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

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Reported by:
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Alex Keros, GM  
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Lance Atkins, Nissan Technical Center, North America  
Dan Poppe, Hydrogen Frontier  
*Paul Staples, HyGen Industries  
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**Public Comment**

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Afternoon Wrap-Up, Conclusion and Next Steps

Jim McKinney, California Energy Commission  

Adjourn  

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

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

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

We've tried to assemble all the key market participants and government agencies and academic groups working to create a hydrogen fueling network in California that can support the large-scale rollout of
Fuel Cell Vehicles scheduled for 2015 here in California. It will take all of us working together to create this network.

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

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

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

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

When the FY 2013 station funds are included, the Energy Commission will have invested nearly $55 million in ARFVTP funding for hydrogen fueling station, station citing support, standards development, and fuel cell bus demonstrations. As I understand it, we have about five active stations here in California with five more under construction from the ARB funding awards. The 11 stations funded from our 2010 cycle, so eight new stations and the three upgrades, will double that number of stations to about 20. Another 15 stations will get us to about 35, which is about half way to the magic number of 68 recommended by the Fuel Cell Partnership and their coalition of stakeholders; and as we understand it, this is the number needed to get us to the initial deployment in 2014, 2015 and 2016 when we could see up to 50,000 Fuel Cell Vehicles here in California.
Our primary goal today is to understand two key points: 1) What defines the optimal station location for hydrogen fueling stations; and 2) what is the best approach for the Energy Commission to use in selecting site locations for hydrogen fueling stations in the future?

There are a lot of other key questions, economic factors, datasets, station performance metrics and decision criteria associated with these key questions. And most importantly, or very importantly, how do we factor in sensitive and proprietary market and cost data from both the automakers and the station developers? We need to understand this so we can be as informed as possible as we develop a new solicitation.

We want everyone here to make their best recommendations to us and we want you to be frank and direct. What we don't cover today, we'll get to in the next workshops and, again, today is really location, location, location.

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

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

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

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

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

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

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

And so welcome to this meeting. Many of you,
I think, came pretty long distances to be here today,
we're going to be as efficient as we can, and as
informative as we can. I want to review the workshop
objectives today and focus people's attention there just
for a moment. And then I'd like to go around the table
and self-introduce speakers, and if there are any individuals on WebEx, if they are speaking, if they would also kindly introduce themselves?

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

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

MR. POPPE: Dan Poppe from Hydrogen Frontier.

Good day.

MR. TILLMAN: John Tillman, Mercedes Benz Daimler.

MR. KEROS: Alex Keros with GM.

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


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

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

MR. MCKINNEY: Jim McKinney.
MR. FARNSWORTH: Jared Farnsworth with Toyota.

MR. ECKHARDT: Steve Eckhardt with Linde.

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

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

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

MR. ACHTELIK: Gerhard Achtelik with the California Air Resources Board.

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

MR. STAPLES: Yes, can you hear me?

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

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

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

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

MS. BARONAS: Thank you very much, Damian. Any other speakers on WebEx? Hearing none, thank you everyone for your introductions. Okay, so moving along on the agenda, this collection of talks is from individuals in governmental agencies. And so we're kicking off this meeting to hear the perspectives of individuals from a policy/technology point of view, and
we're going to start off with Gerhard Achtelik from the California Air Resources Board.

MR. ACHTELIK: Okay, so I guess I will go up to the podium, I assume.

MS. BARONAS: Yes, that would be great.

MR. ACHTELIK: Thanks, Jean. Thank you, Jim.

Thank you, Jean. Good morning, everybody. And thanks for the workshop, it should be a productive workshop today and looking forward to being -- I appreciate being a part of this and I think we'll probably be learning a lot today. But I appreciate the Energy Commission putting this on.

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

This overall is to look at, you know, a lot of
information will be presented today and, at least from my information, there are things that are of higher priority and lower priority, but throwing out sort of, I guess, a buckshot approach of information here today. And just the first point is that we need the infrastructure, so first of all, the big picture is we need the infrastructure in California. The Air Resources Board in January adopted modified Regulations that dramatically increased the number of vehicles that are required, so the key message here is we expect a lot of cars and, in order to enable that to happen, we need to have the infrastructure in place to allow the manufacturers to sell those cars in California. So my first message is that we need stations in California. And then 15 percent of the sales in 2025 will be zero emission vehicles of some kind. The survey that ARB and Energy Commission has conducted, we conducted three surveys, and what has been really consistent is the fact that we expect tens of thousands, upwards to 50,000 vehicles in the 2015 to 2017 timeframe, and while most of the focus in the early years has been in Southern California, we can see that, as we hit the 2015 to 2017 timeframe, we expect a roughly one-third to two-third split between Northern and Southern California, so from a big perspective,
that's one way to start looking is we think the station should be roughly allocated along that same ratio.

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

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

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

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

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

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

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

And so you're looking at some of the coastal communities were based on the information that the vehicle manufacturers provided us, is I think were the most likely to see the adoption of the early vehicles. And then, not to leave out other locations, I mean, I
don't want to focus strictly on those key communities, we've also got to make these cars be able to work in the way they function and are designed to work, so we're looking to expand the markets. We've got to have some of these outlying areas, which could be either market expansion, or destination stations such as Santa Barbara, or Ventura, or we have San Diego.

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

I'll switch to some of the more direct questions that were asked. What is the best approach for selecting site locations? And, again, I'll say that, while I list a number of things, I have two slides on this question, they're not all of equal value, but
they can all be considered at different points. I will say, in a rough idea I have them in some priority, and I would utilize the vehicle manufacturers input in looking at where to target; just like we showed the survey, that gave us a starting point. We're not looking to put a station in Trona, or something like that, right? We're looking on the West Coast right now. And this is where we find that the manufacturers are looking to place their vehicles, different manufacturers have different markets, and so we are looking at multiple locations.

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

The California Roadmap document, a number of stakeholders in this arena are participants in the Roadmap, and this Roadmap is a compiled version of information that, when you talk to the Vehicle Manufacturers individually, you get one input, but the Roadmap represents a compilation of information, and is another good source to work off of in trying to find
where we begin to look for infrastructure. So you can prioritize your solicitations on geographic locations, so roughly, you know, over at the end -- not off each single solicitation, but we go back to there's roughly a one-third, two-third split in vehicles expected, so sort of a prioritization along that line, that distributes the stations throughout the state, not just in one area. But you've got to look at this over -- I realize now you're putting out what would have been three solicitations into one, but geographic location is definitely important in covering statewide, those are things to look at.

To hold workshops like you're doing now, but hold the workshop in the targeted regions to make those areas aware and help raise participation, but go to those workshops and see if you can get participation from the infrastructure providers from the stations, even from the communities that will have these stations, to make sure that the process becomes easier. Visit each station if it's feasible, and on the early days, depending on the number of solicitations, and something we had done and it makes a difference if you go look at a site and you actually drive it, and you can figure out, well, this is a morning route, or this is an evening route; or, if it's along the freeway and if I
missed this exit, I now have to go 20 miles and I didn't calculate my range right and I might need to call the tow truck already. So those are some things to think about.

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

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

What defines the optimum station location? And again, optimum is -- I listed a number of different words and "optimum," I guess, varies with each -- almost...
with each bullet, I guess, because we are in the very early stages and so in some ways it represents -- really, it represents the best compromise. But, first of all, we want to serve the most customers, the priority is light-duty fuel cell vehicles. But, when possible, to consider transit and material handling, and in some limited applications, those will work. You can maybe find a transit location that is located and has the facilities that allow fueling of both, or a material handling location maybe in some locations where it could work, but those are things to keep in mind. I mean, the top priorities where most light-duty vehicle customers would be provided fueling.

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

Access to main thoroughfare -- is this station located on the route that most of the vehicle drivers, most of the consumers, will be on? And is it convenient and safe? We want these stations to be -- we want these
cars to go to the mass market, these are not going to be strictly fleet cars. We want these from the zero emission vehicle regulatory perspective, we want the everyday person to consider this car as an option when they transition from an internal combustion vehicle. So part of that is, is the station convenient and safe. Is it located to where my teenage daughter would be comfortable in fueling at midnight?

What defines an optimal station or can serve critical location customer, too? You know, we were talking about the primary one, but this is now the bridging stations, we want to expand the functionality of the vehicles, so now we want to also keep in mind the Lake Tahoe's, the Santa Barbara's, you know, how do we get from Sacramento to San Francisco? And potentially, you know, another option is these early stations will be -- another thing to think about is these early stations will actually promote future information, so does this station happen to have any kind of outreach implication? You know, is there a school nearby? What will it look like when the person driving their standard internal combustion vehicle and is ready to move up and he sees that hydrogen sign and wonders, "Okay, well, you know, I don't know anything about it." How does that station look? What kind of image does that station give that
potential new customer?
And can the station be located -- in some instances you can locate it for renewable hydrogen. Part of why we're doing this is we're trying to get away from the traditional harvested oil and is this station potentially a place where we can look at a source of renewable hydrogen to drive our vehicle? What benefit does that station also provide to potential Environmental Justice Communities? Is it located potentially in a community that can reduce emissions, have a better overall impact? I think that is my last slide, yeah. So I assume we're all taking questions at the end, then? Okay.

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

MR. ACHTELIK: Okay.

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

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

(Laughter)

So thank you. Let me first start off -- Matt Miyasato, Assistant Deputy for Technology Advancement at
the South Coast AQMD. I want to thank the CEC staff, Jim, Jean, and of course, Pat, and I'm glad to see Mike Smith in the audience, for their hard work. And, you know, it takes a lot of courage to say, "Hey, this is broken, let's fix it," and then do it in a public process, so I really have to hand it to you for doing this.

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

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

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

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

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

Great, so after the long prelude, hopefully my slides will be worth it. So we were asked to present by the Energy Commission a template, and I'm not sure how to fit this into the window here. Let me make the suggestion that you go on to Damian's presentation and then we'll try to fix the file compatibility and present after him?
MS. BARONAS: Okay, that's fine. Damian, you're online and we've asked you to go ahead, please. Is that possible? Damian, would you please go ahead with your presentation? So perhaps he's involved with something else. So I'd like to --

MR. BREEN: Can you hear me?

MS. BARONAS: Yes, we can.

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

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

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

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

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

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

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

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

In terms of, as we kind of look to the future, how now we would locate the stations for the vehicles that we are projecting in the future, one of the ways I think that's been mentioned, and one of the things that we have to do, is we kind of have to look at modeling because we don't have the numbers of vehicles out there that would necessarily dictate, you know, the location of the stations. And as we look at that modeling, there
are a number of different ways that it can be done. We are expecting up here in Northern California that the majority of our users would be early adopters, then they would be similar to the folks who currently drive hybrids, PV, and natural gas vehicles.

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

As you select a station, I think when it comes down to the actual building, I think you have to be very clear on what your objective is. You know, cluster vs. corridor is a huge deal in terms of actually building a station, and I want to explain that a little bit. In an area where you've got a high density of vehicles and you have a lot of predicted travel, you may not have an ability to be very selective in terms of where a station goes. You may need it in a location and then you're going to have to go and jump through all of the hoops that are necessary to put it in that location.
And as you consider corridor travel, your options, I think, become more expanded. You need something that is, well, obviously accessible to the travel corridor that you're trying to open, but it may not need to be in a very specific location, it gives you probably a range of locations where you could locate that station, and I'll explain why that's important as we move down kind of into the latter portion of this slide.

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

And then one of the things that I think is probably overlooked at little bit in terms of when we think about, you know, our overall strategic goals, it's
also important, I think, that you know who your local jurisdictions are. I think we all know in this day and age that certain jurisdictions are more progressive than others, certain jurisdictions are more open to this, they have more experience in terms of the permitting, and I would say a permitting siting and dealing with the issues that are associated with alternative fuel stations.

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

And then, finally, as you kind of look at the overall mechanism for siting of these stations, especially if it's in terms of a strategic goal of you can have all of the other three elements that work, but really, you know, if you're not going to have an automaker who can supply the vehicles, or who can deploy them in the area that you're going to be locating that station, ultimately, you know, you're not going to be successful.
So it's very important as you kind of look at this that you're coordinated with the automakers, that you understand how their rollout will work, the areas in which they'll be selling those vehicles, and you have to understand what their target customer is. And all of those factors need to play together in terms of the actual physical location and selection of a site for a station. So I'm going to end my comments there and hopefully pass it back to Matt.

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

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

So we were asked to give -- this is Matt from the South Coast AQMD, we've been asked to present on the two questions that Damian just went over in selecting locations for hydrogen infrastructure. And as I mentioned previously, let's see, in commenting on Jim's opening comments, we've been a long supporter for hydrogen fuel cells dating back to the late '80s where we supported the Department of Energy and the development of fuel cell battery powered buses. We were
one of the first public agencies to co-fund the Ballard
Transit Fuel Cell Bus Project, and we had the first
commercial installation of a station fuel cell project
at our headquarters in Diamond Bar, so we have a very
long and rich history for supporting zero emission
technologies at the South Coast AQMD. And the reason,
really, is because -- Gerhard showed that chart of
vehicle penetration for zero emission vehicles -- that
is a state penetration rate; the sad fact of the matter
is that we're going to need that type of penetration in
the South Coast much sooner if we're going to meet the
Federal requirements. And so, because of the severe
challenge that we face with air quality, we need to have
these zero emission technologies brought to bear in our
region, first.

Specifically with regard to hydrogen
infrastructure, we had the first Southern California
Hydrogen Net Station back in the AQMD in 2004, I think
the first with U.C. Davis, so that was the first
northern station in the network and we were the first
Southern California station, and we have co-funded over
20 stations, hydrogen stations, some are funded with the
Department of Energy, many with the ARB, and the most
recent ones with the Energy Commission, about $9 million
funded to date, and we recently co-funded, as I
mentioned, the Energy Commission's recent round, and most notably the ones that would be upgrading the station at our headquarters, the one that I mentioned that was open in 2004 that will be upgraded to 700 bar, but also the Linde Station in Orange County. So any stations that are coming into our region, and if there is a need for our support, we are happy to consider that.

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

We keep hearing the automakers are very concerned about their ability to bring vehicles without that infrastructure, and we saw from Gerhard's survey that perhaps the decline in the initial numbers is because of the lack of infrastructure. But that aside, the third bullet, essentially the best location is where it can be utilized by the vehicles and has a willing...
operator, so having the location nailed down without a
willing operator is not a formula for success, so you
need to have both, you need to have a vehicle demand and
you need to have the operator that is willing to
entertain that business for a short time period before
the vehicle numbers increase. So you need demand, you
need the operability.

The second question is what is the best
approach for selecting site locations for stations in
the future, and there's just been a huge amount of work
that's been done by the California Fuel Cell Partnership
and many of the OEMs have provided input, many of the
fueling providers have also tried to provide input, and
I think it's ironic because the Energy Commission is a
member of the Fuel Cell Partnership, you know, many of
your staff have been at these meetings, and I know it's
a resource issue associated with being able to spend
time and countless hours in developing these type of
Roadmap plans, but clearly a lot of work has been done
and being exposed to that as it's developed has been
very helpful for us, in particular, to understand how
these stations are rolling out, what the need is, what
the methodology was for coming up with a certain number
on the dollar amount, so the whole fuel cell partnership
road exercise, as well as the hydrogen infrastructure
trust activities really helped to solidify many of the stakeholders around this kind of number and the total funding amount.

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

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

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

Now that input should be utilized by the Energy Commission as you look towards this new solicitation. Now the previous process, and as you're going forward, you're going to accept specific proposals from entities that are going to propose on very detailed locations for the station, and that is critical to have that type of willing operator. In the past, you had the
OEMs providing support letters for the operators, I don't know if that's going to continue in the future, but what that helped to do is identify to the Energy Commission where these priority locations were in terms of the markets, so it went from clusters to an actual ranking in terms of the proposals that were submitted. Now, if you're not going to do that, and if you're not going to have the OEM input and writing support letters, I have a dash line that shows, well, then you need to validate the sites and the ranking for these stations that you receive. And some of the tools that you would be able to use are modeling tools such as a STREET Program by U.C. Irvine, or the U.C. Davis that Mike Nicholas will talk about, but that should help you validate whether the stations that are identified are actually the high profile ones, or the high utilization ones that you want to fund. Of course, that entails using some engineering judgment. I think Gerhard mentioned one tool that they use is they did site visits. I know that ARB staff, when they first went out with their solicitation, asked the AQMD staff to do ride-along's with them and to kind of ride shotgun as they went through the process, to help them understand how you -- or what makes a good site, help us identify how our prioritizations should occur, and we were happy...
to do that and we would be happy to also assist in this case.

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

So the last bullet is that you need to have OEM input in some fashion, the automakers have to provide input on that market, so be it through the process of the Roadmap and actually having them rank the locations, or having them write support letters for specific stations, or if you're not going to have that input on the front end, do it on the back end, and you could have, for example, a blind survey of your proposal. So a geographical map that says here's all the station proposals that we received, where would you
rank these in terms of priority, so we don't get an instance where you're double-dipping in an area which may not have high value.

And so the final slide I have are just simple recommendations, is to leverage the resources that are already at hand. The Fuel Cell Partnership has put an inordinate amount of effort in identifying the cluster locations and the coverage vs. capacity, we think this I a valuable document, please use this. You are a member of the California Fuel Cell Partnership, so it is a natural fit for you and of the other government agencies to work together. And then, how do you decide on the specific sites? You should use the proposed -- once they're received, you can use your modeling tools by both of these fine University of California institutions, use your judgment in terms of site visits, or do this blind OEM input on a survey, depending on how you seek their advice on the ranking. And I put in a parenthetical here, so the ranking that comes out of this process, is it based only on location? And I say that because I know there are other things that you need to consider -- cost-effectiveness, you have to consider the technology, you have to consider the experience of the proposers, which is extremely critical, and you also have to consider did they understand the scope of the
RFP and the length of the project? Are they willing to take those risks alongside the State and the other stakeholders? So this is only giving you one portion of your decision matrix. And then, finally, I would offer that you should solicit external technical review from other government agencies such as the California Air Resources Board, Department of Energy, NREL, and the AQMDs, and we would be happy to assist you in that regard. So, thank you.

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

MR. STAPLES: Hello?

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

MR. STAPLES: Yeah, this is Paul --

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

MR. STAPLES: Paul Staples of Hydrogen Industries.
MS. BARONAS:  Thank you, Paul.

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

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

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

MS. BARONAS:  You're fine.

MR. STAPLES:  Okay.  Well, really, it's just basically a comment trying to basically say that I think that Matt is thinking on the same lines that I'm thinking of, is that this whole process would be best served if you had a Tech Committee, okay, like the MSRC has, because there was a similar situation about 20 years ago with that and that was what ended up being the end result, is that they formed a Tech Committee, that they had 20 like SAICs in their review process, and
reviewing the data, and scoring it, and then it was
basically presented to the main Committee for final
approval, and then it was up and down, and that was
basically the way it worked out. And it eliminated any
issues or any of the issues as far as here today. So
I'm just wondering if that would be something that they
would be willing to do along with the Bay Area AQMD, and
members of CEC, as well, because this needs to be put in
the hands of the people that are actually spending the
money, right? And of course, taking input from the
automobile manufacturers is very important, certainly,
and other entities, but you know, not all of it is in
one person's hands.

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

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

So, thank you.

MS. BARONAS: Thank you very much, Paul.

Appreciate it. Any other callers on WebEx who would
like to comment or make suggestions along the line of
discussion topics at this time? Hearing none, let's go around the table. I do have questions, but I'd like to open it up for people to provide some input and comments, and maybe their insight into what we heard this morning. Please raise your hand and you'll be acknowledged and can go ahead. Jim McKinney from the Energy Commission.

