
11 station locations and securing locations. I mean,  
12 first, you know, our thought is that, really, with  
13 respect to the value of the location, it should be  
14 included in the scoring criteria, there's already  
15 scoring criteria for a number of items that we're all  
16 very familiar with. Putting a scoring criteria in for a  
17 station is one way to ultimately bring that into the  
18 process.

19           In terms of trying to -- in terms of for  
20 cluster stations, the first criteria in our view would  
21 be you're either in the cluster or you're not in the  
22 cluster. Now, I'm not talking about destination  
23 stations, that's a separate discussion, but with respect  
24 to cluster stations, you're either in or you're out, and  
25 if you're out of the cluster, you're not going to get

1 funded. And the reason I say that is because what --  
2 the points I just made on the previous slide, we don't  
3 want stations going where the car companies don't think  
4 you're going to sell vehicles.

5 In terms of how a score ultimately is  
6 developed, there's been a lot of talk about this, I'm  
7 not going to get into a lot of detail, I think others  
8 are probably better suited. I mean, you know, a couple  
9 of points reducing average drive times, more complete  
10 coverage in the cluster, you know, another one could be  
11 putting it in the neighborhood or in a business area  
12 where the OEMs and other statistics would indicate the  
13 buyers are going to be.

14 With respect to STREET modeling from U.C.  
15 Irvine, excellent tool, needs to continue to be used,  
16 it's been invaluable. This has been talked about  
17 before, but I just want to make another comment on it to  
18 make sure it's clear, I just want to make sure that we  
19 don't look at the dots on the map that are created by  
20 that U.C. Irvine model and say the station needs to go  
21 there because what that serves to do is the station  
22 operators at that corner, or within a few corners of  
23 that dot, their price just went up, you know, they're  
24 not dumb, they're out to make money. So I was very  
25 happy to hear what Tim said earlier, that at the end of

1 the day, if a station goes and it's selected and it's a  
2 good station, and it's not exactly where a dot is,  
3 that's fine, you re-do the model, and you can still use  
4 that model. So that's a point I just wanted to make.

5           Ultimately, what I'm describing here, it's a  
6 bit of an iterative process, so maybe it makes it a  
7 little more difficult, a little more challenging, which  
8 that's unfortunate, but at the end of the day, that will  
9 make the process that much better and I think we'll end  
10 up with better sites for stations.

11           There was one specific question asked about  
12 two sites in close proximity to each other. Our opinion  
13 would be -- our suggestion is, you know, consider  
14 funding the station with the highest overall score, both  
15 of them that get scored, one of them has a higher score,  
16 and that's the one that's least considered for funding.  
17 The other one is not considered. In our view, we don't  
18 need two stations two miles away from each other, or  
19 three miles, and I don't know what the distance is, I  
20 think that needs to be discussed and that can be  
21 determined, but putting two stations at this point in  
22 time two miles away from each other is probably not a  
23 good use of resources.

24           And, you know, just a couple comments in terms  
25 of the benefits of using this type of scoring approach.

1 It does ensure alignment between the OEM target markets  
2 and the early station sites. Secondly, the CEC has a  
3 very good scoring system already in place and it  
4 integrates pretty well within that, so it doesn't  
5 require a wholesale change to the process of scoring  
6 these projects. And then, finally, it does ensure good  
7 coverage of the clusters.

8           With respect to the destination stations and  
9 connector stations, I think that's something that needs  
10 to be discussed on the side in terms of how many of  
11 those are funded. I mean, one point I'd like to make is  
12 we want to make sure that, as we go through the scoring  
13 process, we think it would not be a particularly good  
14 thing if there's 20 stations funded, if 10 of them are  
15 cluster stations, and then 10 are destination or  
16 connector stations, that's probably not a good use of  
17 money and I think the OEMs would look at that and say,  
18 "Well, wait a minute, we have clusters with big holes in  
19 them with a lot of customers." That's where we've got  
20 to get the stations.

21           So in terms of the stations that get funded in  
22 this round, you know, the Notice of Award will be  
23 probably sometime this winter, maybe late 2012, early  
24 2013, you've got to go through a contracting process, so  
25 most of these stations will be commissioned in 2014, and

1   there will be a number of them probably not commissioned  
2   until 2015. When you consider that the fuel cell  
3   vehicle commercialization, it's right about that time,  
4   maybe just a bit delayed from when these stations are  
5   coming out. So these stations need to be built for  
6   commercialization. You know, there were comments  
7   earlier, a number of comments about -- and I think  
8   general agreement -- that we need to have stations  
9   before the cars. And I think at this point I would  
10   slightly change that and say we need to have the right  
11   stations before the cars. And when I say "the right  
12   stations," it's stations that take into account that  
13   we're going to have 10,000 cars on the road in 2015.  
14   And I think that needs to be the view -- hey, there's  
15   going to be 10,000, that's what the car company goal is  
16   and that's our view, we have to have that view, because  
17   if we don't, well, then there won't be 10,000 cars. And  
18   if there's 68 stations, you look at an average kilogram  
19   throughput, it's on the order of 175 kilograms a day,  
20   probably, and there's going to be plenty of stations  
21   well in excess of 175 kilograms a day, they aren't going  
22   to all be loaded at 175. So it's critical that those  
23   stations in this solicitation we consider higher  
24   throughput, we consider stations that are going to have  
25   lots of customers coming every day, five cars showing up

1 in one hour, five cars maybe showing up in 10 minutes.  
2 How are we going to handle that? The stations need to  
3 be able to deal with that.

