

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)
Program (ARFVTP))

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.

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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. ACHELNIK: Gerhard Achtnelik 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

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

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

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

6 MR. ACHELNIK: 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

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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.

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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

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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

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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. ACHELNIK: This is Gerhard Achteplik. 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. ACHELNIK: 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

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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,

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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

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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 tough 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

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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

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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

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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

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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

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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,

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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.

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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

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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

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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 os," some people s
6 Keros.

7 MS. BARONAS: Okay, Ker os.

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

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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

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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

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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

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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

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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

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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

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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.

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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

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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

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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

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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

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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

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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

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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

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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

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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,

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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.

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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,

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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

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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,

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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 Oslow, 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

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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

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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

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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

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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

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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

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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.)

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