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

MR. ACHTELIK: This is Gerhard Achtelik. And...
so by "precision," are you asking how important is it that you hit the exact right spot?

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

MR. ACHTELIK: You know, I would say it probably varies a little bit and if you, I mean, I guess my perspective would be, if you're making a connector station, you might have a little bit more flexibility, but depending on what you're connecting between, you have to look at the range of the vehicle; if you're connecting between L.A. and San Francisco, you have to make sure that you can meet the range of all the vehicles. If you're connecting between Sacramento and San Francisco, you probably have a little bit more flexibility because most of the cars can make that -- so it probably depends on -- it's not a fixed one-mile,
two-mile, three-mile radius, it's going to be depended
upon the application.   MS. BARONAS: Thank you
very much, Gerhard and Jim. And so, Matt, would you
like to comment?

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

personally I think it's important that you put them in
the right cluster area and then, after that, if the
driver has to drive the 100 yards out of their way,
they'll find a way to get to that station.

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

MR. ELLIS: Steve Ellis with American Honda.
Damian at Bay Area, I appreciate your good thoughts and
your presentation. One thing I was tuned in on, though,
was a thought that use patterns needed to be studied and
mention that possibly hybrids, NGVs, and plug-in
vehicles may see similarities here. So I don't mean to
state the obvious, but I want to provide caution also
that, you know, when we think about hybrids, you know,
across the vehicles, there's a common thread possibly
between the purchaser of these vehicles, but where they
differentiate is, you know, let's remember that hybrids
for the most part have run on gasoline, hence haven't
been dependent in infrastructure. NGVs in many ways can
more closely mimic what we're looking at was hydrogen
fuel cell vehicles because possibly some limited range,
or definitely limited infrastructure, but plug-in
electric vehicles have a full function for short range
commute patterns, but one differentiating point of a
hydrogen fuel cell vehicle is this full function with long range and fast refueling. And I think that's an important point that needs to be considered. So in essence, a person with a sufficient infrastructure can wake up on a Saturday morning on a spur of the moment decision and make a long trip and use the vehicle just as they would their gasoline vehicle. So those use patterns can differentiate significantly. And the last part is that all three of these vehicles have, at some time or another, or even today, benefitted from an HOV sticker non-financial incentive, which actually does have a very very strong influence on the use pattern of those types of vehicles, and we've lived in that space ourselves significantly. That was the extent of my comment.

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

MR. BREEN: Yeah, well, what I would say in response to that particular point is often the use patterns of the vehicle themselves, it was more the people who drive it, and that's where we were going for, by putting that up there, we see the folks who would drive those particular types of vehicles as probably...
being from the, you know, possibly from the same demographic, they would have had prior experience using alternative fuel vehicles, and they would be most likely the folks who would adopt these vehicles the fastest. So I don't want folks to focus too much on the actual, you know, one alternative fuel technology vs. the other, the intent there is, okay, and the people who drive these vehicles, where do they go? What are their commute patterns? How would they use these vehicles? Assuming, you know, based on the work that we've seen so far, that it would be mostly these early adopter types, and that at least initially this vehicle would more than likely be adopted by some of the same folks. That's the only point I wanted to make.

MS. BARONAS: Thank you for that, Damian. I have a question for Matt. Could you bring up Dr. Miyasato's Powerpoint, please? He has a process there. Matt, you talked about left-side, right-side, you said it was front-end, back-end, and I was -- what I took away from that slide was that the process you saw had on the left certain features, and then you said something about, well, if the OEM letter -- I may have this right, maybe not -- if the OEM letter does not exist, you move over to the right-hand side. So my loaded question is, if we had both left and right together, would the
process by definition actually be more robust than one
or the other?

DR. MIYASATO: Yeah, certainly the point that
I was trying to make, and that's a good question, and I
apologize for the complexity and the confusion of the
slide, but the point was that you need to have -- so the
two main components that I think you need to have is you
need to have some indicator of market demand, and that's
what you're going to get from the OEMs, and so -- and in
that market demand, there's another granular piece that
you need to dig into and that is what is a priority
ranking for those specific clusters. So you can do that
either of several ways, one is you could ask for that
upfront, and say, you know, Bill Elrick and the Fuel
Cell Partnership, please work with the OEM group and, of
the clusters, develop up to where that priority lay. Of
course, that priority is going to be in the South Coast
AMQD, but in which specific cities and locations? And
how would you rank those? And that may be a difficult
task because they all have different market segments and
visions. So the way I think the Energy Commission had
done it previously is you asked the station providers to
get a letter from the OEM saying, yes, they are willing
to utilize that station. So that could be another
process, but that may be more messy, I'm not sure how
that all works, except in the previous NOPA, and if
those are both in the too hard pile, maybe you do it
after you have received the awards, you do a geographic
map of where you're proposals came in, with no
indication of who is providing the station, and say, "Go
ahead and rank these. Here's what we've got, which ones
do you like?" And that can be an anonymous, you know,
blind survey or something of that effect. So I'm just
brainstorming loud here on potential processes used to
get that market demand information.

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

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

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

MS. BARONAS: Oh, sure. Of course.

MR. MCKINNEY: So, Matt, it sounds like --

Jim McKinney here -- it sounds like you're suggesting
that there may be a very different approach to what
we've done traditionally in all our solicitations; but
after we get the proposals in, we typically go into a
black box, you know, we cut off all communication with
outside parties and stakeholders to kind of preserve to
make sure we have an equal playing field, everybody is
treated equitably. It sounds like you're suggesting
something very different, which is to have a lot of
different input from different parties, whether it's
other government agencies, or automakers, or other
parties, kind of similar to what Mr. Staples was
suggesting with the Technical Advisory Committees. So
is that what you're envisioning?

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

The other process is something that I'm
suggesting only as a manner, or a means to get automaker
input, so if you can't do it on the front end, which is
probably the more traditional way, is get a ranking of
priorities by community, then perhaps there's a
different way to do that, and I don't even know if it's
possible, but if you can do a blind survey and say, you
know, you're doing surveys with the OEMs now, do a
similar survey and say, "Here are -- these are potential
sites," there's no information, there's just a dot on a
map, for example, and let them select it. And then you
can rank it that way. Again, that's only for location
specific station identification, it's not for winning
the proposal, they've got to meet all the other
criteria, cost-effectiveness, cost-share, etc. So I'm
suggesting that, I don't know if it's possible, but it's
an option.

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

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

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

MR. SHEARS: John Shears with the Center for
Energy Efficiency and Renewable Technologies. I think
Drs. Nicholas and Brown are going to touch on this in
their presentations, but I just wanted to raise the
issue that my understanding is, in terms of trying to
site the stations, there's going to be a quasi dynamic
aspect to that because the challenge is, you know, to
get the 60 to 100 stations out there so that we have coverage, you know that's relatively convenient to the customers until the fuel volumes in the market is robust enough that it's self-sustaining and then it becomes about capacity. So in order for the stations to have a greater chance of getting to self-sustaining volumes, the challenge is, of course, of siting them so that they're not unnecessarily competing with themselves as the market is developing. So, as new stations are selected and sited, that will require some adjustment to where, you know, the next adjacent station could be located.

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

DR. NICHOLAS: Yeah, I'll go through some -- this is Michael Nicholas -- I'll come at some of that in the presentation, but that's a good point, is that one station affects the other stations, so if you site one,
then maybe don't site the other, even though they both may be good, but they might be somewhat mutually exclusive, so that's an important point.

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

MS. BARONAS: Thank you for that. Alex.

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

DR. MIYASATO: No, not necessarily, but
clearly it should be reflective of the two-third, one-third split that the surveys are suggesting.

MR. KEROS: Sure.

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

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

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

MR. KEROS: Thanks.

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

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

MS. BARONAS: Thank you, Alex. I have a question for all three presenters on the topic of coverage and capacity. A few -- two presenters out of
the three mentioned this and I'm just curious about the reality of the scalability of some of these devices. I mean, so if you have the right coverage and capacity a little lower, and then you could have plans for scalability in making more capacity, all of that sounds good hypothetically, but how real -- how real is that? And how do you incorporate that into your planning?

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

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

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

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

MS. BARONAS: Well, thank you very much, everyone. We are on schedule, happy to say that. And
so I would like to proceed with Tim Brown, University of California, Irvine.

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

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

Next up was the California Fuel Cell Partnership Action Plan, which was released in 2009, it showed similar sorts of maps, also called for between 50
and 100 stations by 2017 as initial deployment of fuel cell vehicles. And these station locations were much more accurate in that they were based on OEM input on deployment plans, as well as some capacity calculations, though the locations themselves were not as specific, there were these sort of fuzzy dots, giving general locations, but not specific street corners.

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

In 2011, Dr. Stephens presented this work at the National Hydrogen Association Conference for a total Southern California analysis, not just Irvine, and now in 2012, we have the analysis essentially complete for the entire State of California. And it's important to note that throughout this work, since the very beginning, we've worked closely with automakers and that collaboration has really increased recently and it's intimately coupled between our research and what the automakers have helped us perform.
So to focus on this network of 68 stations, we worked closely with six automakers shown here to develop the network required for sufficient coverage for commercial launch of vehicles. And, again, this goes back to the coverage versus capacity question, and we're looking at coverage as what is needed to sell the first car, what does the customer need to have in place to feel confident buying this vehicle without many concerns for fueling? So the results I'm going to present are based on automaker data, market data, technology insights, as well as some analysis work from our STREET tool, which was spatially and temporally resolved energy and emissions -- energy and environmental tool. And let's talk a little bit more about that.

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

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

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

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

So here in the Santa Monica cluster outlined in red, and it's actually -- it's larger than the city proper of Santa Monica, it's where kind of Santa Monica and West L.A., it's a broader area. We've worked down the roadway network within this area into a series of links and nodes, links representing street segments, and nodes representing intersections, and then we overlay the actual existing gasoline stations, in this case, in this region there's 126 gasoline stations. And through the computer algorithm, we can determine the driving distance -- driving time from any area within this -- from any location within this area to a gasoline station, and it's about four minutes. And actually, surprisingly, that's consistent throughout California, throughout urban areas, whether it's Santa Monica, or Irvine, or Berkeley, it's about four minutes to get to a
gasoline station. So we needed a nice baseline and we know people were comfortable with the level of infrastructure of gasoline, so it's something to shoot for with hydrogen.

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

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

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

We could also plot here the stations that the CEC has already funded in this area for the previous funding allocation, three additional stations, brings the driving time down to 15 minutes, and accounts for three percent of the total stations in Santa Monica serving hydrogen. Well, how far do we need to go? Is this far enough? Or do we need to go more in this area? Now we can look at some work from Marc Melaina and Mike Nicholas, actually, he's speaking next, previously who did some analysis of various regions showing that about
five percent of the stations needed to have alternative fuel, if properly located, to meet customer needs. So, let's go a little further and, with four additional stations in the Santa Monica region, we can get down to six-minute coverage and that represents six percent of the stations in the area. And you can see here this curve should be coming, there it is, showing that the eight stations in this region is a pretty nice compromise, it reaches six-minute travel time, route produces this six percent, or roughly five percent, which is theoretically needed, and you can see that, to go from one station to four stations is a dramatic improvement in travel time, four stations, eight minutes, you get a nice improvement. But to go from eight stations out to 16 stations, to do just two minutes improvement, takes quite a few stations, so we see this is a sort of sweet spot in the analysis and, again, we find the same trend in every region we look at.

We can look at this visually to get a graphic representation of what's going on here by looking at the service coverage within the region. Here, we see the red, blue and green coverage, representing two, four, and six minutes. This is one existing station in the region, it has very nice coverage, but you can see
there's definitely some spots that are missing, that aren't covered well. We can compare this to some other rollouts, we add the three new CEC stations, we can get better coverage, and then we go a step further and add what we are proposing here to get eight stations to completely cover all of the residential area within Santa Monica, the Santa Monica region, with a six-minute coverage.

It's important to note that this is a robust methodology. We show here -- this speaks directly to the question that John Shears brought up -- here we see three different configurations of eight stations, each of these plots, there's eight stations in Santa Monica, all representing six-minute coverage, but each at different locations. So the optimization algorithm that we used actually spits out multiple solution sets, and this is nice because this allows for the realities of station siting -- we can't come in and dictate that a hydrogen station must go on a particular street corner, and that that gasoline owner must do this. So, by having a flexible solution set, we can account for real things such as station contracting, and permitting, and various land owners, and station branding, and all these other aspects which occur when you need to site a real station.
One other important point here is that the algorithm, the mathematical part of the model, is only one piece, it presents sort of a rough draft and that is refined with close cooperation with automakers and their input. Shown here is the Palos Verdes Peninsula, and I have medium household income. You see there are some very nice household incomes out there, which are likely early adopters of these fuel cell vehicles, so we would want to target that region. And as a matter of fact, the model output does exactly that, there it is, and you can see here again the two, four and six-minute coverage of that region well covers where these high income families are. But as we speak with automakers, we realized that these people all have to drive essentially one way to get off the peninsula, so we're better served by moving that station up, it covers a larger area that way, and we still in effect capture that population that is out on the peninsula. So there are a lot of additional factors that go into this modeling that working with the OEMs directly can provide, it's more than just mathematical.

So by applying this method within each of these cluster regions, these are the five regions, we've come up with this matrix -- require eight stations in Santa Monica, eight in Torrance in the beach cities, 13
in Orange County, four in the Berkeley area, and 12 in the South Bay. And you can see here what is existing or planned through CEC funding, or ARB funding, and how many additional stations are required to meet the six-minute travel time.

The next step is to understand what stations are needed to seed the new clusters and to really solidify the regional network. You can look here at Southern California as an example, again, we've done this through the entire state, and again I'm showing household median income as a surrogate for a number of things, we've looked at household income, we've looked at vehicle populations, we've looked at some proprietary sales data from automakers. This one, I can show. I have the three main regions outlined, but you can start to see some other regions which look like nice markets.

We have the San Fernando Valley Region where we're proposing two additional stations, Pasadena for three stations, the Anaheim area for one station, and Long Beach for one additional station. And when adding those to the matrix, we get a total of 17 additional stations throughout the state, including Sacramento, San Diego, and some areas in the Bay Area.

And last but not least are the connector and destination stations. And this work was largely based
on automaker input as to where current customers are driving, where they want to go with these fuel cell cars, and how we need to connect the state to make these full function vehicles and not simply urban vehicles.

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

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

The next step in this is to determine the rollout of the stations; sure, we want to get to 68 by the end of 2015 to see this market, but how are these stepped out? I show here the sort of nine stations that
were existing or planned prior to CEC's involvement in hydrogen, and we see that these stations within a six-minute coverage covered 2.7 million people, and they guarantee a drive time within target regions of 24 minutes. If we add the CEC stations, seven additional new sites, I think there were nine stations total in Southern California they funded, but seven new sites, it brings the total almost to 4 million people, and the 25 percent of the total population within this Southern California area, which is about 15.5 million people. So these 16 stations total will reach four million people within six minutes, and it can offer drive time within the cluster regions to any station of 15 minutes.

We then worked with automakers, basically again the automaker input, to determine what the next priority stations were, and what the priority stations were after that, and how do we ramp up to the 68. And I can show a proposed raw no. 1 gets us to 4.7 million people, adding another seven stations in Southern California is equivalent to stations being added in Northern California, which gets us down to a travel time of 9.4 minutes. Another round of stations gets us to nearly six million people covered in 7.3 minutes, and then, last but not least, the final round of stations takes us down to six minutes coverage within the
regions, and covering a total of 6.1 million people,
nearly 40 percent of this entire Southern California Basin within a six-minute travel time.

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

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

MS. BARONAS: Thank you very much, Dr. Brown.

And our next speaker is Michael Nicholas, University of California at Davis.

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

As Tim said, this sort of discussion around hydrogen station siting has been going on for a couple years, and I think what I'm going to do is actually go to my extra slides, first you get a preview of all my slides, but looking at what has been done in the past and let's see, so this is a study we did in 2005, and Tim was talking about percentages of stations, and I thought I'd just highlight a couple things. So we did a study of just general fuel availability, so for gasoline stations, how close are people to the closest station on average, and so we did L.A., San Francisco, San Diego, and Sacramento. And you see that it is somewhat different for the more dense regions and has to do with the road network and the clustering of population in each center, and so you can look at it in several different ways, like three minutes, four minutes, seven minutes, so if you wanted a seven-minute drive time to your closest station, assuming you wanted to equalize it across areas, you would need .8 percent of stations in L.A., one percent -- all the way up to six percent in Sacramento. So the point is -- over three minutes, there's another example, seven percent in L.A., and 16 percent in Sacramento. And if you were to look at the numbers, this is what it would be as a percentage, so
for seven minutes, L.A. would be 26, you know, for a total of 39 in the state if you were looking at seven minutes, and you can look at equalizing it.

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

So what questions need to be asked for these to look at the infrastructure siting? So, who buys the cars? Who buys cars, in general? And who buys advanced technology vehicles? So you want to get to these
customers. So that's a basic question. And what is --
you wanted to find what is the relationship between
purchasing and hydrogen infrastructure. So, if you site
a station, what does that mean in terms of someone's
purchase decision? And what is the relationship between
infrastructure and use, looking at these very very basic
questions? So right now, we're -- this is kind of a
different way to look at it. We want to find out who
wants to buy these vehicles. There's people who, you
know, they're hybrid owners and they're looking for high
technology vehicles, and then who can buy these
vehicles. So they have to have money, they have to be
new car buyers, you're not going to get the guy who is
buying a $2,000 used car to buy a hydrogen vehicle, it
doesn't matter if he wants to, it's just do they have
the ability to. And right now, who can refuel easily is
not there, so we need to move this closer and have some
intersection between who wants to buy, who can buy, and
who can refuel easily. And so this who can refuel
easily is what we're talking about today. So one factor
is, is it close to home, is it close to my frequent
routes, and is it close to my desired destinations?
So this is a proposed decision framework, or
just what we take as basic assumptions, so we assume
that there's a latent market for hydrogen vehicles, even
without everybody out there who wants to buy these vehicles, and we take that as a given, you can argue that, and maybe you have to be aware of the vehicle to want to buy it, but, yeah, we're assuming there's a market out there, otherwise we wouldn't be doing this and that the ease of refueling increases the likelihood of the fuel cell vehicle purchase, so either all on your route, or near your home, and that a prerequisite for that -- this is what we would argue -- is that you need an anchor station, one that you know that you can dependably use. So if I'm going to buy a vehicle, I want to know that somewhere that's convenient for me is where it needs to be for me, even if you consider the vehicle -- right now, there aren't very many stations, so there aren't very many people considering hydrogen vehicles. And then the network of stations does make a difference. As Tim alluded to, there's a network effect and there's a coverage issue, which does increase the value of or attractions of the fuel cell vehicle, so not only is it next to my house and I can go 300 miles round trip from my house, where else can I go on this, regardless of how often I go there? And so the attraction is related to the frequency, so within L.A., you may pass a certain route and, "Oh, that would be useful, I can see myself
running out or forgetting," or something that's more
aspirational, where the attractiveness is related to the
ability to expand what is possible, and that does mean a
lot to people. And other factors -- this is something
that hasn't really been brought up -- other factors such
as the vehicle price and hydrogen price will affect the
desirability, so if you give away cars for half price,
you'll end up with a lot more market and you need fewer
stations to reach that market; but if it's equal to the
price of gas, then you have to put more stations out
there to reach more people, or to reach that market.