4 With respect to the needs of the customer, two  
5 comments there, coverage is critical, we've got to get  
6 coverage, that really kind of minimizes the risk the  
7 consumers see, so if you've got more coverage, they feel  
8 like they're taking on less risk, if you will. And then  
9 station performance, that's about meeting the customer's  
10 needs with respect to the experience and meeting -- you  
11 know, I said here before -- trying to meet as close as  
12 possible the experience they have today with gasoline  
13 fueling. They pull up, and four minutes later, they  
14 pull out, pretty simple.

15 A final comment, you know, the OEMs, again, if  
16 they see stations that meet consumer needs, if they see  
17 stations that are in areas where they now the customers  
18 are, they'll bring the cars to California, they won't  
19 take them elsewhere, they'll bring them here and then  
20 the consumers will buy them, so let's make sure we set  
21 ourselves up for victory and for success in 2015, and  
22 that in 2015, we don't say something like, well, right  
23 now we're talking about no backup and redundancy, let's  
24 not set ourselves up for failure two or three years from  
25 now by not appreciating that these stations being



1 awarded now are stations that have to be ready for  
2 commercialization because that's what we're seeing right  
3 around the corner.

4 I appreciate you all letting me talk today.  
5 Thank you for your time.

6 MS. BARONAS: Thank you, Steve. Moving on the  
7 agenda to Nuvera Fuel Cells, Gus Block. Gus, are you on  
8 the WebEx?

9 MR. BLOCK: Yes.

10 MS. BARONAS: We're ready for your  
11 presentation.

12 MR. BLOCK: Okay, I assumed that you would be  
13 just playing it there -- I sent it in to the CEC on  
14 Wednesday.

15 MS. BARONAS: Okay, please hold on a moment,  
16 Gus. I hear another conversation on the phone. Please  
17 mute your phones. Okay, so, Gus, we're going to pull  
18 your slide up momentarily.

19 MR. BLOCK: Thank you.

20 MS. BARONAS: Still, I hear some non-muted  
21 phones on the WebEx. Okay, so, Gus, we have your slide  
22 displayed now.

23 MR. BLOCK: Okay, great.

24 MS. BARONAS: Thank you.

25 MR. BLOCK: Yes, so we're a company located in

1 Boston, outside of Boston, and also in Milan, Italy. We  
2 make onsite hydrogen generators, hydrogen refueling  
3 stations, and also fuel cell vehicle engines for  
4 automobiles and buses and other types of vehicles. Our  
5 company is owned by Hess Energy, it's an oil and natural  
6 gas company that is based in New York. One thing that's  
7 interesting about Hess is they have 1,400 gasoline  
8 stations along the East Coast, and those are owned by  
9 the corporation, so they are looking at all of these  
10 questions that you're looking at in California in terms  
11 of how to roll out hydrogen infrastructure and, in our  
12 case, how to actually use existing infrastructure of --

13 MR. MCKINNEY: Excuse me, Jim McKinney here, I  
14 would like to repeat Jean's repeated request for all  
15 parties on the phone to please mute your phones. It's  
16 really disrupting the presentation here, so I would ask  
17 for the same courtesy here that we've afforded you.

18 MS. BARONAS: So, Gus, we're on your second  
19 slide.

20 MR. BLOCK: Great. So this presentation is a  
21 very short presentation and basically I just wanted to  
22 take the particular limited perspective of a station  
23 developer and to address the questions that the CEC  
24 posed regarding station siting. So in this  
25 presentation, I'm not making a particular pitch for one

1 form of hydrogen generation, or hydrogen delivery to a  
2 station versus another; I'm assuming the Commission is  
3 interested in any viable option, but I do just want to  
4 represent the concerns as we look at them, that might  
5 not be self-evident, and hope that that's useful.

6           So in terms of the question that was asked by  
7 the Commission regarding what defines the optimal  
8 hydrogen station location, our answer to that would be  
9 siting limitations. The solution that we have for  
10 hydrogen refueling is on-site steam methane reforming,  
11 so obviously access to natural gas is critical, and  
12 then, beyond that, the required offsets being adhered to  
13 from railroad tracks, from buildings, lot lines, you  
14 know, basically following the NFPA-2 and 55 Codes and  
15 IFC Codes, and so on. And, as well, proximity to  
16 overhead lines, power, trolley, and so on. Next slide.

17           In terms of the strategic considerations for  
18 siting hydrogen refueling stations, well addressed all  
19 day today, I'm sure, and certainly in the last few  
20 presentations, proximity to fuel cell electric vehicle  
21 concentration, existing and projected. And so we would  
22 certainly agree that what the OEMs are projecting is  
23 critical to understand in order to have a sensible  
24 siting policy.

25           Station capacity, I think one issue here is

1 more stations with smaller capacity, or fewer stations  
2 with higher capacity, has to be considered and there  
3 might be good arguments for both, but I think that, in  
4 terms of stations with smaller capacity, there is the  
5 advantage of redundancy that could be important as the  
6 stations are rolled out.

7 Another siting issue, clustered in a region to  
8 achieve service and support economies of scale, so we're  
9 a company located in Massachusetts, we need to hire  
10 people locally in order to support the equipment that we  
11 have there, and so just achieving service and support  
12 within a reasonable region is just going to make  
13 hydrogen ultimately cheaper. And I think, also, co-  
14 location with natural gas refueling could be quite  
15 important, for instance, the idea of having stations  
16 that offer a variety of fuels, including alternative  
17 fuels like natural gas, hydrogen, and natural gas  
18 hydrogen blends is quite an important concept to explore  
19 when choosing a site. Next slide.

20 So the question was posed regarding the  
21 definition of cluster, connector station, and  
22 destination stations. So for us, cluster, we're  
23 defining it just from our perspective as a station  
24 developer, so for us that's a 100-mile radius, stations  
25 within a 100-mile radius can be serviced by a single

1 person, or a single service organization, so that's sort  
2 of how we look at clusters. And so for us, connector  
3 and destination stations just aren't a consideration for  
4 on-site generation, we're not addressing these other  
5 policy issues that certainly do make that relevant, but  
6 it's not a consideration from our perspective. And that  
7 concludes my presentation.

8 MS. BARONAS: Thank you, Gus. We really  
9 appreciate your input today.

10 MR. BLOCK: Thank you.

11 MS. BARONAS: Okay, so for time check, I have  
12 15 minutes after 4:00, and so that leaves us roughly 15  
13 minutes for questions. I realize that's rather  
14 compressed; we also have some questions remaining on the  
15 table from the earlier session and, with Michael's  
16 guidance, we'd like to deliver those. So I'd like to  
17 open it up now to the people on WebEx who have questions  
18 or comments to the station developer block of time that  
19 we spent this afternoon.

20 MR. STAPLES: I hear James.

21 MS. BARONAS: Is that you, Mr. Staples?

22 MR. STAPLES: No, I think James Provenzano is  
23 trying to get in. I want to go ahead and speak to him.

24 MS. BARONAS: I'm sorry, I have difficulty  
25 understanding what you're saying.

1 MR. STAPLES: Okay, can you hear me?

2 MS. BARONAS: Yes, I can.

3 MR. STAPLES: It seems like we've got more  
4 than one person on at the same time. I notice James  
5 Provenzano is trying to get on, so I'll hold off for a  
6 couple speakers and I do have some things I want to ask.

7 MS. BARONAS: Okay, wonderful. Thank you for  
8 that. Okay, in the room, are there any comments or  
9 questions to the previous set of speakers on station  
10 developers? Yes, Jim McKinney.

11 MR. MCKINNEY: Again, thank you very much to  
12 all the station developers that have contributed today,  
13 and I just had two follow-up questions, one very broad  
14 and the other more specific. I'll start with the  
15 specific.

16 So, Steve from Linde, there were a couple of  
17 things you said that were intriguing. So when you  
18 talked about, say, a scoring criteria that would include  
19 site location values, do you have more thought behind  
20 that? Like what would constitute a station location  
21 value, especially since you said with the cluster you're  
22 either or out, and out means out I think you said?

23 MR. ECKHARDT: I mean, not a significant  
24 amount of deeper thought. What I wanted to propose was  
25 something that would integrate in well with what you

1 have.

2 MR. MCKINNEY: Uh-huh.

3 MR. ECKHARDT: Would like, you know, to try  
4 and create it so it can be viewed potentially as more  
5 objective, you know, it's a very subjective type of  
6 thing and, to the extent there could be a bit of  
7 objectivity put to it, well, that helps. But, no, it's  
8 something that maybe next week, or some other side  
9 discussions we can discuss further, but I don't have --  
10 I think what would need to go into it, there's been a  
11 lot of comments from a lot of people today about how you  
12 would put value on a site, you know, one site has got a  
13 value of 10 and another one has a value of 6, and  
14 there's ways of doing that. I think for it to work, it  
15 probably has to be an iterative process because each  
16 station is impacted by the other ones in the cluster.  
17 And that makes it challenging. That's the one thing  
18 that would be a bit challenging.

19 MR. MCKINNEY: Yeah, and thanks for that. My  
20 follow-up question to that was, did you have anymore,  
21 say, definition of what this iterative process would be?  
22 Would that be, say, prior to posting of a solicitation?  
23 Or might that come after the solicitation was posted?  
24 Or --

25 MR. ECKHARDT: I would say it would be once

1 proposals are submitted, I think it would be an  
2 iterative process that would include the OEMs and other  
3 U.C. Irvine, U.C. Davis, an iterative process where, if  
4 necessary blindly, these sites are looked at. But I  
5 think that there was mention from a few presentations  
6 about having the OEMs engaged, not necessarily on the  
7 front end, but on the back end, I guess, and that could  
8 be a process for which they could be engaged in it, or  
9 involved with.

10 MR. MCKINNEY: Great. Okay, thanks. And then  
11 my general question to all the station developers is,  
12 does anybody want to comment on just the role of the  
13 station owners at this point? Or perhaps we can save  
14 that for the next workshop, but several people have  
15 mentioned that they're key, I mean, they're a key part  
16 of this, they're not here today. So if there are  
17 anymore comments on that, I'd be interested.

18 MR. HEYDORN: Sure, Jim. This is Ed Heydorn  
19 from Air Products. Station owners are obviously a key  
20 piece to this. If when stations are put in, not just  
21 hydrogen, but any technology, when they're not running  
22 at the point where they can recover their fixed  
23 operating costs, they're not going to keep the equipment  
24 in for very long, so that's key when you talk about  
25 number of stations, location of stations, it makes the



1 challenge for outlying stations greater and the need for  
2 support of those to be longer.