So looking at who can buy, that question and
that framework I put up there, who can buy, looking at -
- we think that new car buyers are probably the most
people who can buy, they're generally higher income, or
they like to go into the dealership, and these are the
people that are probably a target market. But looking
at who buys cars, it's really only 33 percent of
households that buy new cars, at least this is in the
last five years, if you go back 10 years, it decreases a
little bit, but you wanted to find who your market is,
and then there's this kind of hyperactive market and we
are the six percent, so that's six percent of the
households, they purchase 33 percent of the cars in the
state. So these are the new car buyers probably who
you're going to be looking for to buy these fuel cell vehicles.

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

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

So where do they live? This is the Leaf example, so basically you can see that they live basically in the big cities, so you've got Sacramento,
San Francisco, Los Angeles and San Diego, and then you see there is some demand out here, but not really all that much. You see some along the coast, and in Northern California, there's not really all that much Leaf demand. So where are the new car buyers now? I'm very sorry, but this is probably hard to see, but I'll just point out that San Francisco, Los Angeles, San Diego is the same place as where the new car buyers live, and this is the density of vehicle sales per year, and vehicles per square kilometer. And if we zoom in to a little bit closer view, this is Los Angeles, and I've highlighted in red kind of the more cars per mile. And if you're a Leaf -- if you're selling a Leaf, it doesn't really matter if you're looking for number of buyers per mile because you basically have your infrastructure at home, but with hydrogen, you have to get as close as possible to those who want to buy the cars, and so this density of car buyers does make a difference if you assume that the difference from home does make a difference to who buys the car, or who thinks the car is right for them.

So, and overlaid on this is some of the old California Fuel Cell Partnership regions and these have been -- again, another thing to look at to see here is that, outside of these potential areas which have been
redefined several times, but there is market; for example, there's nothing really here, this area around here has a lot of potential and, as Tim pointed out, it does kind of go up to Anaheim and you see that there's a lot of potential market out there. So these are maybe not your first sites, but as you expand your market, this might be where you need to go.

So if you're looking at how do you put this together, or if you have a willing person, what kind of infrastructure do they want? And so we did a pilot study and this is certainly not statistically significant, and we did -- it was 20 respondents, and we asked them where they would like refueling infrastructure independent of where there was a hydrogen vehicle, or some sort of -- it was basically a liquid fuel with long range, similar to gasoline, and so just looking at the infrastructure question, where would they like infrastructure, and these were people from Davis, where did they say they wanted infrastructure? So they said they wanted one near their house, some people said Sacramento, but a lot of people wanted to connect to the Bay Area, and then you have these aspirational stations like Tahoe and, very interesting, Kettleman City came up and, so, I would fully support that idea to put one in Kettleman City because people said, "That's about half
way, that's where I would need it," and people say, "I
go to Los Angeles sometimes," where the area of
agreement is for people in Davis, though, is basically
this area from Tahoe, Davis, San Francisco Bay Area, and
so there's one they want for their house, and then the
next one they choose is like 20 miles away, and then 60
miles away, and then they expand out and then they start
filling in kind of these -- there may be out of your six
choice, actually, I can kind of look at that -- no, I
don't have that down here -- but they start filling in
the network. So they may make it so that they can do
all the stuff they want to do to expand it, and then
they fill in for convenience is kind of the pattern we
see.

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

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

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

So this is illustrative, but it doesn't really have any scale behind it, but you can see that you need lots of -- even if there was only one station, you would
need network stations for someone to feel comfortable about driving a hydrogen fuel cell vehicle.

So how do we define what the anchor station could be? So we think that there's some relationship from the distance of your house to the station, or from your path, like Tim pointed out, Palos Verdes, everyone has to go out a certain path, and that is good enough because that's where the gasoline is now, that's good enough for people to feel comfortable, even though it's five to seven minutes away. So there's an element of path that I'm just ignoring here, and this is more just kind of a though exercise. But we took this, sort of what Tim mentioned, Kitamura and Sperling, and saw where do people refuel with gasoline now? And this is the percentage. So around 60 percent of people refueled within five minutes of their house, zero to five minutes, that's 60 percent of people refueling, and this is the on-site survey that was done on a site, it says, "How far are you from your house?" And this is what they answered, and so there's some drop-off in usage and people generally refuel near their house. So you could say that -- if you did say that this is how you would define the market, you would say that if a station were 20 minutes away, then you would only have 10 percent of people interested in your vehicle, so there's some
distance -- I think that's a bit optimistic, so I just through simply just cutting it in half, I just changed those assumptions. Anyway, this is not purchase behavior. But if you said that perhaps 10 percent of people are interested, or 20 percent of people are interested if the station is 10 minutes away, that sounds a little more realistic to me and that, if you were two and a half minutes away, that would mean 60 percent of people were interested, for which infrastructure is not a barrier; this is ignoring those network effects I talked about -- assuming there is a network out there, how close does your anchor station have to be to your house? And there's some relationship to distance, we think.

So, well, how much might one station do? And this is looking at Santa Monica. So also, we're interested in market. We know how many households there are in California, there's about a million vehicle sales per year in California, and I showed that perhaps there's slightly higher income, this is 75K+ per year adjusted to today's numbers, so that's about $92,000, so $90K+ per year market in California, out of all the cars you sell in California, or maybe if this is your target market, you've only got this much to work with, about 613,000 -- why do I have decimal places there -- but
613,000. And so if you look at a place like Santa Monica, well, what are you talking about? So how many people live in this small area that you potentially could sell a fuel cell vehicle or two per year, and you've got about 4,000 cars sold per year in Santa Monica, and then how many of those 4,000 could you reach with one station? So you could reach around 3,000, looking at that previously adjusted number if you're assuming there's some relationship between distance from home to your nearest station, or your anchor station. So one station could get up to 70 percent. And I'll clearly admit that this is just a thought exercise, and these are the research as far as what is that relationship as far as purchase network, I suppose, comfortable with the network and that distance from home, or your path.

So one station in Santa Monica could provide, you know, decreasing utility to people out here, but still there might be some people for whom that's sufficient. And so, looking at those numbers, you reach about a 70 percent. So to John Shears' comment about dynamicism [sic], yeah, if there were two stations in Santa Monica, you'd probably want at least two for redundancy, but you know, does the third one go in Santa Monica? Or does it go somewhere else? I would say that
you would have to look at something like this and figure this out a little more carefully and perhaps it's better to expand, especially initially, to reach the maximum market for which these anchor stations are sufficient.

So this is, again, just going along this thought exercise.

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

So this is just looking at how many vehicle sales are
there -- you can't just make people buy cars, people get
in accidents, that's why they need a car, or they have a
change in their life, that's when they need a car, you
need a new car, there has to be reason and there's a
cycle to these things.

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

So just -- well, I don't know if I need to go
through this, but there's different types of stations,
anchor stations, there are home stations, and then there
are local stations, and these connector stations, and
then, well, I'll just -- we've kind of gone over the
connector destination type discussion already. But if
you were just looking at anchor stations, how close
would these be on average to people's houses? So you
just define the population here. This is not done with
sales numbers, but you'd say -- you get about four
minutes on average from home to the nearest station, but
you'd have to divert and it would be on average about
5.6 minutes diversion time. So this is what it looks
like for all eight clusters and you see that Irvine is,
as Tim mentioned, higher than all the others, and that
there are some places that have better fuel access than
other places. So these were 12 areas defined by that
survey and they all have some tote around one to two
minutes, using the network I used, it's an unloaded
network, and so it might be slightly fashioned to the
stuff Tim used. But if you want to see where do
people from these clusters drive, and what sort of
network they might want, you can site stations based on
diversion time, and you see these are in white, so you
take the home anchor stations as given, and where do
people pass by the most, and what is the best
arrangement of people for whom you're siting -- you're
siting the network vs. their anchor station, so what
might they find valuable? So we can look at the traffic
distribution from only these customers. And I think the
gentleman from Bay Area Quality Management District kind
of highlighted this finding where those people go and then serving those people. You can see the diversion time goes down by adding stations out in the network. Some of these actually end up in potential cluster areas. So how do people actually re-fuel? So, again, this is a little more back to the basics, you can find it in journal transport geography, but do people actually go to their nearest station? Or is there some sort of network effects? And these are -- you can see there's two different scenarios here where you have people -- you know, there's the freeway here, and do they travel to their nearest station? Or is it more like this? Is it in the direction of travel where there's some relationship to the direction of travel and to the nearest station like that Palos Verdes example, and it turns out, anywhere along the path of freeway is acceptable in most cases, and the bottom example is how people refuel. This is just for gasoline -- sorry, this is a gasoline study looking at population distributions, traffic distributions, and how people would refuel with gasoline. So one thing to notice, some very general things, is what is the influence of freeways. So based on distance from the freeway, first of all, we see the population -- people don't live next to the freeway in the same proportions that they drive next to the
freeways, this is an intensity measure, and this red line here is the population density versus distance to the freeway. So it falls off, there are more people near the freeway. But you look at the gasoline intensity per square mile here and most gasoline is pumped near the freeway. And I think, looking at total percentages, this is about 50 percent of all gasoline is pumped within one quarter mile of the freeway.

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

So again, you can also go back to basics and look at where is all the fuel sold in L.A., and again, there's a lot of fuel sold in kind of these places where there's lots of cars and a lot of new cars, and a lot of population density, so these are potentially also good places and places to look. And also here you see this relationship to the freeway, you see all this gas, there must be something there, you know, an agglomeration of demand. So along the freeway is one of those things you can look for which might raise one higher than the other.
So what is the optimal approach? First, you have to find the predisposed customers, and this is very basic, not as specific as Gerhard went through, but more kind of a framework, so you find those customers who want to buy the vehicles, who can buy the vehicles, so you look at hybrid sales, EV sales, that might tell you something about how adventurous people are, and then OEM marketing input is very important. I know Honda has run a survey that says, "Are you interested in our fuel cell vehicle? And where do you live? Would you like more information?" And they have a lot of information and a lot of input to give to these siting decisions. So, site them as close as possible to their commute or shopping paths. So you could, as a general rule, say the nearest freeway entrance or large road entrance, a lot of times they aren't really freeways, they're highways or some other large capacity road. So once you find out where these people live, assuming that's a prerequisite, then you fill in the regional holes, looking at connector stations like I showed; and if you plot the paths of these people, and then also with an eye towards making those connector stations for the initial customers also anchor stations for somebody else, so there's dual duty possibilities, and then there's some like Kettleman City in Tahoe that maybe
don't have that function, you just don't expect it, but it does have an effect on how valuable the car is.

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

So some conclusions. Kind of going through the same sort of things, but anchor station is a prerequisite, and where that anchor is, you know, it could be at your work, that could be the one you plan to use most of the time. Most people would probably have one that they would like, or a set of ones like, "I'm going to use this half the time and this half the time."

Anchor stations should be cited to attract potential buyers, and this is the main thing I would have to say, is what is your goal? Your goal is to sell cars, and I would say a secondary goal is to increase the use of the cars, but you want to get those cars out there, what
convinces people to get those -- to buy those cars? And if gasoline stations -- if anchor stations are like gasoline stations, and I'm making a little bit of a jump here, but if you take this to be true, then they would be sited on the path and home or freeway, or other frequent path. Again, it's not always this freeway context that I highlighted, it's just easier to demonstrate. And all else being equal, the closer to home is better, but if you have it on a frequent path and it may not be such a penalty to be farther away. One thing to think about, potential buyers near a station are limited, you have to look at people who are buying new cars, and there's only so many cars sold in California, and a station may have to build up demand over time just because you need to catch the cycle. And you also may need to site -- you know, go outside these initial clusters relatively quickly to get the best bang for your buck.

So the market will develop over several years, as I said, just because of the way cars are bought. The number of stations necessary is not absolute because it does depend on this market price, both of hydrogen and the vehicles, and so it is somewhat variable. There are some things that are outside of your control. So the aspirational stations, as I showed, it did add value for
the customers, and so how do you get the return on investment? I don't know, people may not use the one in Kettleman City, but there are certainly a lot there, and so there's some places you might be able to identify like Las Vegas, and Yosemite is a place I mentioned. And redundancy is important, we found this out, this is one of the big learnings from the first rollout of stations, is having a second station does help out how a lot of people think of one station, but they probably would like to have two. So when you develop an area, or you find an area, one station means two, and that could define the next (quote unquote) "cluster" or mini-cluster. And those stations should be some distance apart, and so this might be another criteria that you could look at for siting, so there's some network effects and, you know, people -- the confidence people have. And that does need a little more research. So I think that's all I've got. Thanks.

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

MR. POWERS: Yes, I have a question.

MS. BARONAS: Please identify yourself and give us your question.
MR. POWERS: I unmuted myself. If you can mute everybody else, there might be not quite as much background.

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

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

DR. BROWN: Sure. Thank you for the question. This is Tim. Just to address one comment you made about station owners, station owners are generally private individuals and aren't necessarily associated with the branding on the stations, so you're right that the large oil companies have some issues with hydrogen right now, but it's not correlated to the fact that, you know, individual owners are still interested on their own individual bases, or not interested on an individual basis, regardless of what perhaps the branding on the station does. But regardless, we all know that we can't dictate where these stations go. Our model certainly outputs a specific street corner, and that's nice, but we've found luckily, somewhat of a coincidence, that we can move that location across the street or down the block and this would re-optimize and still maintain the same number of stations within the region. For example, the Santa Monica or the Orange County, 13 stations there provide the 6 million of coverage. Certainly, it matters which 13, but we can find a number of solutions where 13 works. So, by doing that, we can work with whatever stations are proposed and understand if that
will fit into one of these solution sets and essentially there are enough locations that it does, and we can do that, we can take into account the permitting issues, the actual contractual issues between equipment providers, or hydrogen providers, and station owners. Or, if appropriate, you know, Greenfield sites that aren't existing gasoline stations, so I think it's fortuitous that the modeling suggests that this sort of number of optimizations can be configured a number of ways.

DR. NICHOLAS: Yeah, I would agree with Tim, we've run different kinds of scenarios and the number really does say -- number versus the output of like average travel time to the nearest station does stay pretty constant, so there's a lot of solution sets that work, and we assume fully that not every -- there's not going to be an optimal site, and so the question becomes, when you put it in the non-optimal site, what does that mean for the rest of the network? It does have an effect and you analyze, you go forward from that. You can analyze how much better it would be -- you can analyze two different station options and say, "Okay, this is a non-optimal site," they're all non-optimal, and then this is, but which non-optimal site is better. And so, yeah, it's just about getting the
outputs. There's a target numbers, which is the best
you can do, and then it's always going to be slightly
different than that, which is fine, but probably pretty
close.

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

MR. POWERS: That's correct.

MS. BARONAS: Okay, thank you.

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

MS. BARONAS: Okay, please identify yourself.

MR. STAPLES: Yeah, this is Paul Staples with
Hydrogen Industries. I have found that it's really very
relative to the station owners, themselves. I've been
contacting station owners for the last two and a half
years, spoken to over 100 station owners. I found that
it's closer to about 50 percent are willing to listen to
what I have to say, that's not bad. After that, I
figure about 20 percent of those are willing to
consider. So I would have to say it really is on an
individual basis. A lot of these guys are not happy
with the oil company overload. They really just don't
like being bullied around and pushed around, which is
what it is, and they end up taking the heat from the
customer around gas prices. So they're willing to
consider something, as long as they don't end up being
in the same situation that they are in with the oil
companies, all right, where they have control over their
prices, they have control over how they do business, and
that's really what I think the case comes down to. So,
yeah, the oil companies are not interested in doing it
and that's probably a reason, I mean, let's face it,
what did what's his name say -- with Valero Oil -- "You
want us to fund our own demise?" Well, I thank them for
that compliment that our plan is going to eliminate
petroleum in such a short time, that they don't want to
participate. Fine, don't participate. We can do it,
then you'll end up having to come to us later, all
right? Which I'm perfectly happy to deal with and I
think that most of us should be, right? Because they
will come eventually, they'll have to, or they'll lose
business, it's as simple as that. So I don't see the
problem with dealing with individual gas station owners,
it's like herding cats, but it's attractive, I think.

Thank you.

MS. BARONAS: Thank you very much, Mr.

Staples. I'd like to open it up to the people in the
room, and if any of the other presenters have comments
and questions for this set of panelists. Please.

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

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

MR. SLEIMAN: Okay. One of the issues is that we operate, you know, a multitude -- again, lots of
stations, and one of the problems that we find is that
every hydrogen station has maybe one pump, while a
gasoline station has five, six, seven pumps. And when a
station goes down, you know, the guy who makes a lot of
money comes up, can't find hydrogen, and does not want
to drive 10 minutes to the next station. So the six
minutes, I would like you to consider maybe having them,
yes, adjacent to each other, two stations at the same
corner. That way, we don't get to that situation. And
every OEM will have a technology issue at one point, so
if you locate the same technology at each corner, and
there's a problem with that technology, then that whole
region is not going to be serviced. That's the comment
that I wanted to make to CEC.

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

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

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

MR. SLEIMAN: Yes.

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

MR. SLEIMAN: Yeah, you're probably right.

Thank you.

MS. BARONAS: Please, Joan.

MS. OGDEN: Hi. This is Joan Ogden with U.C. Davis. And I just wanted to make a comment, sort of following along with what the last speaker said, and this is based on a study that we did at U.C. Davis with a lot of input from some of the auto companies and the oil companies, about two or three years ago. And one of the biggest siting of things that everybody desired was, in a given cluster area, let's say a city area like Irvine, or some of the other areas that have been identified by the partnership surveys, you really want to have more than one station, so you want to have two and maybe three for this redundancy reason and backup reason. That being said, I think there's a balance also, how many stations you want to put in a cluster, and it really has to do with what kind of travel time metric you choose, and I think there's an interesting
contrast between the Irvine studies, the Davis studies there, and that the Irvine studies were looking for a maximum travel time, if I understand it right, Tim, and correct me if I'm not, and didn't want anybody to have to travel more than, you know, the number you choose -- six minutes. In the Davis studies, we took an average travel time, so the philosophy there was that, within a cluster, you have enough stations there, you know, two or three for redundancy, but then you have a travel time where you look at an average travel time, some folks live a little further away from a station and some closer, so if you have an average of three minutes, some people travel one minute, some travel five, kind of like what we might have more with gasoline. So I think there's no one definitive answer, but that's something to weigh as to how many stations to put in one area versus branching out into other clusters, you know, say filling in more of those pieces on the map that showed the dark red, you know, that were good possible early adopter sites. So I think that's something to look at. Interestingly, too, although Mike was really focused on what the underlying reasons were for why consumers would choose fuel cells, and so on, I think the other thing that is interesting is we came out with two sort of differing sets of assumptions in the Irvine model and
our model with roughly the same number of stations statewide that would be required for what, in judgment and in consult with lots of different groups, came out to be a reasonable travel time. Thanks.

MS. BARONAS: Please, sir.

MR. ELLIS: Steve Ellis with American Honda.

So two brief comments, one, definitely, Michael, I appreciate your bottom line and that is one station equals two. For years, I've been saying one station doesn't make a market, and yet we've had to live with that, just as John mentioned and you've acknowledged. But also, I'd like to clarify something based on an earlier comment I made to Damian and that you, Michael, had referenced, and that is I think there was confusion in my comment about hybrids, NTVs and plug-in vehicles. My emphasis on that point was on the use patterns, not as to whether these are potential market customers for the vehicles. So, to be very clear, absolutely I believe that these are potential customers for hydrogen fuel cell vehicles, but the use patterns are significantly different and my concern there was, if this were studied, as was mentioned, it has the potential to lead astray as it relates to the siting of the stations, that was my key point. I just wanted to be very clear on that.
MS. BARONAS: Alex.