3 MR. MCKINNEY: Great. Thanks, Ed.

4 MS. BARONAS: Thank you, Jim. Any other  
5 questions or comments at this time? Yes, Joan, please.

6 MS. OGDEN: Hi. Joan Ogden from U.C. Davis.  
7 A couple of interesting things that I think several of  
8 the presenters, the station providers talked about,  
9 which was the need to have larger stations in the queue  
10 and be thinking about those now so that they'll be ready  
11 for 2015, and the probability of moving, although we  
12 need, you know, 50 or 100 kilogram stations now, as we  
13 scale up, we'll need to go to the larger stations. So  
14 just one thought, I wanted to ask, when you think about  
15 evaluating sites, I assume that depends a good deal on  
16 the footprint available, on the size of the system  
17 you're putting in, as well as the type of system. And  
18 so I was just wondering, would you see that as being  
19 something that would be part of a criteria so there  
20 would be different site criteria depending on the  
21 station size and the type of station that you were  
22 putting in?

23 MR. ECKHARDT: Well, certainly any site that  
24 is proposed for a higher throughput station, say over  
25 200 or 300 kilograms, as opposed to under 100, certainly

1 it should be a site that is, you know, a cluster site  
2 and one that would be deemed as a good location, in an  
3 area where there would be a fair bit of prospective  
4 buyers. And that's something that the OEMs or other  
5 entities could provide that input as to whether it's an  
6 appropriate site for a larger throughput station. Of  
7 course, you know, the figure I threw out, I think I said  
8 175 kilograms a day roughly, average, for all cluster  
9 stations by the end of 2015, I mean, that means in 2016  
10 it's going to be even a greater throughput, so our view  
11 is all the stations need to be well over 100 kilograms a  
12 day, at least in clusters, all of them need to be well  
13 over 100 kilograms a day, and then there needs to be  
14 some that can handle the top end of that, well over 175  
15 kilograms.

16 MS. OGDEN: Maybe I'll just ask, too, if  
17 there's anybody who has evaluated the existing sites,  
18 and I know various groups have done that and looked at  
19 that, with respect to those criteria -- and I wouldn't  
20 expect those would be publicly available, but is that  
21 something that's been going on, either through  
22 Partnership, or through some of the industrial gas  
23 companies?

24 MR. POPPE: Yeah, Dan Poppe from Hydrogen  
25 Frontier. Actually, NREL keeps a lot of this usage data

1 and it's available, it's published every quarter, so  
2 that actually shows how many cars, what time of day, and  
3 NREL has a valuable tool for that information.

4 MS. OGDEN: But this is existing hydrogen  
5 stations?

6 MR. POPPE: Correct.

7 MS. OGDEN: I guess I was thinking about sites  
8 that might become hydrogen stations in the future, if  
9 there were any databases that evaluate, let's say, you  
10 know, gasoline sites, that sort of thing for how  
11 appropriate they are for --

12 DR. BROWN: I can comment on that, Joan. This  
13 is Tim Brown from UCI. We looked into that issue in our  
14 first study with the City of Irvine, trying to  
15 understand where stations would go, and see the  
16 footprint, and where a station could actually go. And,  
17 of course, the City of Irvine, we have a great  
18 relationship with the City itself, as well as the major  
19 landowner in the City because the City is called the  
20 Irvine Company. And even with those relationships, we  
21 have found it very difficult to find that data. It's  
22 truly a boots on the ground kind of operation where I  
23 don't think that database exists, at least we haven't  
24 been able to find it.

25 MS. OGDEN: Yeah. I know DOE tried to do it

1 from kind of a high level a few times, just looking at  
2 georeferenced characteristics and so on. So as far as  
3 you guys know, it doesn't exist. Thanks.

4 MS. BARONAS: Please go ahead.

5 MR. HEYDORN: Joan, this is Ed Heydorn. With  
6 respect to your question on capacity vs. coverage,  
7 that's maybe the latest version of the chicken and egg,  
8 and you know, I think there are two views to this and  
9 our view is that capacity is more important today  
10 because I don't think the automakers know precisely  
11 where the vehicles are going to be sold, so it's  
12 questionable whether to put the large station in now, or  
13 provide coverage to allow multiple markets within a  
14 given region to develop cars, and then grow with the  
15 demand as more vehicles are sold within a region.

16 MR. STAPLES: Finally, something I agree with  
17 Ed Heydorn on.

18 MR. BARONAS: Yes, please. Go ahead.

19 MR. ELLIS: This is Steve Ellis with American  
20 Honda. Tim, I was intrigued by what you just said about  
21 your studies in Irvine and it made me think that in, for  
22 example, just five years, we've seen significant  
23 advancements at the station level, just as we've seen at  
24 the vehicle level. Do you feel like if you went back  
25 and did that study again, you might find, for example, a

1 station where, from a footprint standpoint, may not have  
2 been suitable then, that could be today?

3 DR. BROWN: Had the study been successful the  
4 first time around, then, yes, the answer would be  
5 different, I agree. Stations never improve so much, but  
6 we never got to the point where we had any significant  
7 results because we couldn't get enough data without  
8 sending graduate students out there to measure station  
9 sites, which we didn't do. But, absolutely, the  
10 footprint keeps decreasing for greater and greater  
11 capacities because of the technology improvements or the  
12 maturity of station configurations.