MR. KEROS: Alex with GM. And this actually sort of touches Jim, on your sort of precision point. And one, a huge compliment to the work that Davis and Irvine do, it really sets the fundamental stage of how to look at this issue. And Joan is spot on, it's amazing every time we study this issue, we sort of land ourselves at the same answer. So it's nice to feel comfortable that we're all getting to the same location. And we've talked about this, but average time to a station with traffic, not free flowing, these are all really important factors as a tool in the process, and I will use the 405 and Santa Monica Blvd. intersection, and if anybody in this room is going to work on hydrogen station siting, that's the intersection to go to, to understand the precision question because if we lent ourselves specifically to the models, we would find a completely different answer than if we went there. And anybody knows that's -- I've got to watch my words, right -- nobody crosses that 405 line, people going west, people going east on Santa Monica Blvd., you seem to be pulled into a whirlpool of waiting to get to the freeway forever, it's frustrating, customers are getting to the freeway and then getting on a freeway that's already congested. You see all of these issues. And I
think if we were talking average time, or maximum time, we might site the stations differently. But if you were to ask somebody like me at the highest level, where do you want stations, I want one station on one side of the freeway and I want one station on the other side of the freeway. That would not be maximizing anything, and it wouldn't be optimizing anything, and so a lot of -- just a reminder, and we've heard this a couple times, is the siting of the station and the tools that we can use with Davis and Irvine are really important, but understanding those idiosyncrasies of a specific site location really helps. And I think, to date, what's happened is the OEMs have acted as the proxy to that analysis and taking it quite seriously, and perhaps we can explore today how is it not just the OEMs, it's others, and how do we pull these tools into the long term planning and short term planning.

DR. NICHOLAS: I appreciate your comments, Alex and, yeah, you're right to a certain degree, but also, it's kind of like Yogi Berra said, "It's so crowded, nobody goes there anymore," so obviously some people are going there if it's so crowded, so it's going to be passing on somebody's route. But if that were your only station, yeah, that might be a good thing to look at because if you were forced to go there, that's
different than, you know, you may be forced for another reason, but every time you wanted to refuel, it could get grating. So some more analysis would need to be done exactly where people refuel in Santa Monica, and then, yeah, adjusting the models for slower travel time, you can potentially address some of those things, but maybe your comments are more towards like on-the-ground is extremely important, which I wholeheartedly agree, and you have to look at these sites, you can't just depend on the models, but they can give some guidance.

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

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

MR. ELLIS: No, it's just the simple -- I had made a comment to Damian in reference to his comments about studying the use patterns of certain vehicle type drivers and what he had identified was hybrids, NTVs, and plug-in electric vehicles. Yet his response and then your comment made reference to whether these are potential buyers for fuel cell electric vehicles, so I think that's where the disconnect occurred. So I simply wanted to clarify that I absolutely acknowledge that
these are potential buyers for the cars, but that
studying their use patterns can lead maybe astray simply
because the use patterns of those three vehicle types
are significantly different. The last point I did make
to Damian, and I think this is a point that we all have
to consider, and that is that there is this external
factor of the HOV sticker that has a significant bearing
on the usage of those vehicles, and we've seen that as
one class of vehicle lost the use of that sticker, which
caused people's actions to shift, so this is an
important point. And, again, I want to keep the
emphasis on as it relates to the siting of stations.

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

MS. BARONAS: Thank you, everyone. That was
very informative and, Jim, do you have a question?

Comments? Okay, go ahead.

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

MS. BARONAS: Yes, sir.

MR. MCKINNEY: This is great, this is why we
hired you, Jean, so thank you for being a great
moderator. So one of the things that the Commission wanted to better understand with this morning's presentations, and specifically with the modeling work that has been presented by both U.C. Irvine and U.C. Davis, so one of the things we're exploring is the utility of these tools to help us make kind of our final decisions, ultimate decisions as we go forward, and so one of the things that I'm trying to understand and another theme here, is how do we get the OEM input, the OEM confidential market data, all that experience, how do we get that input into our process. So historically, and I think this started with ARB, I don't know if South Coast did this, as well, but it was the latter from the OEMs that really served to convey that communication, those preferences, those rankings. And one of the things that I'd like to understand better, both Tim and Mike and Joan, is how might the STREET model, or the U.C. Davis modeling work, you know, serve as an alternative approach or as a proxy, or another means of kind of combining all the great demographic data, the traffic data, with the market survey results and the preferences from the different kind of customer classes, from the automakers, how might those tools serve that function?

DR. BROWN: I think we're well-positioned to
serve that function, as I mentioned, we're working closely with the automakers and it's a bit like herding cats, but we've done our best and I think there's a level of trust there between our modeling as a tool that helps the automakers, it provides a nice baseline for them, as well as we very much appreciate their feedback and input. And through that, we've developed this plan, which I think is pretty robust and pretty well accepted by the automakers and stakeholders, it provides a nice foundation for where these stations need to go and how they roll out. So I think that's sort of in place already. Whether that becomes part of a solicitation and takes the place of OEM support letters, I'm not sure that answer is clear, if OEMs would want to sort of give up that opportunity to participate themselves, but, if so, I think we work well as a group. The other part would be, in our ability to help evaluate sites that were proposed, and I think we can do that to some extent, certainly location is one criteria and it's sort of a go, no go criteria, as long as it's in the right location, that moves it to the next point of evaluation, and I can see us giving some sort of scoring criteria based on location of one location vs. another, but it would be difficult to make that the sole selection, it would be silly to do that. Certainly, if there's a site
one way on a freeway intersection, and another way on a
freeway, one will be nominally better than another based
solely on geography, but then you have to move on to all
the other considerations, you know, cost, performance,
experience, and trust of the project team, those sort of
things. So I think we -- the street modeling and the
collaboration we've built, could be a nice input to the
proposal process, as well as perhaps part of the
proposal evaluation. But as far as taking the place of
OEM support letters, I'm not sure that's something I
could make the decision on.

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

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

One other thing I think where Davis could help with some of that, too, is sort of -- and we've been interacting with the Fuel Cell Partnership as they've done the Roadmap, is looking at over time, as you build more stations, and you go from an initial concern, more with coverage, you know, having enough out there so the first people who buy the cars to capacity, where you're getting up to 30,000, 50,000 vehicles and more, at that point you're starting to look at fairly larger stations and, so, I think there looking at the ground becomes even more important if you're putting a larger station, perhaps, rather than a single pump in an existing station or something. So that's certainly -- we've done
a lot of looking at that, and looking in addition to the station siting, I think the economics starts to become a part of that, too, you know, a question like do you want to build more smaller stations, or do you want to build fewer larger stations, which may give you a lower cost to hydrogen. So I think we can help with some of that.

MR. ELRICK: If I can, Bill Elrick, California Fuel Cell Partnership. I think to the question of the U.C. presentations and what they can do, and Joan just said it, the U.C. research models, etc., provide one of the first funnels to probably the PON development side, and this afternoon we'll talk about the Roadmap, which I hope might be another tool on developing where the PON should start to point people, and that's the first funneling of information. And I think you have a lot of that information, it's out there, it's public, it's refined constantly to get better and better every year. Going a step further than that, I think something that Matt at AQMD had mentioned, looking at what's next after solicitations are out and the bids come in, how do you define the site-by-site preferences? This is where I think we heard a lot of cautionary information of it's an accuracy versus precision discussion because some of this will be a balancing effect of many different criteria, and I think it will be and hopefully the OEMs
will speak to this later, but important maybe to
consider, instead of the letter writing rule that
they've had in the past, which puts them in the front,
but not seeing what the proposals actually are, they're
wading through an expectation of what might be coming to
CEC for review, but not an actual review of what's
presented. As far as locations, I think that's a very
good suggestion to look at -- to have them in as part of
that advisory role, to provide that because they each
have a different approach, a different market, different
information, and it's not one, but the collective need
of all of them, and so bringing them in and, you know,
if they're getting their information through these
models in the front end, and it shapes the picture, then
in having them on the back end is a way to provide more
specific input and, as you get to that point, I think it
will be very valuable and I would just suggest looking
at that.

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

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

MS. BARONAS: Absolutely.

MR. STAPLES: And real quick.

MS. BARONAS: Okay. Please identify yourself
first, though.

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

MS. BARONAS: Thank you very much for your comments. And so, to keep on schedule, I'd like to
conclude this session and turn this over to Jim McKinney. He's going to give us a wrap-up of the entire morning. Thank you.

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

And to try to summarize some of the themes that I've seen today, I think one is, you know, you guys, Energy Commission, don’t start from scratch. There's tremendous knowledge, experience, expertise, capacities out there in the private sector, the government sector, and the academic sectors, so really leverage that existing information, build on the good work that's been done, and perhaps read in between the lines, you know, fine tune as appropriate going forward. And so, again, I think some of this is great refreshers in terms of the clusters, the demographics, the sales projection data, the work of the partnership and the
Roadmap, and the real world stuff; so, Matt, I really appreciate, I think, both you and Damian bringing in kind of those on-the-ground real world considerations, whether it's in terms of permitting, or local traffic patterns, or just local regional expertise.

One of the things that struck me was the suggestions from many parties about expanding the network of advisors and, again, I think we're doing that, getting a good first start at that today, but some configuration, some variation on the technical advisory committee, so I think both Paul Staples, Matt Miyasato, several have raised some version of this concept of bringing in more parties to advise us as we go forward. And, again, I think Matt and John Shears and some others have said very clearly, you know, don't forget the station operators; we don't, we think about them often and, again, we'll hear from them later today and that's both the station developers and operators. And you know, this kind of leads me to some of the tensions or the challenges that we face here, so one is kind of the tension between coverage and the economics of station viability. So I've heard, you know, I think both kind of the academic groups and maybe the car companies say, you know, coverage is key, coverage is great, the more station that you can get the
better, the more stations you can early the better. And then there's the hard reality of economic viability and how many stations can a given locale support. You know, we're funding up to 70 percent of capital costs due to some, I think, well reasoned asks from some part of the station developer community, and work that we've seen from the partnership, we've started to contribute some O&M funding, contributions to this, and I think that's an economic reality and I really want to hear more about this from the station operators and developers as we get into this. So it's not a new theme, it's not a new tension, but I think it's really one that we have to be mindful of going forward.

And kind of in concert with that, you know, when I learned Economics in school, I mean, you kind of have these perfect assumptions, you have perfect markets, you have sellers, and you have purchasers, so in this case we actually have two groups of sellers, we have station developers who have to develop a station and then sell a fuel product, we have the car companies who have to develop a product that people are going to want to buy, sell that, and then we have the consumers who are going to buy both the fuel and the vehicle, and hopefully live happily ever after in their high performing, low pollution emitting vehicles. And so,
again, that's kind of perfect economic theory and we have to work in with that, you know, academic modeling, and again, kind of our government decision process. And kind of going back to the notion of your kind of multiple advisors, maybe we can have the OEMs and some others advise us kind of before and after. Government does have a role here because there's so much government money at stake and it's just critical that we invest that as wisely and efficiently as possible, so we really don't want stranded assets, we don't want to fund a station that would be under-performing primarily because of the opportunity costs, you know, if we had put that money someplace else, had a higher performing station, that would have been a more efficient use of these scare public monies.

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

So I think that's all I have to say. I don't
know, Jean, would you like to add anything?

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

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

The second comment is, I think I just want to echo what Joan said, and Bill, and others, you use the
tools that are available to make your judgments, but
don't put the judgments in the hands of the tools, so
don't give away your flexibility to award stations based
on the viability of the other components of the
proposal, that is cost-effectiveness, the proponents,
the station operators, all of those things are very
important. So, for example, I kept thinking you get two
proposals and, gee, one is seven minutes away, free
flowing traffic time, we're not going to consider that,
right? So you need to consider other things besides
these metrics that are being suggested, so that's just
one part of your toolkit, don't hang your hat on just
one simple -- some metric -- because there's other
factors involved.

MR. STAPLES: Thank you.

MS. BARONAS: Jim, go ahead, please.

MR. MCKINNEY: Yeah, thanks for that, Matt.

That's a good reminder. Yeah, and I think the last
thing that I am thinking about there at this phase is
going back to what Alex said about, you know, be careful
about how we prioritize and we really do want to build
these markets, both in Northern California, Southern
California, and through all the regions; so one thing
that we've kind of kicked around internally, as opposed
to having, you know, one open solicitation, come one,
come all, you know, let's let the market develop the best proposals. Perhaps one thing that we could do is segregate these by region and say, you know, we're going to allocate money, whatever the proportion is, I don't know yet, but that we could allocate money or evaluate proposals on a regional basis, on a cluster basis, so that might be another way at getting at the coverage issue and a good distribution of stations early on. So I'll just put that out. If you guys think that's interesting, or too simplistic, just let us know as we go through the day.

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

(Recess at 12:05 p.m.)

(Reconvene at 1:05 p.m.)

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

MR. BREEN: Yes, I am.

MS. BARONAS: Okay, thank you very much.

MR. STAPLES: Paul Staples is here.

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

(Pause) Okay, so if we could get started again, please, because we have a tight schedule.
Hello, this is Jean Baronas. I'd like to call this session together for the afternoon. Okay, so it looks like the critical mass is here, so we're going to get started. And so the afternoon, really, when you think about it, if you remember what we learned in the morning and apply it in the afternoon, then maybe at the end of the day, the next steps will be very very very meaningful. So please keep in mind next steps at the end are desired, okay? So if you want to keep a list of steps and then we can read them out near the end, that would be great, as we go through this, that would be very much appreciated.

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

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

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

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

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

So we saw this earlier, these are the results of the automaker fuel cell vehicle survey conducted just
a couple years ago, the results indicate the automakers plan to significantly increase production between 2015 and 2017, which is consistent with the announcements made by several of the automakers here in the room, and we'll hear more about this later.

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

Our members brought over 10 years of experience placing cars with customers and building and operating hydrogen stations in California to this discussion. Automakers also brought their proprietary customer marketing information, we consulted with network development experts at U.C. Davis; over the past...
years, the automakers have engaged U.C. Irvine and its STREET model to more closely examine those clusters, to determine the number of stations necessary to ensure the proper coverage for customers within these communities.

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

Thanks to the work by U.C. Davis, as well as the OEMs' own market information, we know that people tend to fill their cars near their home and near their work, but that's not enough. They also want to know that they can get fuel in the places that they like to visit and, as we heard, destinations. We know that the stations must be customer friendly, that means well lit, under the canopy, easy to operate, and not filling the family sedan next to a transit bus or a garbage truck. And, thanks to modeling from U.C. Irvine, we know that six minutes is the maximum time that people consider it convenient for traveling within those clusters. This combined research gives us a good idea where these stations need to launch within the commercial market.
Earlier, we heard some of these details that helped define the robust network of hydrogen stations needed within each cluster by the number and the location of fueling opportunities. Each station added to the cluster reduces travel time and improves accessibility to stations, as described earlier by UCI, and by focusing on the initial market needs; or, on the left side of the tipping point, provides the greatest return on this public investment. The Roadmap outlines the path to reach this tipping point to enable us to move towards the right in a full commercial market.

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

So the initial network. This map, thanks to UCI STREET, Tim and their work, the modeling program presented earlier shows the optimal areas for the
initial hydrogen station network in California. It provides fuel for the first 20,000 fuel cell vehicle customers into five urban areas, with some redundancy in those clusters. It puts stations in connector areas that are also the seeds for the next clusters, and it provides stations in popular destinations like Tahoe and Santa Barbara, which will also likely prove to be early adopter communities.

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

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

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

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

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

So later today, we'll submit this Roadmap, we've been working a long time on this, and this is the first part of our plan, customer acceptance of vehicles includes the need for these fueling opportunities.

We're also developing White Papers and business acceptance, financial stability, and meeting the government goals and regulations. Through this collaborative effort, the California Fuel Cell Partnership members will help identify a smooth path across the bridge to a consumer market. Thank you.

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

MR. STAPLES: Paul Staples again, Hydrogen Industries.


MR. STAPLES: Yeah. Well, first of all, it's nice to finally get someone to echo something I've been saying, which is that, yeah, the stations need to come first, they always needed to come first, okay? So it's
very important to get them out there even before the rollout happens because, if nothing else, it's public information, it's public comfort knowing that the fueling stations are going to be there when the vehicles do arrive. One of plans I have in mind is to basically put big signs out there, even before the stations start breaking ground, put a sign out there saying, "Hydrogen Fueling Coming Soon." Okay? And that's basically what needs to be done. Now, for success, though, I think your estimate of 68 stations is low, really, it is. I mean, you're going to need more like 100, okay, at least, for the rollout to be successful, at least 100, and then of course more coming as the rollout continues. Because it's all a matter of public awareness, okay? It really is, and there's nothing more public awareness than the station being there, saying "we have hydrogen for sale," okay? And that's going to do a lot for people to say, "Okay, well, maybe I can buy one of those fuel cell electric vehicles," okay, "Maybe it would be worth it to do it," okay? Save some money on a gas cost, on a cost per mile basis, as well as you have to keep the environment clean and know that, down the road, I'm going to have something other than gasoline that I need to buy, and that's really going to be the key right there. So certainly I welcome the idea that the
stations need to come first, that the chicken and egg thing is now settled, but also I think you need to consider readjusting those estimates on how many stations need to be there by 2015 to be successful. You need people to know that fueling is coming and fueling is there, okay? And that's another thing that the State could possibly do, is to put out more press releases saying hydrogen fueling stations are coming, they're planned. Okay? Be ready for it. And the automobile companies probably should start doing some advertising right now, as we speak. So that's all I have to say at this time, I'll have more later.

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

DR. BROWN: Yeah, this is Tim Brown. I would just like to comment on Paul's statements about needing more than 68 stations. Bill can attest to this, that we spent hundreds of man hours, probably thousands, on this research, a number of years to develop the methodology and well over a year now working with the automakers to refine these numbers, so I'm curious, Paul, what your
assessment of needing more stations -- where that comes from, we'd all love to have thousands of stations, but the reality is that we think the 68 number is a very nice number and what is required. I don't think more than that is required, initially. And Mike, I don't know if you have additional things to add along those lines. I think some of your research would probably say 68 is maybe too many.

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

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

DR. BROWN: That's okay.

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

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

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

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

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

MR. ELRICK: Yes. This is really a pragmatic approach of using all the best information we have and being very judicious with the use of public funds, and the purpose is, yes, 100 stations would be nice, the automakers may say that's even low by a magnitude, but we have to be conscious of this balance between what we have, what we need, and the 68 is really how to launch that market, it's how to get us to that point where we can start to move away from public funding, move to a confidence level that customers are readily lining up versus more scratching their heads at the beginning. Sixty-eight is not a magic number, it is through a lot
of research and analysis, we will have to learn to deploy, to learn and adjust each year as we go because we could be off a little high, we could be off a little low, it's only in hindsight when we're going to go back and say what worked or didn't. It is, again, a constant improvement, but very confident that an awful lot of experience, time and resources went into get to what we think is a very pragmatic approach to being able to launch a successful market.

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

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

MR. ELRICK: So the 68 is not a capacity discussion, it's really a discussion of coverage to get the amount of, I'll say, dots on a map that, placed in the right location, the customers will say yes to purchasing a vehicle, because right now one of the things we're learning is, as a potential customer walks into some of the dealerships and opportunities now to lease a vehicle, and when they ask -- to Mike's point, you know, where can I fuel? Can I fuel near my house? If the answer is yes, the conversation goes on. Can I fuel where I work? If the answer is yes, it goes on.
Can I go to the places I like to go? Tahoe, Santa Barbara, San Diego, another filter on if they're going to say yes or no, and so this is really to get to the point where we can answer for a great majority of people that will likely be the first adopters, "Yes, yes, and yes."

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

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

MR. ELRICK: As a starting point.

MR. SLEIMAN: And when you say "large stations," you're saying 500? You said those two things, you said "small" and "large." Can you just give
MR. KEROS: This is Alex with GM and I'll jump in and cover Bill since Ger and I, we were intimately involved in creating it, there is a variation -- you will see in the Roadmap it varies from actually 60 kilograms a day with some of the existing installations that are going in, all the way up to 500; that is, I will say, average capacity across the board. Everybody in this room has to understand, when they read the Roadmap, there is the flexibility that Mike was talking about, is built into it.

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

MR. ELRICK: That's new additional funding.

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

MR. SLEIMAN: So in total, how much
MR. ELRICK: $65 million on top of the current investments, the $29.7 million in the CEC PON. That's new monies that haven't been identified yet.

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

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

MR. SLEIMAN: Okay, thank you.

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

MR. ELRICK: In the clusters, that's a really big part of it. We recognize that through a number of different analysis and research that has to be a part of it. In the emerging markets, the destinations and locations, there's a little less of that, and again, you'd want to have more redundancy than that. Some of those sites are only planned right now, at least in this
plan, one site in some of those communities, we really think redundancy is very important, but at the same time, if we build redundancy into every station, if every station becomes two, we would really up the numbers. So we know there's going to be some time where, pick a random point on the map, City X that has only planned on one station, that we want to get a second on in there, we're only planning for one now, but we would like to constantly be thinking that, after this plan starts to take off, we are coming in later with the second one as consumers start to purchase more cars in that area, as more people visit that area, redundancy needs to be built in, but we can't double them up every time right now.

MS. BARONAS: But a certain percentage is redundant?

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

DR. BROWN: That's probably fair, so redundancy in the clusters, the Berkeley, the South Bay, the Santa Monica, West L.A., Torrance, and Orange County regions, but also in some of these what we're calling
the new developing clusters, which is San Diego,
Sacramento, San Fernando Valley, Pasadena, those areas
will have redundancy built in, as well.

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

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

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

MR. TILLMAN: First, I just want to say thank
you to the CEC, staff, for putting together this
workshop. It's really important to Mercedes Benz and
Daimler that we have the opportunity to discuss in this
forum where everyone can communicate what they're interested in and what their concerns are. I also want to say thank you to the previous presenters for actually making the case that the stations and the cars need to be where the customers are, those to the customers is critical, we need to put these stations where the cars are going to be, and the cars are going to be where the customers are.

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

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

As of June 2012, we have delivered 44 fuel cell vehicles to customers with access to only five stations, however, even with these successful deliveries we currently have model year 2012 vehicles at select
dealerships, which we cannot deliver due to inadequate infrastructure and fuel. We are therefore disappointed at the current status of station deployment. Any further delay only adds to this lack of fuel availability.

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

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

Our current vehicle planning has to take into account the fuel availability, and that process will be affected by deficiencies in the station build out.
Keeping in mind the 68 station recommendation indicated by the CEC plan, we're therefore behind already. We -- the 10 stations that we're short is one indication that we need to be farther along than we are. When we fund new stations, we also must keep in mind that existing stations will also need upgrades to handle the growing customer base. The Santa Monica Station, the 35 MPA, is an example of this.

And on to the specific questions that the CEC asked us to look at. What is the best station approach for selecting site locations, defining the optimal hydrogen station location, and what our recommendations would be to get our data into the CEC selection process. This UC Roadmap, the CaFCP Roadmap, identifies hydrogen station locations which are seen by the industry to have a very high value. Selecting station sites using these recommendations is a good starting point, but this information has been referred to by many other presenters before. So getting directly into the questions, specifically, what defines the optimal hydrogen station location? The ultimate hydrogen station location is often hard to determine and the method for determining the optimal location varies with each location. The process isn't black or white. But the optimal locations are often not even the same for
each OEM. We have a requirement to look at where our 
customers are, so we may not pick the same locations 
that are optimal for us, but we do believe that having 
the stations across a region is very important for our 
customers to see the fuel availability. So an open 
process where multiple parties and OEMs have input on 
the optimal location is critical.

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

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

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

MR. KEROS: Close.

MS. BARONAS: What is it, then?

MR. KEROS: I say "Keros," some people say "Kéros.

MS. BARONAS: Okay, Ker õs.

MR. KEROS: Good afternoon, everybody. So just real quick to sort of give a little bit of background and perspective, many of you know personally that I've been directly involved in the siting of stations for Project Driveway, which is GM's fleet of fuel cell vehicles, and I certainly appreciate Mercedes Benz's situation with trying to put out vehicles and trying to be successful doing that. And from my own experience in having to manage that, the stations have unfortunately been behind the timelines that, for a lack of a better term, have been promised. GM has actually had to go out, site, install, operate, and build stations, so the clear example that most people know about our experience is the Clean Energy LAX Station. As John hinted at, as well, we've had to go to some measures to be able to support our fellow OEMs, to be able to expand this market in that. So I understand it's the same across the board. We've also been in this
-- just as a reminder for everybody -- and I say GM, but I know most, if not all the OEMs have been involved in effectively every hydrogen solicitation since the ARB solicitations began back in -- maybe it's '07, but that it began. So there's been -- the word I use, there's an evolution of the process and that evolution, as I know below, has been positive, it's been beneficial, and more importantly, it's been necessary. So the truth of the matter is, how we've gotten this far to date through the solicitation process has worked for the most part, and to suggest that a complete reinvention of the wheel is necessary is something I'm not sure we would agree with; but we think tweaks, we think adaptations are going to happen this round. I'm not naïve to think it's going to have to happen in future rounds. So, as we work together through this effort and, as the words I've used previously, this is a team sport if there ever is one, and the OEMs can't do it on their own, the government can't do it on their own, station providers can't do it on their own, customers can't do it on their own, so we call really have to work together to make this happen. People have said this, but I'm going to reiterate it, the Roadmap, the OEM's conversations in GM's perspective is we do not want to waste the State's money, bottom line, it does not help us, it doesn't
serve our purposes to have a station that is not being
used, it doesn't help us trying to get customers out
there, and it doesn't help us get cars out there, so
anything across the board from ill-timed, to poorly
located, to really under-performing sites, is a concern
and the OEMs are very aware -- GM is very aware of this
every time we lend our support to a particular station.

So this being said, and we've talked about it,
so I don't want to reiterate it, but the Roadmap is a
very good collective effort to explain how all of these
pieces come together. It is one tool, and that's a
message we've all said, but it is really one tool in the
toolbox to then make this happen. It establishes the 68
number, it establishes sort of the goals as we move
forward, it reminds us that we need to be flexible as we
do this, and it needs to be an iterative process. So
let's not -- let's use that tool, I think, Jim, you said
it very well, some of the tools are there, let's take
advantage of them to execute and move forward. And the
Roadmap does appreciate the tension between coverage and
utilization, or economic viability. This 68 number, as
you will see when the Roadmap is published here very
soon, is trying to reconcile what our marketing guys
want, which is thousands of stations, as well as what is
necessary for the station providers to give it a good
go, if you will, to have the basis of it. There's been a lot of input on it, it really is the collaboration of many.

I want to explain a little bit of sort of -- I know we're not looking backwards, but I think it's fair to say how we sort of walked through this process, and the Roadmap is another step in the process since the solicitations began, but a lot of work has been done over and over again to prioritize. We, GM, and others have recognized ahead of a PON, ahead of every time we want to put money out there, how do we work together to make sure that money is spent efficiently and prudently. And, really, some of the tools that we've talked about, the work we've done with Davis, the work we've done with Irvine, there has been some of these actually blind surveys that have happened in our process, we've done it ahead of the PON to make sure that we were prepared because we didn't know when those dates were coming. We've done it individually, we've done it confidentially, as others have pointed -- John pointed out -- where you sell a Mercedes is not necessarily where you might sell another vehicle, you know, there's different perspectives. There's been feedback loops in that, meaning proprietary data has been given and the collective information has been provided to us for
sanity checks, if you will. And we've worked through it. And then, we've also worked through this iteratively, so I would hesitate to recommend a list of, number one, fund this station, all the way down to number six, fund this station, we have to make sure the process is flexible and adaptive each time. GM's data is in all of this. So when we ask about is the market data -- how do we get the market data? Market data has actually been used, it's put into the process, it's both put in formally in terms of handraiser data to folks like U.C. Irvine, and it's also put in informally when we get together and we start reconciling our efforts, 405, good example.

Another example, and just for everybody's benefit, is I live in the other South Bay down in Torrance and Redondo Beach, and if we're trying to look at perfection, one might suggest, "Well, put two stations on PCH, in that area," right ? It's a high traffic area, it makes the most sense, put them a couple of miles apart from each other, but I think experience when you go out there will tell you, well, actually, Aviation Blvd. is a really high traffic throughput area, and maybe you want to put one on PCH and maybe one on Aviation, I don't think the models can rectify that, if you will, but we can as OEMs and local knowledge when we
go out to these sites, do those sort of things, as well as the group, I mean, this could be a collective effort if folks do want to participate. So, you know that model can't pick that corner, I said that previously, I think we need to remember that there's a lot of different elements that go into picking a location that don't just count on the location itself. I think Matt said that well, this morning, that these pieces all fit together and they do so in such a way that we get to the right answer, if you will, or the most appropriate answer. So my recommendations, GM recommendations, leverage what's happening already. We've said it, I appreciate the comment, Jim, let's stay on that track. Let's sort of take these steps and UCI is a good example, but there might be other third parties who can secure some data, do some digestion of the data, analyze it, and then come back to the OEMs and say, "Hey, how does this look? Does this make sense?" We have to have feedback loops in reconciling; if not, you're going to lose a really good piece of the fidelity of the effort. I think the OEMs need to continue to help on the corner assessment. Unless we have a better model out there, I think the best available process for it is that corner assessment. I think the letters of support have been one mechanism, I think they've worked to date...
in terms of the process behind it to make the effort holistic, if you will, from both what GM believes, as well as sort of reconciling a next steps. Others have said it and I'll say it again, I actually think, if the letters are inappropriate or undesirable, actually maybe even ahead of it, OEMs as advisors could be a really good benefit. If there's a clean room that the OEMs could go into, if you will, and participate in the evaluation of stations, in such a way that people feel comfortable, that it's transparent, I think it's valuable. That's happening right now, but the advisor role is actually happening to the station provider in terms of the letter of support. So it's a matter of where do you want it and who do you want the advice to go to. Do you want the advice to go to the station provider? Or do you want the advice to go directly to the CEC?

If nothing else, and we've said it before, I'm appreciative that this is the type of dialogue that the CEC wanted, but let's make sure the dialogue continues. As I said, this is a team sport, absolutely. We are not going to be successful without each other, so the OEMs, General Motors, continues to be supportive of one-on-one meetings with station providers and other stakeholders, we are absolutely supportive of one-on-one meetings with
California agencies, let's keep that dialogue open. If it needs to be in a workshop forum, let's do it, if we need -- because there is some sensitive data being exchanged, then we need to do it in a little bit more of a clean room, let's do it that way.

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

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

MR. ELLIS: Good afternoon. My name is Steve Ellis. I'm the Manager of Fuel Cell Vehicle Sales and Marketing for American Honda. And I also want to start out by thanking CEC leadership and staff for the ongoing
good work that's been done over the years, and also, you
know, this opportunity today to provide some valuable
feedback through the process toward improving the PON.
I want to cover a few areas here, one is that from
Honda's standpoint we do have relevant infrastructure
experience, both with the obvious hydrogen fuel cell
electric vehicles, but also with other gaseous fuels
such as our Civic GX natural gas vehicles that we've
been selling in the market since 1998. We learn a lot
through gaseous vehicle experience and interfacing with
the stations, and those providers. It's a dedicated
alternative fuel vehicle, simply meaning it is dependent
and has been dependent on a very limited station
network, but we've been part of the process of helping
that network grow and ease the access for those
customers, and also interfacing with fleets and consumer
markets for that car.

On the fuel cell side, we did the first
vehicle deliveries to fleets starting in 2002, literally
under a two-year lease. These were not just loans,
these were people that had to commit to operating these
vehicles. And also, then, what was known then as the
world's first retail customer deliveries, starting in
2005, also under a two-year lease. But that gave us the
confidence to move forward with the next step and that
is the FCX Clarity, and I think that's a vehicle that we
got all out with, you could say, to really demonstrate
the value and possibility of an all-electric, zero
emission vehicle, with fast fueling and much greater
range. We also, in doing that, though, had to outreach
to find customers and we did that, hence seeking
handraisers, and that was the first effort of its kind
with fuel cell electric vehicles. We also established
the first fuel cell vehicle dealership network and had
to train those salespeople and service people to
interface with our customers, also the first customer
deliveries from dealerships, and these salespeople have
to answer tough questions for vehicles and a fuel
technology they've never had to do before in their life.
And, again, these were deliveries under a three-year
lease, once again representing our confidence in the
technology.

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

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

So we needed a new model, really what you would call stations designed for customers and markets. And to do that, we worked collaboratively through common goals with, as you've heard earlier again, U.C. Davis,
the ITS group, and U.C. Irvine, in what led to the STREET model, and identified common problems and shared those with other groups such as the Fuel Cell Partnership, and even other automakers, and shared learnings with funders of the station, such as ARB, CEC, here today, AQMD, and even Department of Energy and others. Yet, in all of that work, the guiding principles were to remain technology neutral; you could say it's too early to lock into a single technology of station type, to remain vendor, and supplier neutral, and really to focus on the needs of the customer. So the results of that, I think, is what we've seen now and you've seen presentations today, of what's been developed as a cluster, leading to a regional network, but also including the need for destinations. So the Fuel Cell Partnership Roadmap really does encompass all of that and, again, it really emphasizes the need for redundancy and backup, and even for destinations and connectors.

So to kind of look forward, this new model for infrastructure really does need to be a market oriented station location, it needs to take into consideration factors such as handraisers that we OEMs collect, market data, which is often proprietary information, timing of distance between stations, as we've heard through this
research, eventually getting to six minutes or less from their residents -- and, again, that's good research and experience that tells us that. But also, market factors such as income levels, demographic information, even technology intenders, and I think you all heard me, I was a little sensitive to a misunderstanding of a thought about the different vehicle technologies, so here's kind of that proof, that we recognize that hybrid electric vehicle drivers today, and CNG drivers, and battery electric drivers, are potential market customers for fuel cell electric vehicles, too. We've already experienced that, you could say. And then we need market considerations such as the major streets and thoroughfares, hence the coverage that is so important to allow a customer to even make that initial purchase decision, kind of that go, no go point. Customer focus stations, then, you know, of what's built, what we need is credit card access 24/7 access, and that's a must. And we know that today that's challenged by the Codes and Standards and DMS, but it's not "if," it's "when." Clean and well lit, easy, ingress and egress, and that does play to this question of location. Easy user interface such as pins and screens, multiple hoses and simultaneous refill capability, plus today, 350 and 700 bar capability, with high quality fuels. And that's the

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definition of a capacity.

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

So I'm not going to go through all this, but there are, of course, certain expectations for stations, I think this is the kind of work we need to do collaboratively offline, you might say, but two key points here are really something that struck me in this last round of offers that may have been missing and that is that it's critical that we have multiple dispensers or at least hoses per station -- and this is critical -- with independent control systems and user interface that will allow simultaneous use of each hose. We take for granted that, you know, if we pull up to a gasoline station, we don't have to wait for any of those other people to start using that dispenser, yet today that is the case with many of our stations, and what was frustrating to me, very frankly, was that we saw
proposals that were of, let's say, yesterday's design, not the design that we need for tomorrow. So that's a key point that I wanted to cover, and I think the bottom line here is that frequent consultation with OEMs will assure that these differences can be ironed out before construction begins, and that we really do represent the voice of the customer, and I think that has to be understood and appreciated.

So from a suggestion standpoint, starting with prioritization of these locations, it's clear that maybe some gaps exist between what we recommended as OEMs vs. what the awards provided, and I say it this way -- with a word that may sound harsh, but I think it represents a bit of that frustration -- and that is to please heed the suggestions and definitions in the OEM support letters. So, for example, when we say primary and secondary locations, that has to be understood and reflected in the outcome. And then heed the collective voice of automakers, hence we are the voice of the customer and this is one specific example that's really meaningful to us at Honda, and that is that -- and I'll put it this way -- that for the second year in a row, the award has not provided a San Diego either connector or destination. This is just not -- this is not just a frivolous request on our behalf, this is the result of
asking our customers where should these next stations
be, and where do you want to go? So you know, I'm hard
pressed to think that I might know better than my
customers where they want to go and how they want to use
their cars, and I would ask the same of you.

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

Prioritization of construction, I think this
is really a critical point, and I can't stress enough
that there's an urgency of immediate need that really
does have an impact on our customers. And once again, I
use this term -- to heed the collective voice of us
automakers, and the example being Santa Monica. We
delivered the world's first Clarity to a customer, Santa
Monica, virtually this time four years ago. And to this
day -- to this day -- 100 percent of the customers in
that market have been solely dependent on a single hose
limited capacity station. So you know, we are desperate
that, of the stations that have been awarded, we've been watching these dots on a map -- that's the term I'll use -- virtually fade in color before the first shovel has hit the ground for the construction, and that really is defined as we are one moment from failure in that market.

So in summary, I think a feedback process can be very valuable and I would ask that you implement a final check somehow to find a way through a procurement process, to confirm locations, irrespective of vendors or technology, that's not the goal here, it's really about the location and getting it right. And then we want to make this offer, which is to always question everything that you don't understand until you do understand it. And I'll have to add, not to a fault, not to the point where you're seeking perfection, don't let that "perfect" get in the way of the good. But at the same time, it's critical that basic concepts and, at the end of the day, what the needs of the customer are, really can be met through your efforts with funding efficiency. Okay, thank you very much. And I'd just add that behind this deck of slides are specific the questions that we were provided, and very specific answers to each one of those, but I think what I just covered really does answer those questions. Thank you.
MR. BARONAS: Thank you, Stephen. So is an individual for Hyundai here? No? And on WebEx, is there a representative from Hyundai here? Okay, hearing none, we'll move on to Nissan, Lance Atkins. Oh, okay, I've been asked to re-ask the question because the WebEx was on mute when I was talking. So, I'd like to ask, is there an individual from Hyundai Kia on the WebEx who can give a presentation today? Okay, hearing none, we will move on to Nissan and Lance Atkins. This is Jean, is someone trying to address our meeting today? Okay, thank you. So we will move on with Lance Atkins from Nissan.

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

So you asked what defines the optimal hydrogen station location and, quite frankly, from our point of view, that's the one that meets Nissan's unique demographics for our brand, the type of vehicle that we'll sell, the price range that we'll price that vehicle at, and it's the station network that supports those Nissan customer behaviors. Fueling -- where and
when they want to drive, and importantly, that those are stations that have customer-friendly performance and fuel delivery when a customer desires it, and those are critical issues for the stations that go into that network.

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

You probably also want to limit what you need from individual OEM input, and we've learned in the past it kind of tends to lead to confusion because, I stated before, we each have a little bit different set of plans and priorities as part of this process. However, there is a tremendous amount of stuff that is very much available to be used, use the work and the tools that have been developed in the prior processes via our
individual OEM inputs to third parties like CaFCP and UC Irvine. This is aggregated, the individual OEM interests, into a single image. It allows us a uniform voice to speak with about what's needed and perhaps most importantly for all of us, it allows common areas of interest amongst the OEMs to be visible, where we can discuss them as a group, even study them academically, and it's really that activity that's led to the U.C. Irvine STREET analysis, and the CaFCP Roadmap.