13 MR. TILLMAN: This is John from Mercedes Benz.  
14 One key thing I'm hearing now, in a majority of the  
15 station developers' comments, that is key to this, is  
16 that they would like input from the OEMs in one form or  
17 another, whether it be based on vehicle deployments,  
18 whether it's technical issues, evaluations for station  
19 technologies, the CEC needs to be mindful of that in  
20 trying to separate the OEMs' input from the process.  
21 Your energy fuel providers are asking for exactly the  
22 opposite, more OEM input. So there needs to be a way in  
23 your process to have the OEMs' input there, while  
24 they're evaluating the station proposals, maybe not, but  
25 in some fashion to where the station proposal, or

1 provider, can feel the OEMs believe that they're putting  
2 a station in that has value to us.

3 MR. STAPLES: Can I get a few words in?

4 MS. BARONAS: Yes, please. Go ahead, Paul.

5 MR. STAPLES: Yeah. I'm kind of curious  
6 because, first of all, Ed, I agree with you on that last  
7 point, very much so. I think we definitely need to get  
8 as many stations out there as possible and grow with the  
9 demand. And I think that's important. Now, with regard  
10 to something that Linde said, clusters, it's kind of so  
11 very definitive - if it's outside the cluster, you don't  
12 get selected, you're out, your disqualified, it's almost  
13 like it sounds like you were talking from the  
14 perspective of it's your decision to make, you know?  
15 So, really, it comes down to basically what makes sense.  
16 You've got one that happens to be just outside a line  
17 that was drawn arbitrarily at some later date, after  
18 you've already done it? And then ask for a station in  
19 an area that doesn't exist? Kind of makes that sound a  
20 little bit weak. I think what you need to do is you  
21 need to have a diverse group of people on the committee,  
22 and certainly the automobile companies should have some  
23 input on it, but have a diverse group of people that can  
24 look at it. It is the taxpayers' dollars. So it's  
25 really up to the taxpayer, or those who are representing

1 the taxpayer, the CEC, or Air Resources Board, or the  
2 AQMD, to make that decision, okay? To say, well, you  
3 know what? We think that this is a good station, as  
4 well, you know, it's in a wealthy area, has a lot of  
5 throughput of traffic and all that, and everybody  
6 driving in there has the kind of money that you're going  
7 to need to buy these vehicles, it's in an area that is  
8 very important this needs to be done, that should be the  
9 determining factor. Okay? Right there. So it may not  
10 suit the demographic of one particular company or  
11 another, but it's going to fit somebody, okay? So I  
12 think that's possible, that's appropriate. Also --

13 MS. BARONAS: Thank you very much --

14 MR. STAPLES: -- you're wrong about  
15 redundancy. Redundancy is good. Okay?

16 MS. BARONAS: Thank you, Paul, for the input.  
17 This is Jean. I think Steve was talking in terms of an  
18 example. Is that correct from your mind, Steve? Go  
19 ahead and add, Steve, please.

20 MR. ECKHARDT: Well, I mean, with respect to  
21 that comment, I mean, that's our opinion and I think  
22 that's what we were asked to bring to the table is our  
23 opinion. I mean, listen, from a station developer  
24 perspective, I'd rather have more leeway to go more  
25 places, it makes it easier to find a site.

1 MR. STAPLES: Agreed.

2 MR. ECKHARDT: So, I mean, but if we were all  
3 allowed to do that, we are going to have stations all  
4 over the place, they're going to be too spread out,  
5 we're going to run out of money, there needs to be some  
6 discipline, if you will, around where these go. And  
7 that Roadmap has the discipline to focus us in some  
8 areas that have been determined as the best areas by the  
9 people who are in the best position to know where the  
10 best customers are going to be with the early customers.  
11 And my point was to say let's stay disciplined in those  
12 areas. Now, again, I'm not -- this is not a self-  
13 serving comment, because I'd love to go all over the  
14 place, it's easier to find a site if I can have more  
15 leeway. But at the end of the day, I think we'll all be  
16 less successful because we will either run out of money,  
17 the State's money, or there will be too many stations  
18 too far apart, and that's not a cluster, that doesn't  
19 make a network.

20 MS. BARONAS: Thank you for that, Steve. And  
21 so, now Angela has comments or questions. Please  
22 introduce yourself for the record.

23 MS. NANALAL: Yes. I'm Angela Nanalal with  
24 PowerTech Labs. We're a station provider, as well, and  
25 we're working with Dan Poppe of Hydrogen Frontier. So I



1 just had a couple of comments. When we were looking for  
2 stations for this past solicitation, there were three  
3 main key things that we had to find, the first was to be  
4 in the cluster that the OEMs and others had decided was  
5 the key location; the second was to find owners that  
6 were willing to work with us because it is a technology  
7 that's new, it's just important to have them on board  
8 and willing to work with us; and the third was a  
9 footprint that was large enough to contain all this  
10 equipment. The gasoline stations are small as it is, so  
11 if you're trying to cram in additional equipment to fuel  
12 hydrogen vehicles, you need to make sure that it's large  
13 enough and also be able to scale up for when we do have  
14 more cars filling those areas. And then also the point  
15 of scalability, one approach is to maybe not build the  
16 stations as large, build them smaller, and have the  
17 footprint and the ability to scale up, so when you do  
18 have more vehicles, you can scale up. And that way  
19 you're not outlaying as much of the cost up front and  
20 you can add it on as you get more vehicles. That also  
21 helps with the business case because part of funding  
22 these station is having enough vehicles to buy hydrogen  
23 at these stations, so if you don't have the throughput  
24 at these stations, your business case sort of goes out  
25 the window. So those are the important things that we

1 found in this process.