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

So in terms of how the OEM market data fits into the CEC process, use CaFCP's Roadmap, use STREET to direct where the station site search is, those tools say a lot about where we need to find the stations. You may even want to consider using STREET tool to help evaluate the viability of those final site locations; just don't go so far as to try and make final decisions as if government was an OEM. You're still going to need some individual OEM group input in selecting those final viable sites because what our station providers are going to actually be able to deliver, contracts and space to install their stations, is probably going to vary from the academic ideal, and there's going to have to be some resolution and compromise amongst the industry for those anomalies, for how do we take what we have and make the best network possible, because at the end of the day, what we're all here to do is not create a miscellaneous collection of stations, we're here to create a single functional network that allows all of us OEMs to sell cars and compete with each other in the market, and gives our station providers a shot at growing this into a viable profitable business. I think Alex is absolutely right when he says, "This is a team
sport in this activity and there's a lot of iterative
loops and discussions that are necessary for us all to
succeed." So I thank you for your time and attention to
these details. Thank you.

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

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

So first, I'm going to begin with some
background on challenges and next steps for fuel cell
vehicles. So Toyota, our target is to start commercial
launch of a sedan-type fuel cell vehicle around 2015,
and in this picture, we show our FCV-R concept, which we
exhibited at the Toyota Motor Show in 2011. And with
developing these vehicles and preparing for this launch,
there's been some challenges that we've achieved, and
some remaining challenges. Now, some challenges that
we've been able to meet are a cruising range of
approximately 800 kilometers. Another key one is
hydrogen refueling time of approximately three minutes. And then, also, low temperatures starting down to minus 30 degrees Celsius. So we're able to achieve the requirements that our customers need in order to use these vehicles like they would their normal car.

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

Some additional background is about the number of stations that we will need in order to be able to launch a commercial market in 2015. Now, these figures were taken from the CaFCP's Hydrogen Infrastructure Roadmap. Now, there's already been a lot of discussion today about the background and the work that went into developing the number of stations that are needed, the clustering and the specific markets, and the general location for these stations, but the key point we want to take away is that we'll need 68 stations, will be needed by the beginning of 2016. So we've identified the number that we need, and we've identified the general locations for the stations, so that's good process and a lot of hard work and effort went into...
So this is mentioned by several other speakers today, is that station performance and access is equally as important as coverage when we're considering developing this commercial market. The experience that the customer has must be consistent with conventional vehicles. And as Stephen and Alex talked about it, from a performance perspective, we need to be able to follow the current best practices for fueling, for example SAE J2601, and then fuel quality, SAE J2719, so we need to be able to fuel the vehicles and have confidence in the quality of the fuel that we use. Second, the stations need to be scalable up to 500 kilograms per day, average daily capacity. Now, that may not be the same for all the stations, especially destination stations or connector stations, but we need to design that scalability in order to be flexible as we implement this infrastructure network.

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

Another important one for access is that we
need to have simultaneous fill capability where each
dispenser nozzle is controlled by a dedicated user
interface, so similar to what a customer's experience is
now when they fuel their gasoline vehicle.

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

So that brings us to -- okay, so we've
identified how many stations we need, we've identified
the general regions and locations where those stations
need to be, now we need to look at how do we efficiently
and effectively prioritize where those stations are
built and in that rollout? So, earlier Matt from AQMD
talked about after the PON, after the solicitation, how
do we have a feedback process in getting a better image
of a prioritization, we're also proposing let's look at,
even before we finished the solicitation and process, in
the middle of the solicitation development, we should
have kind of an interactive and formally defined process
for prioritizing station locations. And so, in this image, the idea is that we'd use a third-party such as U.C. Irvine and their STREET modeling to import data from the OEMs and market data, then analyze that data and then aggregate the results to develop a prioritized station list that then can be fed directly into the California Energy Commission as they develop their solicitations. So, by doing this, we're able to improve the process and make it more efficient at the beginning, so to give us some clarity of what we're doing. Now, there's a lot of details that would go into this, but this is kind of a general overall idea of how we can improve this process and to clearly define roles and responsibilities within that process.

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

So we feel that using this type of process -- and like I said, there's a lot of details that would
need to be worked out -- but we have a very formalized
and clearly defined roles and responsibilities to
improve the solicitation development process and focus
that process. So that's it. Here's a picture of our
FCV-R concept. As you can see on the bottom left photo,
I've had some personal comments to me that it looks kind
of like a whale, but I think it's a good-looking whale,
so anyway, thank you for your time.

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

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

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

MR. STAPLES: Yeah, in reference to the
previous presentations, let me make myself clear about
my statement about there should be more stations. This
is not -- it's more anecdotal evidence. What we do is
I've been doing a lot of data mining with fueling
station people, and working in the area also with a
major company that sites fueling stations and sites them
for a living, and you know, a big company, one of the
largest in the country. And it's based on that, it's
based on that common sense knowledge that you always
need more than what you're planning. Okay? And I
understand that goes from the standpoint of the -- in
2016, most of the automobile companies are going to be
rolling these things out, and I just think that they
need more stations than what's being proposed, that's
all, and it's just an observation, but that observation
is based on 20 years worth of experience in the field
and also as a person that drives. So that's just my
sense, my feeling, my experience, and my instincts tell
me that 68 -- although being that it will be enough to
meet the cars that they plan to have on the road at that
time, it's not what it's all about, it's about having
enough out there so that people will see them and want
to buy more than what you're just planning on putting
out. If all you're doing is planning on putting enough
stations out to meet the rollout numbers that they're
projecting, you're not really meeting the goal of what
you're trying to do.

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

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

MR. ELLIS: So I think we can't strive for
anything less than 100 percent. I think, as I
indicated, sometimes we may accept the experiences of
the first few as indicative of what the rest of society
will be willing to accept, and that can send us astray.
So the leading edge, early adopters may be willing to
"put up with" -- is the term I'll use -- things differently than the rest. So we have to build for tomorrow, we have to listen carefully, so all of our customer mix, we have those that I would refer to as the advocates, that clearly they're not troubled if they had to drive 20 minutes out of their way for fuel, right? That's who they are. But that's not who we sought as customers, we wanted average John and Jane Doe people that would tell us the truth based on the fact that they're paying with their other wallet and they have high expectations. So I think, you know, the answer is as simple as close as you can get to mimicking the experience that people have today with gasoline vehicles, the sooner the better.

MR. SLEIMAN: No six-minute drive time?

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

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

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

MR. ELLIS: I don't know that there's a simple answer because you'd have to respect the individuality
of people. And you know, when your phone number, like
my phone number, is in their cell phone as the first
point of contact, you know, you're subject to getting
that call that can include an expletive or two if things
go wrong. We're lucky that, for the most part, that
hasn't been the case. But we just have to seek in all
cases, you know, keeping down time to a minimum and,
more important, I think, is both the perception and the
reality of response to problems. Customers will be very
forgiving in the early stage when they see that things
don't go right yet, they also see how hard people are
working to correct it. And I think it's both frequency
that has an impact on that, but also the quality with
which the issue is resolved. So they'll be very
forgiving, only to a point. And that tipping point will
come, I'll say, fast and harsh if the frequency is
beyond what they're willing to put up with. So you
know, we can't build for the earliest adopter or the
enthusiast that's willing to be put up with things
different from the average retail consumer, we have to
strive for that 100 percent gasoline-like experience.
And I'll give one example where a hydrogen station, some
changes were made, and our customers when they would
reset the trip meter would see the range available to
them on the display, and that was one way of determining
what we know of as the quality of fill, or the state of charge, well, with that change it altered that and they were seeing 20 miles less, and you know, for me to get a phone call and say, "Steve, I want my 20 miles back," you know, that's telling. And we can take that type of thing for granted, we can take our gasoline cars and run them down to when the fuel light comes on, and some of us may fill within the first two miles, and some of us may drive 30 miles past that light, to but to hear a person say, "I want my 20 miles back" speaks highly to the impact of these type of changes, you see. So these are valuable lessons that we've already seen, so when we push -- you push the station operators to a high level, that's what's behind it.

MR. KEROS: This is Alex with GM. Just to mimic some words. So, first a disclaimer, of course Mercedes Benz and Honda customers are paying, but Project Driveway was non-paying customers for us, and the goal was throughput and learning, and certainly we purposely picked different personalities, different locations, different incomes, to get a varying level of understanding of the customer, and so Steve says it very well, missed fuels, or unable to fuel, having problems fueling, will result in midnight phone calls, one, to our team to deal with it, us, not the OEMs, and two, I
mean, these people are missing their appointments and
their efforts in -- I'll give you a sensitivity around
this -- we know these vehicles are going to be more
expensive than their gasoline counterparts, which we
just have some information from Mike that suggest the
income level for those people are going to be elevated,
likely. That means those people probably are going to
value their own time more so than others, and will have
a sensitivity to their own time when dealing with such.
I'm sure that's reflected in other OEMs' deployments,
testing, it certainly has with General Motors; so,
paying or non-paying right now, customers are -- they
are forgiving, but there are some that aren't.

And I'll give you some recent experience. Our
community is still very closely knit, even though some
of the folks have gotten out of the cars and one of the
-- I'm going to use this word, I'm going to be direct --
embarrassing points of what we're dealing with is the
folks who are filling up with one station, or two
stations in an area, come to us now and say, "Alex, I
thought there was going to be more stations in the
area," and these are the people who in 2007, 2008, and
2009 for us, were our advocates, in many respects are
the folks that are going to go out there and help lead
the charge towards this evolution and bring on the
market. If they are looking at the scenes and don’t see progress, they are indicative of what I would say the general customer might see, as well. So these are all points and we're all working together to get success, but we have to realize progress, getting to 68 and beyond 68, to Paul Staples' point, is very important and we have to have progressive steps over these years to get there.

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

MR. KEROS: One hundred.

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

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

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

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

MR. SLEIMAN: Okay, thank you.
MS. BARONAS: Yes, please, Joan.

MS. OGDEN: Okay, thanks. Hi, Joan Ogden from U.C. Davis. Really fascinating set of presentations by all of the OEMs. I'm sort of hearing two things from you guys, and I just wanted to ask if I'm perceiving this right. One is that, you know, stations now and stations within the next couple of years, there are some things that could be done to get closer to 100 percent and to minimize the midnight phone calls, and so I hear that all of you want the next round of stations as they come in to take these things to town, I mean, things like having two hoses, and things like — other things that would make there be redundancy or, close enough station so that if one station was down for any reason, you could go to another, and those kinds of thoughts. And then there's the other issue, it seems to me, is the getting to 68 because I'm sort of hearing 68 is the launch point if I heard your presentation right, Bill, it's not that 68 is going to cover the 50,000 or so vehicles that are going to be there in 2015 and 2017, it's getting to the point where there's enough of a signal that there will be other private industry funds that will flood in and will build those other stations beyond the 68, but at that point there will be a clear sign. And that's the other things you guys, of course,
want in order to move along the innovation. So is that fair to say? And could you comment on that?

MR. ELLIS: Thanks, Joan for the great understanding there and observation. I'll put it this way, and that is it's become apparent to me that it's a procurement issue. So, for example, when I give that example of customers needing to be able to pull up and not wait for someone else, you are already using the hose, well, they can hold the other dispenser hose in their hand, but they can't authorize it; for example, what we've learned is that, unless the PON contains that type of specification, that requirement, then it's an unfair competitive playing field whereby if one vendor says, "I'm going to do what they said and meet the needs of the customer and have multiple hose dispensers with independent control systems," they will experience a higher cost to their proposal than the one that doesn't, and that's a key aspect of this, that from a vendor competitor standpoint, we need that parity, we have to get these points right. And if that's been an omission of the past, today I'm asking for that to be changed, but that's, hence, the reason that I bring up this point about a continual improvement loop, and I apologize if I failed to say it, but if you look at a Demming-like principle of continuous improvement, a plan, do, check,
act, and repeat every year, that I think is what will bring to light these points, and then we have this continual improvement, we'll get where we need to go, and the stations of tomorrow will be better than the stations of yesterday. Okay?

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

MR. KEROS: Well, Steve, 1) our cars have to
be running 100 percent of the time to rate, I mean, don't forget, the customer will hold us to that, right, I think we both agree; 2) as a station operator who -- no, we can't put a car on the road that's less than 100 percent --

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

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

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

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

MR. ELLIS: Steve Ellis with Honda again.

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

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

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

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

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

MS. BARONAS: Okay.

MR. ELRICK: -- i.e., in clusters, keep going,
then, say, a destination station, and actually that's
not critical in its own element, but it gets back to
that balancing --

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

MR. ELLIS: Sure. And I know that, by nature
of putting that into my deck of slides and making that
request, that there has to be an action behind that.
So, one is, I would say it's both formal and informal,
and what I mean by that is that the station builders
have what I'm going to call the information, the failure
site issues that play out publicly, and then maybe
there's some other stuff behind the scenes that doesn't.
So some feedback loop from their side, from the auto
side, we can provide that based on customers and things,
but I think to answer your question, probably like the
California Fuel Cell Partnership is a great venue to
let's say call those relevant players together, an all
hands type of meeting where the process is laid out,
whether it's twice a year, or whatever frequency is
needed, to recognize both lessons learned over the last
six months, what are the action items that need to be
attended to, and then how that will play out, whether it
is just internal, or whether it actually does need to
then be externalized into a PON procurement document.

     MS. BARONAS: Okay.

     MR. ELLIS: That's just an idea.

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

     MR. FARNSWORTH: I think the performance
requirements are based on what we know our customers
will need. So I think, if we can meet those
requirements, then I think it may date it, but it's what
we will need.
MS. BARONAS: Okay, so -- yes?

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

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

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

MR. ELRICK: If I can jump in on that same topic, I think, to that point of is it dated is a good question, and I think the key is coming up with some of the minimums through a process as Jared had suggested, or others, that develop a minimum threshold knowing that these will be a few years from now, and at the same time, finding a little bit of balance, say, other incentives, to go a step further, anticipating what -- in this case -- what the commercial standard needs to be; we don't know it, but considering there being extra incentives such as more funding for something that takes it beyond that minimum, so that it doesn't become a...
disincentive, but actually a way to improve the network, the technology, and the customer experience in a way that both enables the minimum to be met and reach further into the future, as well as recognizing that, in some cases, you'll want to -- the minimum might be enough at another location, and you really want to maximize what your opportunity is.

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

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

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

MR. KEROS: -- but like, for example, metering of hydrogen, right, this is what I would consider probably a performance characteristic that we all have an interest, and a collective interest, in trying to move forward, but it's an expensive proposition and any bidder, for example, that throws that into their proposal is creating a higher hurdle for them due to the added cost. So, to me, a year ago I don't think I would have said, hey, make sure metering technologies are a part of it. So this is the feedback loop and the
learning that we go on that, hey, this is a piece of the
industry that we all need to move forward. I think it's
the exact type of thing that CEC wants to fund, they
have in the past, right, with projects with DMS, but how
do we integrate that into the performance
characteristics of the proposals? I mean, to me that's
a very clear example of how we move forward.

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

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

I want to go back to question I kind of put
out earlier, which is the relevance of precision. So
we've been talking a lot about station specs,
reliability performance, and I think that's one thing
and we'll do that more over the next couple of
workshops, but in terms of location, you know, the more
precise something is, the more expensive it is, or more
time consuming it is to get there. And I've kind of
heard some different things today, so earlier on I think I was hearing, and maybe this was from our colleagues in the Air Districts and the agencies, that getting the first couple in a cluster is good enough, that's pretty good, that's a good way to get the things going, and then the precision becomes more important as you start adding stations and you don't want to have them too close or too far apart, I think I was hearing that. And then, some of what I'm hearing this afternoon is that, you know, I think Alex used the word, kind of the street corner, but that's really important, kind of that intuitive feel, that gut feel, you know, how is the station used, what are the traffic patterns in there, how accessible is it? That's also very important. So I'm still thinking about, you know, how do we find the right balance in this precision thing. And I was particularly intrigued by what Jared put up from Toyota, which this sense of, you know, maybe there could be a lot of OEM input and collaboration, say through a third party, whether it's STREET, or some other, or the Partnership, or somebody else, and kind of creating a priority list. And perhaps that goes into the solicitation so that the Energy Commission will solicit and accept bids for stations within a certain distance of this list of priorities, and I think that's very
interesting. So I wanted to put those -- I want to make
sure I understood that right and then I kind of wanted
to put that question back out on the table, and also
queue it up for the station developers in the next
panel, the relevance of how right, how perfect does it
have to be on these initial locations.

MR. KEROS: I think the data that you're
looking for, Jim, first resides in the Roadmap, or it
will, that's going to get delivered to the Energy
Commission here soon, hopefully by the end of the day.
We've been working hard to get it to you, trust me. I
think I agree with everything and the feedback loops
that you said, except for the last one, which is the
distance away from that point. And I think Matt
Miyasato had noted, and I don't want to speak on behalf
of him, but he again said, if it's seven minutes away,
or if it's 1.2 miles out of the loop, not one, we want
to manage it. And I'll give you the reason why. One of
the questions I've always asked of any proposal is, what
is the station operator like? And for example, if we
are looking really at two different corners, right, and
in one corner there's an operator whose got 10 stations,
wants to try this out, wants to make something happen,
versus the other operator across the street who is
reluctant, but sees this as a business opportunity,
personally, I feel like I could make that decision. But, if we're truly just going on location and we circle, they're equal, all things else -- so that's part of I think some of the information that personally I digest when trying to ascertain, you know, what's the level of precision necessary moving forward and, again, the example of two on PCH versus one on PCH, and one on Aviation, sorry for those that are not from the area that I am, but you know, I remember walking through there and actually very much looking at a map vis a vis what other stations were being proposed, what was already on the table, going, wow, that looks neat, look, the thoroughfares are going this way, the thoroughfares are going that way, we cover every axis into 405, you know, we cover all of these concepts, that's what I mean the model can't decide on that corner and there might be another station that looks perhaps a little bit more attractive. So, I get where you're going and I wish we had a checklist and a template and a tool that we could just -- trust us, it would make a lot of OEMs happy if we had that tool because it would be pretty darn easy to put the information in and spit it out, but sometimes the model will be spot on and sometimes the model won't, and we need all of the professional experience around this table to help decide on that level of precision.
MR. FARNSWORTH: This is Jared with Toyota, and that's part of why on that organization chart there we showed that you have the OEMs in different groups, communicating directly with STREET, or different models, to really nail down what those are, not relying on one or the other, but making it a collaborative process.

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

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

DR. NICHOLAS: Yes, actually this goes back to some comments that you guys made, and Alex answered it a little bit, so it could be a nuanced answer, but those people that the OEMs that have customers out there and
they're actually paying money for the vehicles, what --
what I was hearing before, I think it was Steve who said
it, is we have people waiting for the customers, but
there's not enough capacity at these, even these
suboptimal stations, like if there were higher
throughput, we could do more. So, anyone who would like
to volunteer information, what is kind of the waiting
list? And even with our minimum number of stations,
what's kind of the potential market there? And the
second part of that is, how far away are they from their
home? And what sort of dynamics do you look at when you
look at customers? Do they -- what sort of criteria do
they put on themselves and you put on them as being
potential fuel cell customers? Is it six minutes? Is
there anyone who is seven minutes? Or what's -- is
there a take rate relationship? Or what -- as people
who have put out these two real customers, what do you
see?

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

DR. NICHOLAS: Oh, okay.