2 MS. BARONAS: Okay, Angela, thank you very  
3 much for your comments and contribution.

4 MR. ECKHARDT: I would just like to make a  
5 comment. With respect to the scalability concept, I  
6 mean -- I'm Steve Eckhardt from Linde -- and we agree,  
7 we think these stations should be scalable, that's the  
8 way ours are designed, to scale, and start at a certain  
9 level of capacity, and then increase. Our view is that,  
10 to the extent that you can put a station in and then not  
11 have to upgrade it six month or a year later, or 14  
12 months later, that's probably good because going and  
13 upgrading stations causes a lot of issues at the site,  
14 it costs a lot of money because you've got to mobilize  
15 twice, so there's pluses and minuses, and I don't think  
16 there's any right way to go, or wrong way, there's a  
17 number of ways to go. Certainly, I think I would agree,  
18 though, with everybody that the scalability concept  
19 makes a lot of sense. Our stations follow that concept.  
20 But, again, we'd like to put a station in where we don't  
21 have to necessarily upgrade it almost immediately.

22 MS. BARONAS: Thank you for that. Alex,  
23 please.

24 MR. KEROS: Steve and I always talk over each  
25 other.

1 MS. BARONAS: But are you two the people who  
2 are going to peel off early?

3 MR. KEROS: Yeah, we're going to peel off here  
4 in a couple minutes, I apologize --

5 MS. BARONAS: Okay, then please go ahead.

6 MR. ELLIS: Yeah. I'm his ride. Just one  
7 point which ties into what I presented, but General  
8 Motors would certainly welcome, I'll say, more than 68  
9 stations in the Roadmap. We would certainly welcome to  
10 consider all locations, and some locations perhaps  
11 outside of clusters or some of the early  
12 adopters/destination stations, as well. I think I'm  
13 looking at it in this workshop through the lens of  
14 prudent use of the State of California's money, so if  
15 there are any infrastructure providers out there who are  
16 willing to invest solely their own capital in other  
17 locations that they find to be attractive because they  
18 believe the market can grow, 1) I will welcome that, and  
19 2) I would certainly encourage you to talk to OEMs on  
20 how to sort of, I'll say, make it 69 and 70, if you  
21 will, but the lens and the recommendations, at least I'm  
22 bringing forward today, is really about how do we  
23 maximize the investments, particularly the Energy  
24 Commission, to make sure that we get the most bang for  
25 the buck for the taxpayers, and I think that's a little

1 bit of where perhaps, Steve, you're coming from with  
2 respect to trying to fund stations within a cluster, or  
3 within what the Roadmap has laid out and, second, before  
4 I turn it over to Steve, it is with a significant amount  
5 of pride and appreciation that I know we just delivered  
6 the Roadmap to the CEC.

7 MS. BARONAS: Please go ahead.

8 MR. ELLIS: Steve Ellis with American Honda,  
9 once again. I think today has been great because it's  
10 been a process of open dialogue, where we can agree, we  
11 can disagree, or agree to disagree, and yet there's been  
12 a couple things I've heard that, simply because this is  
13 a matter of public record, I think there's a couple of  
14 corrections I would offer. One I heard said that  
15 automakers or OEMs don't know where they want to sell  
16 their cars; I can't speak for everyone, but I do know  
17 that, when we announced the program for the Clarity, we  
18 had identified very specific clusters where we were  
19 going to accept handraisers as prospects for those  
20 customers, and I think we've identified those well.  
21 We've communicated that very broadly within the industry  
22 and to hydrogen station providers. So I think, from our  
23 standpoint, we do know where we're looking for the  
24 customers for the cars. I've also heard some comment  
25 that I would interpret as a willingness to build

1 stations outside the clusters, we've had experience  
2 where some people have referred to it as "if you build  
3 it, they will come," and we've seen those type of  
4 approaches fail in the past. So I'm just providing  
5 caution that somewhere between those two comments needs  
6 to be some very strong collaboration and analysis that  
7 would allow, I'll say, the truth to come out there. But  
8 from our standpoint, we do know where we want to sell  
9 the cars and we have enough data to now know where those  
10 people have voted, you could say, as handraisers to  
11 acquire fuel cell cars. Thank you.

12 MS. BARONAS: Thank you for your input. So  
13 noted. Okay, so we do have a public comment period as  
14 part of the CEC's process and, prior to that, I wanted  
15 to give Michael the floor for his remaining questions  
16 from the earlier session today. So please go ahead,  
17 Michael.

18 DR. NICHOLAS: This is actually for Alex. I  
19 don't know if you have time to answer. You know, maybe  
20 you can't answer it to the point, and Steve answered a  
21 little bit, it was about the existing customers and the  
22 idea that you're leaving a few customers on the table  
23 because of lack of capacity and such. That was one  
24 question, like what's kind of your sense with the  
25 existing locations and those small number of locations,

1    how much market is there, or how much market is kind of  
2    left? And then, how far away from those stations do you  
3    see that you gather customers? What's kind of your  
4    limit internally? Where do you stop considering people?

5           MR. KEROS: I don't think we're at a point in  
6    the market to be able to determine how far do you  
7    actually pull a retail customer from. I think there's  
8    certainly a lot of analysis from the gasoline side of  
9    things, you particularly have studied this question. So  
10   at this point in time, I don't think it's fair to say,  
11   the data is just frankly not there. Have we left  
12   customers on the table, I think, is what you're asking?  
13   Certainly, our program looks a little bit different than  
14   others, it has evolved from the customer facing aspect  
15   of it. I can reiterate messages that General Motors had  
16   to invest a significant amount of our own money to  
17   complement the infrastructure that was there and there's  
18   some sarcasm in that statement, we had one or two  
19   stations that were available, we had to put fueling at  
20   all of our clubs, we had to build Clean Energy LAX, we  
21   had to do a lot of, say, extraordinary measures to be  
22   able to give our customers a sense of the experience  
23   and, frankly, it wasn't always what we wanted. So  
24   fueling at the Burbank hub, which at one point in time  
25   was a lot of kilograms, I know it was the busiest

1 station in the world, yeah, we were beating you, Tim,  
2 sorry. But I think the "if you build it, they will  
3 come" expression that has been sort of perhaps tossed  
4 around today, I think there's certainly demand right now  
5 and we need to find a way to help satisfy it. How much  
6 of that demand? Is it 68 stations worth today? I think  
7 the answer would be no. But there's certainly pent up  
8 demand to be able to complement. I'll use us as the  
9 example, Clean Energy LAX is now sharing duties with the  
10 GM fleet and the Mercedes Benz fleet, General Motors  
11 does not want to be fueling Daimler, you know, Benz  
12 cars, in the sense of -- let me clarify -- I don't mean  
13 it derogatory -- we just don't want to be a station  
14 operator. A station operator for our own customers is  
15 one thing, to be able to manage and fill a gap, but I  
16 can tell you, there are Mercedes Benz customers who are  
17 using our station, who would like to find a normal  
18 retail station in their backyard. So if nothing else,  
19 that's a very clear example, there's the demand out  
20 there, I think Steve said it very well, and an immediate  
21 demand for like the Santa Monica area that needs to be  
22 addressed. So I've walked around the question, but,  
23 yeah, there's demand. I don't know how we quantify it  
24 today, but there is certainly some pent up demand.

25 MS. BARONAS: Thank you for that, Alex.

1 Appreciate it. I'd like to move into the public comment  
2 part --

3 MR. STAPLES: Could I just make one comment,  
4 that someone has made that sounds like it's directed to  
5 me?

6 MS. BARONAS: Okay, Paul, go ahead and then  
7 we're going to move --

8 MR. STAPLES: Just real quick.

9 MS. BARONAS: Okay.

10 MR. STAPLES: Real quick -- I never said  
11 "build it and they will come," although I don't think  
12 that that will be a bad idea considering what we've got  
13 right now, which is very little, okay? However, that  
14 was never an advocacy of what I was saying, okay? I  
15 just want to make that clear. Thank you.

16 MS. BARONAS: Okay, thank you for your input,  
17 so noted. So now we're moving into the part of the  
18 agenda for public comments. At this time, we will  
19 entertain comments from the public.

20 MR. PROVENZANO: Yes, this is James Provenzano  
21 with Clean Air Now.

22 MS. BARONAS: Go ahead, James.

23 MR. PROVENZANO: Good afternoon. I'm also a  
24 driver of a fuel cell vehicle and I've driven over now  
25 22,000 miles on fuel cell vehicles, and I want to thank



1 you for this opportunity to address all of you. I also  
2 want to thank and commend the CEC for having an  
3 encouraging and open process to discuss these important  
4 issues. Am I the only one representing the nonprofit  
5 public advocacy world here today? If I am, then maybe  
6 that suggests that the hydrogen industry needs to  
7 address and reach out to that important constituency.

8 I want to thank the OEMs and the State of  
9 California, specifically the Air Resources Board, the  
10 South Coast Quality Management District, and especially  
11 in the last six months, the CEC for keeping the Hydrogen  
12 dream alive. The billions that have been invested by  
13 the OEMs are why we are talking here today. They have  
14 done their homework and they know what works, and what  
15 will take transportation on the solution equation.  
16 Remember why we are here, to protect the public's health  
17 from air pollution and to reduce greenhouse gas  
18 emissions, and to help reduce the expected impacts of  
19 global climate change.

20 I want to show support for the districts Dr.  
21 Miyasato's offer, or recommendation, for an ad hoc  
22 technical review committee, so to speak. That committee  
23 could do analysis on not only the locations proposed by  
24 the PON respondents, but they could also do analysis on  
25 the greenhouse gas and criteria pollutant reduction

1 offered by the respondents, technologies, and particular  
2 approaches. This committee should and could include the  
3 OEMs and conduct the analysis while being (quote)  
4 "blind" to the individual respondents. As stated by  
5 Linde, the location of the proposed stations by the PON  
6 respondents could be incorporated into the scoring of  
7 the proposals, but if they are in the specified  
8 locations as stated in the PONs, the proposals should be  
9 evaluated, scored, and considered by CEC staff. I ask  
10 the CEC to move quickly on all this, we are running  
11 behind, as everyone knows, and I think you have gotten a  
12 good idea of the frustration developing over the (quote)  
13 "slow" introduction on the hydrogen infrastructure. I  
14 don't know, is Gerhard still there?

15 MR. ACHELNIK: I'm still here, Jim.

16 MR. PROVENZANO: Hi, Gerhard. This is not  
17 directed just to you, but to all agencies that could  
18 bring weight to this, but I am not coming up with  
19 solutions here to some of the issues crippling the  
20 stations from coming on-line, but I think it is time for  
21 the State to leverage its authority and help accelerate  
22 the whole process. The State should be helping to meet  
23 the needs of the OEMs and get these stations up and  
24 running so they can bring out these cars that are so  
25 important to the goals of the State. If the OEMs are

1 nervous about contract performance, or their ability to  
2 achieve the goals as stated in their proposals, then the  
3 CEC could require contractors to meet milestones that  
4 are indicative of sound progress, and if those  
5 milestones are not met, they would raise a red flag, and  
6 that would initiate a predetermined backup plan to  
7 ensure compliance with the rollout plans of the OEMs.