MR. ELLIS: My version, and I have actually
said this publicly for at least a year, even in I'll say
these circles, hence in previous CEC meetings, is that
and I'll give Santa Monica as the example -- I couldn't have delivered more cars if I wanted to, and it's a pause, or comma, or whatever you want to say, without adding risk to the existing customers. So two reasons, 1) by putting more cars into that market, and that is the market we had identified, and that is the market we got handraisers for, one, we would overload the station capacity, we'd monitor that closely, we'd get feedback from Shell, they'd tell us if we're getting short fills because of that. We know there's peak times of fueling, Mondays and Fridays, that sets the bar for what that limit is. So, if we did, then we'd risk customer satisfaction --

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

MR. ELLIS: Right, and so where I was going to get to that is that's really more confidential and proprietary, that we wouldn't say in a public forum, but the simple point there is that, whether it's that station with its single hose, and that's the second part of that, and that is that, you know, we don't publicly tell all, so to speak, but I can tell you that we have faced challenges where, whether it's one of our customers, or another vehicle's, customers filling at
the station guarantees that the next person has to wait.
So, you know, to answer that question, if I had put more
cars into the market, then I start compromising those
customers' satisfaction and that has an impact on the
next thousand cars I may want to deploy. Do you see
what I'm getting at? Because now the message from those
two people, as plays out in social media and other places,
word of mouth, is negative. And we don't want to add to
that.

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

MR. TILLMAN: If I have to.

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

(Recess at 3:03 p.m.)

(Reconvene at 3:12 p.m.)

MS. BARONAS: Okay, so it seems like we have
critical mass again, so please take a seat and we'll
continue. So are the people on WebEx, are you still
able to hear us?

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

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

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

MS. BARONAS: Yes, we can hear you.

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

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

MR. HEYDORN: Great, thank you.

UNIDENTIFIED SPEAKER: What was your presentation titled?

MR. HEYDORN: It's No. 12. That's it, thank you. I'm Ed Heydorn, Business Development Manager with Air Products, and I'm pleased to be here today and thank the Commission for organizing this workshop to talk about approaches for selecting locations for hydrogen fueling stations. If you could move to the next slide. So I'll be talking about station locations, I believe, and then -- I'm having trouble reading the
slide this way, I apologize -- well, first I'll talk about supply chain perspectives for hydrogen fueling stations, and then talk about siting criteria that I'd like to propose.

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

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

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

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

MR. HEYDORN: Good, okay, thank you. This slide shows the various supply chain elements that could be used for production distribution, and then use of hydrogen in refueling stations. In terms of overall fueling station experience, Air Products is approaching one million total fueling events, we have an individual site that's now operating at 50,000 fueling events a year. So within that realm and in terms of some of the comments that were made earlier, there are projects that are being deployed in other fuel cell applications today that could be done with great speed, high reliability, and meet the requirements of the users. So it's not
something that has to be invented, it's just having to have that commercial throughput to be able to make that happen. Go to the next slide.

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

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

Right, and then there were other definitions
provided earlier on connector stations and destination stations. So we can move to the next slide.

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

So as has been talked about today, the key is getting best information on where to put stations. We've heard about the automakers, they definitely have the best sources of information as to where they're able to sell cars. If you're not able to ultimately place
the stations where the cars are going to sell, then the
stations will be underutilized and may not be able to
stay open for a significant period of time.

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

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

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

In terms of the docket, we had submitted information regarding some of the other topics that were included within the original workshop, the definitions, especially talking about structure of the solicitation, and I know there are other topics today that were raised.
by Mr. McKinney and others, and we'd be glad to talk
about those in future workshops. So I thank you for
your time and thank you for the opportunity to speak
today.

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

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

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

So for demand, a realistic expectation so far
really hasn't shown itself, cars were going to be out
earlier, there was going to be higher demand, we're not
seeing quite that demand. I don't really agree with
having the PON set a limit on the capacity of each
station, I think at this point we need stations whether
-- whatever size they are. I think in the future these
constraints of size and scalability are more of an
issue. So as far as demand, the really only resource
would be the car companies, you need to make sure we
understand what their rollout plans are and provide for
those.

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

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

Accessibility, again, the closer you are to the thoroughfare, the better. But, again, there's other factors that come into that, like the station layout, is there enough room? Are you going to be able to get two pumps? Are you going to inhibit the gasoline sales with your hydrogen pump there? These things are critical to the station owners currently and that's probably one of the biggest complaints we have now is that they really don't see an income stream from hydrogen, and it's more of an ego thing for them to embrace this technology, and as long as it doesn't cut into their profits, your station layout, and dispenser location are pretty critical. Again, a lot of these stations are smaller
footprint, there's not going to be enough site for on-site generation, so we have tube trailer issues and those are becoming problems with some municipalities about having a tube trailer for an extended period of time, so there's a lot of things as far as accessibility is concerned that really factor into a station's location.

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

And then the hardest one of all is the contract wording. There was a comment earlier from the car companies about access agreement, you know, when there's liability involved, there's attorneys involved, when there's attorneys involved, there's liability definitions, and I just don't know how we're going to get past this fueling agreement, I'm open to suggestions later, so contracting wording is really sensitive, you
know some station owners are great, no worries; other stations owners, you know they want everything in black and white, and his lawyer, his lawyer, his lawyer, and so contract wording is really -- I like to see that more a part of the PON process next time because, even though you have a station that will get funded, if nobody can fill there because of these agreements, then you spend a lot of money for nothing.

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

And then, distance from other stations. As the reliability grows, this distance is getting to become farther, of course, so there needs to be a minimum distance requirement. But, again, that local demand is going to determine how many stations in that
area. If the stations do 200 kilograms a day, then it might be worthwhile to put in another station near that one. So the things that we see as a factor in that demand would be, you know, what the speed of the fills is, what the duration of the fill is, so the faster the fill, they're more likely to go to that location. But to me, the biggest holdback is the number of back to back fills. Right now, it's not that much of an issue because we only see maybe two or three cars at a time, but a year from now and two years from now, we're going to see 20 cars in a row, and you don't want to be that fifth car, or that sixth car, so you know, the number of back to back fills is going to be probably the biggest deciding factor as far as distance from other stations. And then the volume of the station, again, it can be flexible, I'd like to see some of these first stations be maybe smaller so we can get them out there sooner, you know, I understand we're trying to get to what will be two or three years down the road, but two or three years down the road doesn't solve our problems we have today.

So the last one, selecting the locations for hydrogen infrastructure, again, as we grow in the future and stations grow, that market demand is going to dictate what stations are successful, what areas are
popular, and we need to listen to that demand. We need to be able to get with the OEMs and look at what the market demand is. The real liability, of course, is going to be an issue, and whoever can have the better functioning station, performing station, will win out. And then the ability of the station to increase driving distance is -- we don't categorize cluster stations, connector stations, we need them everywhere. We need, you know, as a car owner myself, we need to have the experience be more like a gasoline type of experience where we can go to San Diego, we can go to Santa Barbara, so you know, focusing on these cluster locations, I'm not so sure, is a great idea as much as we need to make it a broader experience, maybe better stations, farther apart. So that's pretty much it.

Thank you.

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

MS. BARONAS: He may what?

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

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

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

MS. BARONAS: Yes, okay. Thank you for that.
Okay, so then Hydrogenics will be moved down in the agenda and we'll move down to Hygen Industries, Paul Staples.

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

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

MR. STAPLES: Okay, well, I'll try to modify it because, I apologize, I didn't hear anyone trying to signal me before, so my apologies for that. Okay, well, anyway, thank you for this opportunity to present to you. My name is Paul Staples, I'm Chairman and CEO of Hygen Industries. We're a small consulting company that consults on hydrogen technology issues and project development, program development, you know, when I was Executive Director of Clean Air Now, James and I partnered to build the world's first commercially permitted solar hydrogen generating facility, fueling station, and a fleet of vehicles running on hydrogen back in 1994. My partner right now, Rich Capra (ph), he may even be the audience, he designed the SunLine facility and also designed the installation at (indiscernible), and also did the installation on the Santa Monica project, which we helped to develop, and several others throughout the state, the United States,
and even North America, as they've been working in the 
industrial gas industry for quite some time. So we do 
have some knowledge in this area.

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

This isn't rocket science, folks. Show me 
someone who owns a vehicle in any one of these cities 
that we're planning on doing this, that lived there for 
years, and just ask them, "Where's the best areas?" And 
it's the most affluent areas because that's what this is 
all about, that's where the location is, okay? You 
cannot predict hydrogen fueling throughout when we don't 
have any, okay? So, I mean, anyone that has lived there 
for more than a year would be able to tell you. I lived 
in L.A. for 25 years, okay, I can tell you everyplace 
where these vehicles are going to do well. And it's the 
same ones that you guys came up with in the RFP, you 
know? So there really isn't -- it isn't rocket science, 
let's not over-analyze it, let's not try to overdo it, 
okay? Because that's what I think is happening here.
Everybody is afraid to move. Everybody has got liability. There's legal suits I have to deal with, why the EV is out there, why the automobiles are doing it, because -- they didn't chose to go down this road, it's because the cars are chosen for them. So this was an issue, okay, and they settled it by going in this direction, so from that standpoint, you know, this really is all about basically getting enough stations out there, and that's really it. Redundancy is no vice, okay? It's actually a very good thing. Now, you don't want one right across the street from each other -- not now, no, down the road, you betcha, but not right now. But if you have one a couple miles away, it's not that big of a deal, okay? So it only helps to build recognition and that's really the important part. If a preference is needed, always first off the bat should be whose got the cleanest technology. Second one is who has the best location between the two. And if they're more than a couple miles away, that should be fine, okay? It's not going to kill each other, it's only going to help in the sales, okay, of the vehicle. So different customers have a choice in case one of them goes down for repairs. The next slide, please.

So, again, it isn't rocket science, if you do need an expert, if you feel better, any private
consulting firm where there are no conflicts of interest, that specializes in locating, siting, building, and supplying station equipment, and traffic modeling, could easily provide data for locating stations. I'm working with one right now on this. So certainly, you couldn't do worse than requesting a station off of Montana Street in Santa Monica where there is no fueling stations, it's multi-million dollar mansions. So, I mean, and that's an example of someone who requested it that I've experienced. So this is the key, let's stop over-analyzing it and get down and get some stations out there, and that's it.

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

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

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

Yes, it's interesting, our research about how
to optimize the selection potential, well, much of it,
as I stated, already exists. I mean, Caltrans has it, a
lot of information, so there's a lot of area, city
governments, AQMD, I assure you, most of that
information exists, it's not necessary to have
proprietary confidential information to do it. Granted,
the automobile companies should be involved, if their
vehicles are selling, they're the ones that have to meet
these things, but you don't need to depend on that
alone, exclusively. I mean, there is no valid specific
data for hydrogen fueling at this time, there's not
enough stations out there, so if you don't have the
infrastructure out there, or more than a couple hundred
vehicles on the road, you know, I mean, they're just
basically beta miles, you know, and a few demonstration
facilities, that's basically what we have at this time,
clearly not enough to make a proper valid analysis,
okay? So that is what we're going to be doing now.
We're going to learn all that, over this -- off of this
effort right here, if we get enough stations out there,
and we'll know more later. But in the mean time, it's ridiculous to try to measure throughput of hydrogen vehicles and a fueling infrastructure at this time, when there's no specific significant data that exists at this time for hydrogen fueling vehicles, so you've got to go with the knowledge that you do have and that is throughput for regular gasoline stations because that's our customer, that's what we're going for. We're not going for the PEV, we're not going for the hybrid customer, we're going for the whole ball of wax on this, okay? So that's really the way we really need to approach this thing, that we are going to replace petroleum. Valero believes we'll replace them, that they will call for them to fund their own demise. That's the biggest compliment I've heard yet for hydrogen. But at any rate, that's just my outlook on this effort, you know, at this juncture. Next slide, please.

Okay, the definition of clusters, connector stations. I mean, you know, we've already been through that, the clusters should be expanded to other areas, not just where hydrogen is sold, into areas along major transportation routes and destination stations, as well. And the next cycle of vehicle sales and customer acceptance down the road. L.A. to San Francisco, it
would be very important to have a connector station between those stations. Kettleman City on 5, I don't think gets it, it really doesn't. You know, the only people you will have are those that are commuting from there, where at least if you do it on 101, you get local communities that will be buying them, as well. So you get double the effort there. You know, include areas like San Fernando Valley, Encino, Sherman Oaks, Woodland Hills, Burbank, Studio City, Pasadena, and Riverside, as well, because they all have very affluent areas and they will all buy them, even if they don't have a lot of hybrids at this point in time, they will buy these, okay? And I can assure you that, in those areas that you'll do some sales if you have stations there. Pacifica, Richmond, Berkeley and San Rafael and San Francisco, connector stations like Santa Rosa, Petaluma, San Luis Obispo, Santa Barbara, all along major highways and thoroughfares, and their freeway exits. Next slide, please.

So I mean, all the automakers, their input should be in the Investment Plan, absolutely, you know, that's already in place, as well as other stakeholders. You need more renewable stakeholders input. What I think you really need, too, get some renewable power producers in there because otherwise it sounds like
you're just going to go with fossil fuel generator and hydrogen, okay? That's the way it looks. You don't have them sitting in there, you don't have them on the committees, and you should. Other ideas for recommendations for hydrogen infrastructure siting, remove the requirement for an LOS, a Letter of Support, from an automaker or any other participating private entity to apply, okay? Too easy to exploit, too easy to be tempted by favoritism. Next slide. I think that's it. Well, there is more, but that's a good start and I certainly thank you for your time. I have a few other issues that I would love to define, and so if you have a few more minutes, I would be glad to move in on that, but I don't want to impose on you, unless you have a few extra minutes remaining.

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

MR. CARNELLI: Yes, I'm ready.
MS. BARONAS: Okay, great. And then the other loose end, yes, Dan, it was under 10 minutes, I heard you ask that and then I was starting to talk to Ghassan here, so yes, thank you for keeping to a time schedule.

MR. STAPLES: No problem.

MR. CARGNELLI: Hello?

MS. BARONAS: Yes, we hear you.

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

MS. BARONAS: Is this Joe Cargnelli?

MR. CARGNELLI: Yes, it is.

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

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

Hydrogenics is a hydrogen fuel cell and hydrogen generation company. We have over 2,000 hydrogen products deployed in over 100 countries. We've delivered over 40 hydrogen vehicle fueling stations worldwide and we currently service 10 public hydrogen fueling stations in California. We are the world leader
in water electrolysis with over 60 years of experience
in designing, manufacturing, installing industrial and
commercial hydrogen system around the globe. For those
of you that may not be familiar with electrolysis,
essentially we take water and we use electricity to
separate water into its two basic components, hydrogen
and oxygen. Our corporate headquarters are located in
Mississauga, Canada. Next slide, please.

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

In order to address, I guess, the question
regarding optimal fueling station location, we really
need, I guess, location criteria. We've tried to list
some location criteria here that should be used in the
decision making process, so supply chains for example,
centralized and delivered model versus on-site hydrogen
production, customer reach, you know, urban versus
interstate links, certainly hydrogen price, carbon
footprint, also very important, green or renewable
hydrogen, and really how green is another criteria.
Scalability, does the site have expansion capacity for
future growth? Do the solutions for the sites have
expansion for future growth? And also, additional
value. So when considering, for example, electrolysis
as a solution for fueling stations, does the location
site offer the potential to maximize the value of the
solution? And I'll talk more about that in my
presentation. So, for example, there could be
additional value streams that can be provided when at
certain locations when using electrolysis as a form of
hydrogen delivery. Next slide, please.

In this slide, I'd like to illustrate, I
guess, the two popular approaches for hydrogen fueling
stations. At the top, we see the centralized SRM
delivery model, which is a valid way to distribute
hydrogen. Some sites, I guess, are challenged with the
approach, or with this approach, because of the
distances sometimes encountered between point of
production and the point of use, while other sites
struggle with large hydrogen transfer trucks going and
coming from the site. The other alternative is on-site
and, in my case, on-site electrolysis, also a proven
alternative, and in the past, the major challenge for
electrolysis has been the cost of hydrogen production.
So the challenge for electrolysis and site
selection is really how to maximize the total value that
the solution provides, and when selecting sites, we
really need to consider all of the value streams that, again, electrolysis will be able to bring to the group of stakeholders. Next slide, please.

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

The bottom left image that you see in the slide is a recently opened Hydrogenics electrolysis hydrogen fueling station located in Oslo, Norway. It serves both buses and cars and, again, the ribbon opening ceremony was a few weeks ago. In the middle is an image of Europe's largest urban electrolysis-based fueling station, also with our technology. Again, it serves both cars and buses. This station is owned by a large electric and gas utility, which is quite interesting, this is a trend that we're starting to see more and more, and in subsequent slides I'll explain why electric and gas utilities are interested in sites that can handle electrolysis.
On the right is a Shell hydrogen station located on Santa Monica Blvd. in Los Angeles, also with our technology, which has been in public operation since 2004. Next slide, please.

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

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

With this slide, I'd like to illustrate that electrolysis-based fueling stations actually can do more than just make hydrogen, so in the selection -- in the site selection criteria when you're looking at various technologies and looking at where electrolysis makes sense, I'm going to say that this is going to be a very critical part for electrolysis-based fueling stations, so what we're looking at is basically the operating signal of an electrolyzer, illustrating that an
electrolyzer is a very dynamic load. The graph shown is actually an electrolyzer being operated by a local Independent System Operator, or the Grid Operator. So while the electrolyzer was producing hydrogen for a fueling station, the electrolyzer was also performing an additional valuable ancillary grid service called Frequency Regulation, so today fossil fuel power plants are paid to perform this service; as we add more and more renewable energy to our power grid, more ancillary grid services are going to be required, and this is an excellent way to add an additional value stream to the fueling station. Electrolysis-based fueling stations have the ability to perform this valuable service and capture this value, so interesting characteristic and interesting to consider how that fits into the site selection process. Next slide, please.

I apologize, I just lost the screen here.

Next slide. Can you tell me which slide you're on, please?

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

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

MS. BARONAS: Now you have your next slide up,
which are the two circles. Should we go back one slide?

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

MS. BARONAS: Okay.

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

NS. BARONAS: Yes, we are.

MR. CARGNELLI: Okay. So on June 11th, the California Energy Commission explored ways to minimize the issues and costs associated with greater renewable energy penetration. Next slide, please. So today, the California Energy Commission is looking for optimal hydrogen station locations and the best approach for selecting sites for these future stations. Well, I'd like to pose a question. What if you could address both challenges, so the challenge of solving renewable energy integration, and also solving the challenge and issues with selecting sites? So today I'd like to say that we live in a world of energy silos, so the electrical power grid silo, the transportation energy silo, the natural gas energy silo, there's no communication between these energy silos, and today there's really no technology that can bridge these silos. And I'd like you to sort of think about electrolysis as a bridging technology between these silos, the ability to move energy, for
example, from the power grid, the electrical power grid silo, into the transportation energy silo that I just discussed, so this would be vehicle fueling and, again, I'd like you to think about moving energy maybe from the electrical power grid into the natural gas grid silo. So when you think of fueling stations, they can have more value than simply fueling vehicles. Next slide, please.

Are we on the slide that starts with Distributed Power?

MS. BARONAS: Yes, we are.