8 Now I would like to make a quick comment as a  
9 California resident, and a fuel cell vehicle driver. We  
10 need a station in Santa Barbara, one in San Diego, and  
11 one on the 395, half way between L.A. and Mammoth. So  
12 thank you so much for your time, I appreciate it. And  
13 thank you for all the good work that everyone is doing  
14 there.

15 MS. BARONAS: Thank you, James, for your  
16 input. Are there any other comments from the public?

17 MR. MAITA: Yes, this is Ben Maita.

18 MS. BARONAS: Please go ahead, sir.

19 MR. MAITA: Hello?

20 MS. BARONAS: Yes, we can hear you. Please go  
21 ahead.

22 MR. MAITA: This is Ben Maita calling.

23 MS. BARONAS: Yes, Mr. Maita, we hear you.

24 MR. MAITA: Okay. I wanted to speak about the  
25 renewable hydrogen potential that most of you heard the

1 presentation by Hydrogenics. I think it is a unique  
2 concept that solves many of the problems of the  
3 renewable industry, it brings the energy storage, it  
4 brings the carbon-free clean hydrogen, and it brings the  
5 stability, and many other benefits. So I highly  
6 recommend to CEC to look into this as a long term  
7 solution to California and many of the world's problems.  
8 Thank you.

9 MS. BARONAS: Thank you for your input.

10 MR. SLEIMAN: Could I just add to that?

11 MS. BARONAS: Yes, please.

12 MR. SLEIMAN: Yes, this is Ghassan from  
13 Hydrogenics. One way also that this can help with the  
14 filling station is that this can solve the SB 1505  
15 problem where we can put renewable hydrogen to natural  
16 gas pipeline, which can be later reformed to make  
17 hydrogen.

18 MS. BARONAS: Thank you for your contribution.  
19 Please go ahead, sir. Identify yourself, please.

20 MR. BRAHMTHATT: My name is Dhaval Brahmthatt.  
21 I'm from PHYchip Corporation in San Jose, California.  
22 My comment relates to suggesting that there ought to be  
23 a small business component to the infrastructure setup.  
24 I haven't heard that so far. I have heard big companies  
25 say we are going to run for 50 years, or whatever, and

1     that's fine, but we would like to see opportunities  
2     being offered to small businesses. Thank you.

3                 MS. BARONAS: Thank you for your contribution.  
4     So noted. Any other comments from the public at this  
5     time? Okay, thank you very much. So I would like to  
6     move on to the agenda to the wrap-up and conclusion and  
7     discussion of next steps by Jim McKinney.

8                 MR. MCKINNEY: So again, I just deeply thank  
9     everybody who has come today, who has made the trek to  
10    Sacramento, and going back to this morning; so, the  
11    agencies, the Air Districts, our academic partners and  
12    colleagues, and then station developers and car  
13    companies. This has been really useful for us and we  
14    again deeply appreciate it. And I think it's been a  
15    very informative discussion and we have different points  
16    of view on a lot of tough issues, and that's to be  
17    expected as we kind of continue to get this new part of  
18    the alternative vehicle industry up and running.

19                I'm not really going to try to summarize  
20    everything that happened this afternoon, there's just  
21    way too much information and I think, you know, us -- us  
22    being our staff -- need to go back and really kind of  
23    think about this, reflect on it, and kind of gather our  
24    thoughts for the next couple of workshops.

25                And with that, let me say we would like

1 everybody who has presented today to present your  
2 information to our docket, and the docket information is  
3 there on the workshop notice that all of you received.  
4 I think you've had some sneak preview of the June 29  
5 workshop agenda, so I would like the last couple of  
6 comments on renewable hydrogen, we're going to work that  
7 into one of the next two workshops, I appreciate the  
8 comments on the small business aspect, and I would note  
9 that -- I don't think Hydrogen Frontier is a Fortune 500  
10 company, so in your dreams, right, Dan? That's where  
11 you're headed, right? There you go. So that is  
12 something we're mindful of and thanks.

13           Again, let me just say thanks very much for  
14 everybody and you've given us a lot to think about and I  
15 think we have a lot of work to do as we evaluate our  
16 proposal, solicitation, and scoring process. So, unless  
17 Jean, or other members of our staff have any other  
18 closing comments, observations?

19           MS. BARONAS: So, yes. I will just thank you  
20 also. I've really enjoyed your presence today and all  
21 that you've said. We do have a lot of homework to do,  
22 as Jim said. And one comment came up from a quite a few  
23 people -- who do you contact at the CEC now? Who should  
24 be the contact point? And so I think, right now, it's  
25 the docket that's listed on the workshop notice. Okay?

1 So there is a docket open until June 30th.

2 MR. MCKINNEY: Is that --

3 MS. BARONAS: Excuse me? Yes, that is -- we  
4 can extend that, but that's to prepare for the June 29th  
5 meeting. So that docket is available for you to email  
6 attachments, diagrams, anything you'd like.

7 And thank you very much for coming. Any other  
8 comments from the staff at this time? Hearing none,  
9 then this meeting is adjourned.

10 (Adjourned at 4:56 p.m.)

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25