MR. CARGNELLI: So with this slide, I'd like to mention that Hydrogenics is pioneering a concept called Power to Gas, which in our minds is one of the most innovative ways to store and transport large quantities of energy, or surplus energy. Essentially, Power to Gas is the process involving the use of excess electrical power to produce hydrogen by electrolyzing water. Now, the hydrogen gas can then be stored and used for vehicle fueling simply in vehicle fueling stations, or it can be comingled with the existing natural gas infrastructure network, or mainly the gas pipeline network. By feeding the excess electrical power as hydrogen gas into the natural gas grid, the stored energy is not restricted from the site of
generation. So separating generation and utilization offers grid operators more flexibility in terms of managing surplus power. So when you think of hydrogen fueling stations, again, there's an additional value stream here to other stakeholders that are participating in the selection of vehicle fueling station sites.

Right? So, again, three value streams that I've talked about now, vehicle fueling, grid stabilization, and energy storage. Next slide, please.

So I guess, in summary, I'd like to say that California is extremely well positioned to capture all of the value that hydrogen via electrolysis can deliver. I listed some of the location criteria, everything from on-site supply chain, customer reach, delivery price, green hydrogen, scalability. I talked about additional value streams like Frequency Regulation, and energy storage. I maybe would like to sort of wrap up by saying that, in considering site locations, maybe a broader stakeholder group, or maybe a broader stakeholder group should be involved that can benefit from electrolysis-based fueling stations, for example, electric utilities, the local Independent System Operator, wind farm operators, gas and electric utilities. Now, these stakeholders would see ancillary benefits from electrolysis in addition to the fueling
benefit that electrolysis could provide. Also, involving a broader stakeholder group in pushing this technology out, would allow for the dividing of the investment and returns amongst multiple stakeholders and partners. And maybe in closing, I'd like to say that electrolysis-based hydrogen fueling stations can provide additional system benefits, system benefits across the board, that help solve some of the issues and costs associated with renewable energy penetration. And if we can bring the stakeholders together with the policy makers, we're going to be able to unlock hydrogen's true potential and solve the hydrogen price issue that's highlighted here in this slide with the yellow checkmark, and deliver the cleanest hydrogen. With that, I'd like to thank you for your time and the opportunity to speak this afternoon. Thank you.

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

MR. CARGNELLI: Thank you.

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

MR. ECKHARDT: Thanks for inviting me here on behalf of Linde to participate in this workshop. You know, so far I think this has been a great discussion, a lot of good debate, progressing us to ultimately a
better solution and looking forward to the discussions next week, as well. We remain very excited about progressing, getting hydrogen stations and fuel to those stations to meet the rollout needs of the fuel cell vehicles, and what I want to talk about today is, you know, some of those key discussion points that were brought up by the CEC.

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

So today, for a second here I want to talk about what are some things that we think about when we enter a market. Well, the first thing is what does the customer want, and then the second thing is, well, how do we cost-effectively meet those needs? And what's really critical, and what I think we need to keep in mind is we need to consider both the cost-effectiveness and meeting the customer needs. A lot of discussion around cost, a lot of discussion around making sure that we minimize the cost of getting this done. To the
extent that we go too far one way or the other, I think we do ourselves a big disservice. It's about doing things cost-effectively, but also meeting the needs of the end customer and that end customer, you always have to keep in mind, are the people that are going to be driving these cars and pulling up to those fueling stations every day.

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

Second point, if you think about the investment per station, you know, on the order of a million or two a piece for the State, a very critical decision, you know, you compare it to, say, charging stations, or E85 stations, that are also funded by the State. You know, those decisions are important, you want to get those in the right location. But those investments on a one-off basis is very small; each one of these investments is very big, and what that means is
we need to collectively, all the stakeholders, need to make sure that every single one of those investments goes in the right location, that that investment ultimately is used very well and ultimately turns into a site that can turn into a business for hydrogen fueling.

The third point, you know, aligning the fuel with the buyers, and to the extent that we do that, the OEMs will take a look at this and they'll take a look at those stations, and they will bring more and more cars to this market. It's a bit of a self-fulfilling prophecy; we put the stations where the customers are likely to be, the cars will come, and the customers will buy them. And a concern that we need to make sure that we don't create a reality out of is putting stations where customers may be few and far between, or there may be no customers for a number of years, our concern is that just drives the OEMs to consider other places to put their cars. You know, we're in a competition here and we want California to do very well in that competition. We want California to have a lot of fuel cell vehicles in the future. And the way to do that is to make sure these stations go into the right locations. And to the extent that we follow a process that does that, you will have a lot of station developers very excited and very interested and very engaged in bringing
stations out. On the flip side, of course, if the process is one that serves to put stations where maybe the customers may not be, you know, station developers are business people, and business people ultimately want to create a business, want to prove the business model, and if those stations ultimately look like they're going in places where the customers may not be, station developers may not be so interested in pursuing the process.

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

In terms of trying to -- in terms of for cluster stations, the first criteria in our view would be you're either in the cluster or you're not in the cluster. Now, I'm not talking about destination stations, that's a separate discussion, but with respect to cluster stations, you're either in or you're out, and if you're out of the cluster, you're not going to get
funded. And the reason I say that is because what --
the points I just made on the previous slide, we don't
want stations going where the car companies don't think
you're going to sell vehicles.

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

With respect to STREET modeling from U.C.
Irvine, excellent tool, needs to continue to be used,
it's been invaluable. This has been talked about
before, but I just want to make another comment on it to
make sure it's clear, I just want to make sure that we
don't look at the dots on the map that are created by
that U.C. Irvine model and say the station needs to go
there because what that serves to do is the station
operators at that corner, or within a few corners of
that dot, their price just went up, you know, they're
not dumb, they're out to make money. So I was very
happy to hear what Tim said earlier, that at the end of
the day, if a station goes and it's selected and it's a good station, and it's not exactly where a dot is, that's fine, you re-do the model, and you can still use that model. So that's a point I just wanted to make.

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

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

And, you know, just a couple comments in terms of the benefits of using this type of scoring approach.
It does ensure alignment between the OEM target markets and the early station sites. Secondly, the CEC has a very good scoring system already in place and it integrates pretty well within that, so it doesn't require a wholesale change to the process of scoring these projects. And then, finally, it does ensure good coverage of the clusters.

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

So in terms of the stations that get funded in this round, you know, the Notice of Award will be probably sometime this winter, maybe late 2012, early 2013, you've got to go through a contracting process, so most of these stations will be commissioned in 2014, and...
there will be a number of them probably not commissioned until 2015. When you consider that the fuel cell vehicle commercialization, it's right about that time, maybe just a bit delayed from when these stations are coming out. So these stations need to be built for commercialization. You know, there were comments earlier, a number of comments about -- and I think general agreement -- that we need to have stations before the cars. And I think at this point I would slightly change that and say we need to have the right stations before the cars. And when I say "the right stations," it's stations that take into account that we're going to have 10,000 cars on the road in 2015. And I think that needs to be the view -- hey, there's going to be 10,000, that's what the car company goal is and that's our view, we have to have that view, because if we don't, well, then there won't be 10,000 cars. And if there's 68 stations, you look at an average kilogram throughput, it's on the order of 175 kilograms a day, probably, and there's going to be plenty of stations well in excess of 175 kilograms a day, they aren't going to all be loaded at 175. So it's critical that those stations in this solicitation we consider higher throughput, we consider stations that are going to have lots of customers coming every day, five cars showing up
in one hour, five cars maybe showing up in 10 minutes. How are we going to handle that? The stations need to be able to deal with that.

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

A final comment, you know, the OEMs, again, if they see stations that meet consumer needs, if they see stations that are in areas where they now the customers are, they'll bring the cars to California, they won't take them elsewhere, they'll bring them here and then the consumers will buy them, so let's make sure we set ourselves up for victory and for success in 2015, and that in 2015, we don't say something like, well, right now we're talking about no backup and redundancy, let's not set ourselves up for failure two or three years from now by not appreciating that these stations being
awarded now are stations that have to be ready for commercialization because that's what we're seeing right around the corner.

I appreciate you all letting me talk today.

Thank you for your time.

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

MR. BLOCK: Yes.

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

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

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

MR. BLOCK: Thank you.

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

MR. BLOCK: Okay, great.

MS. BARONAS: Thank you.

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

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

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

MR. BLOCK: Great. So this presentation is a very short presentation and basically I just wanted to take the particular limited perspective of a station developer and to address the questions that the CEC posed regarding station siting. So in this presentation, I'm not making a particular pitch for one
form of hydrogen generation, or hydrogen delivery to a station versus another; I'm assuming the Commission is interested in any viable option, but I do just want to represent the concerns as we look at them, that might not be self-evident, and hope that that's useful.

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

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

Station capacity, I think one issue here is
more stations with smaller capacity, or fewer stations
with higher capacity, has to be considered and there
might be good arguments for both, but I think that, in
terms of stations with smaller capacity, there is the
advantage of redundancy that could be important as the
stations are rolled out.

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

So the question was posed regarding the
definition of cluster, connector station, and
destination stations. So for us, cluster, we're
defining it just from our perspective as a station
developer, so for us that's a 100-mile radius, stations
within a 100-mile radius can be serviced by a single
person, or a single service organization, so that's sort of how we look at clusters. And so for us, connector and destination stations just aren't a consideration for on-site generation, we're not addressing these other policy issues that certainly do make that relevant, but it's not a consideration from our perspective. And that concludes my presentation.

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

MR. BLOCK: Thank you.

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

MR. STAPLES: I hear James.

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

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

MS. BARONAS: I'm sorry, I have difficulty understanding what you're saying.
MR. STAPLES: Okay, can you hear me?

MS. BARONAS: Yes, I can.

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

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

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

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

MR. ECKHARDT: I mean, not a significant amount of deeper thought. What I wanted to propose was 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
proposals are submitted, I think it would be an iterative process that would include the OEMs and other U.C. Irvine, U.C. Davis, an iterative process where, if necessary blindly, these sites are looked at. But I think that there was mention from a few presentations about having the OEMs engaged, not necessarily on the front end, but on the back end, I guess, and that could be a process for which they could be engaged in it, or involved with.

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

MR. HEYDORN: Sure, Jim. This is Ed Heydorn from Air Products. Station owners are obviously a key piece to this. If when stations are put in, not just hydrogen, but any technology, when they're not running at the point where they can recover their fixed operating costs, they're not going to keep the equipment in for very long, so that's key when you talk about number of stations, location of stations, it makes the
challenge for outlying stations greater and the need for
support of those to be longer.

MR. MCKINNEY: Great. Thanks, Ed.

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

MS. OGDEN: Hi. Joan Ogden from U.C. Davis.

A couple of interesting things that I think several of
the presenters, the station providers talked about,
which was the need to have larger stations in the queue
and be thinking about those now so that they'll be ready
for 2015, and the probability of moving, although we
need, you know, 50 or 100 kilogram stations now, as we
scale up, we'll need to go to the larger stations. So
just one thought, I wanted to ask, when you think about
evaluating sites, I assume that depends a good deal on
the footprint available, on the size of the system
you're putting in, as well as the type of system. And
so I was just wondering, would you see that as being
something that would be part of a criteria so there
would be different site criteria depending on the
station size and the type of station that you were
putting in?

MR. ECKHARDT: Well, certainly any site that
is proposed for a higher throughput station, say over
200 or 300 kilograms, as opposed to under 100, certainly
it should be a site that is, you know, a cluster site and one that would be deemed as a good location, in an area where there would be a fair bit of prospective buyers. And that's something that the OEMs or other entities could provide that input as to whether it's an appropriate site for a larger throughput station. Of course, you know, the figure I threw out, I think I said 175 kilograms a day roughly, average, for all cluster stations by the end of 2015, I mean, that means in 2016 it's going to be even a greater throughput, so our view is all the stations need to be well over 100 kilograms a day, at least in clusters, all of them need to be well over 100 kilograms a day, and then there needs to be some that can handle the top end of that, well over 175 kilograms.

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

MR. POPPE: Yeah, Dan Poppe from Hydrogen Frontier. Actually, NREL keeps a lot of this usage data
and it's available, it's published every quarter, so
that actually shows how many cars, what time of day, and
NREL has a valuable tool for that information.

MS. OGDEN: But this is existing hydrogen
stations?

MR. POPPE: Correct.

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

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

MS. OGDEN: Yeah. I know DOE tried to do it
from kind of a high level a few times, just looking at
georeferenced characteristics and so on. So as far as
you guys know, it doesn't exist. Thanks.

   MS. BARONAS: Please go ahead.

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

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

   MR. BARONAS: Yes, please. Go ahead.

   MR. ELLIS: This is Steve Ellis with American
   Honda. Tim, I was intrigued by what you just said about
   your studies in Irvine and it made me think that in, for
   example, just five years, we've seen significant
   advancements at the station level, just as we've seen at
   the vehicle level. Do you feel like if you went back
   and did that study again, you might find, for example, a
station where, from a footprint standpoint, may not have been suitable then, that could be today?

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

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

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

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

MR. STAPLES: Yeah. I'm kind of curious because, first of all, Ed, I agree with you on that last point, very much so. I think we definitely need to get as many stations out there as possible and grow with the demand. And I think that's important. Now, with regard to something that Linde said, clusters, it's kind of so very definitive - if it's outside the cluster, you don't get selected, you're out, your disqualified, it's almost like it sounds like you were talking from the perspective of it's your decision to make, you know? So, really, it comes down to basically what makes sense. You've got one that happens to be just outside a line that was drawn arbitrarily at some later date, after you've already done it? And then ask for a station in an area that doesn't exist? Kind of makes that sound a little bit weak. I think what you need to do is you need to have a diverse group of people on the committee, and certainly the automobile companies should have some input on it, but have a diverse group of people that can look at it. It is the taxpayers' dollars. So it's really up to the taxpayer, or those who are representing
the taxpayer, the CEC, or Air Resources Board, or the AQMD, to make that decision, okay? To say, well, you know what? We think that this is a good station, as well, you know, it's in a wealthy area, has a lot of throughput of traffic and all that, and everybody driving in there has the kind of money that you're going to need to buy these vehicles, it's in an area that is very important this needs to be done, that should be the determining factor. Okay? Right there. So it may not suit the demographic of one particular company or another, but it's going to fit somebody, okay? So I think that's possible, that's appropriate. Also --

MS. BARONAS: Thank you very much --

MR. STAPLES: -- you're wrong about redundancy. Redundancy is good. Okay?

MS. BARONAS: Thank you, Paul, for the input. This is Jean. I think Steve was talking in terms of an example. Is that correct from your mind, Steve? Go ahead and add, Steve, please.

MR. ECKHARDT: Well, I mean, with respect to that comment, I mean, that's our opinion and I think that's what we were asked to bring to the table is our opinion. I mean, listen, from a station developer perspective, I'd rather have more leeway to go more places, it makes it easier to find a site.
MR. STAPLES: Agreed.

MR. ECKHARDT: So, I mean, but if we were all allowed to do that, we are going to have stations all over the place, they're going to be too spread out, we're going to run out of money, there needs to be some discipline, if you will, around where these go. And that Roadmap has the discipline to focus us in some areas that have been determined as the best areas by the people who are in the best position to know where the best customers are going to be with the early customers. And my point was to say let's stay disciplined in those areas. Now, again, I'm not -- this is not a self-serving comment, because I'd love to go all over the place, it's easier to find a site if I can have more leeway. But at the end of the day, I think we'll all be less successful because we will either run out of money, the State's money, or there will be too many stations too far apart, and that's not a cluster, that doesn't make a network.

MS. BARONAS: Thank you for that, Steve. And so, now Angela has comments or questions. Please introduce yourself for the record.

MS. NANALAL: Yes. I'm Angela Nanalal with PowerTech Labs. We're a station provider, as well, and we're working with Dan Poppe of Hydrogen Frontier. So I
just had a couple of comments. When we were looking for stations for this past solicitation, there were three main key things that we had to find, the first was to be in the cluster that the OEMs and others had decided was the key location; the second was to find owners that were willing to work with us because it is a technology that's new, it's just important to have them on board and willing to work with us; and the third was a footprint that was large enough to contain all this equipment. The gasoline stations are small as it is, so if you're trying to cram in additional equipment to fuel hydrogen vehicles, you need to make sure that it's large enough and also be able to scale up for when we do have more cars filling those areas. And then also the point of scalability, one approach is to maybe not build the stations as large, build them smaller, and have the footprint and the ability to scale up, so when you do have more vehicles, you can scale up. And that way you're not outlaying as much of the cost up front and you can add it on as you get more vehicles. That also helps with the business case because part of funding these station is having enough vehicles to buy hydrogen at these stations, so if you don't have the throughput at these stations, your business case sort of goes out the window. So those are the important things that we
found in this process.

MS. BARONAS: Okay, Angela, thank you very much for your comments and contribution.

MR. ECKHARDT: I would just like to make a comment. With respect to the scalability concept, I mean -- I'm Steve Eckhardt from Linde -- and we agree, we think these stations should be scalable, that's the way ours are designed, to scale, and start at a certain level of capacity, and then increase. Our view is that, to the extent that you can put a station in and then not have to upgrade it six month or a year later, or 14 months later, that's probably good because going and upgrading stations causes a lot of issues at the site, it costs a lot of money because you've got to mobilize twice, so there's pluses and minuses, and I don't think there's any right way to go, or wrong way, there's a number of ways to go. Certainly, I think I would agree, though, with everybody that the scalability concept makes a lot of sense. Our stations follow that concept. But, again, we'd like to put a station in where we don't have to necessarily upgrade it almost immediately.

MS. BARONAS: Thank you for that. Alex, please.

MR. KEROS: Steve and I always talk over each other.
MS. BARONAS: But are you two the people who are going to peel off early?

MR. KEROS: Yeah, we're going to peel off here in a couple minutes, I apologize --

MS. BARONAS: Okay, then please go ahead.

MR. ELLIS: Yeah. I'm his ride. Just one point which ties into what I presented, but General Motors would certainly welcome, I'll say, more than 68 stations in the Roadmap. We would certainly welcome to consider all locations, and some locations perhaps outside of clusters or some of the early adopters/destination stations, as well. I think I'm looking at it in this workshop through the lens of prudent use of the State of California's money, so if there are any infrastructure providers out there who are willing to invest solely their own capital in other locations that they find to be attractive because they believe the market can grow, 1) I will welcome that, and 2) I would certainly encourage you to talk to OEMs on how to sort of, I'll say, make it 69 and 70, if you will, but the lens and the recommendations, at least I'm bringing forward today, is really about how do we maximize the investments, particularly the Energy Commission, to make sure that we get the most bang for the buck for the taxpayers, and I think that's a little
bit of where perhaps, Steve, you're coming from with respect to trying to fund stations within a cluster, or within what the Roadmap has laid out and, second, before I turn it over to Steve, it is with a significant amount of pride and appreciation that I know we just delivered the Roadmap to the CEC.

MS. BARONAS: Please go ahead.

MR. ELLIS: Steve Ellis with American Honda, once again. I think today has been great because it's been a process of open dialogue, where we can agree, we can disagree, or agree to disagree, and yet there's been a couple things I've heard that, simply because this is a matter of public record, I think there's a couple of corrections I would offer. One I heard said that automakers or OEMs don't know where they want to sell their cars; I can't speak for everyone, but I do know that, when we announced the program for the Clarity, we had identified very specific clusters where we were going to accept handraisers as prospects for those customers, and I think we've identified those well. We've communicated that very broadly within the industry and to hydrogen station providers. So I think, from our standpoint, we do know where we're looking for the customers for the cars. I've also heard some comment that I would interpret as a willingness to build
stations outside the clusters, we've had experience
where some people have referred to it as "if you build
it, they will come," and we've seen those type of
approaches fail in the past. So I'm just providing
cautions that somewhere between those two comments needs
to be some very strong collaboration and analysis that
would allow, I'll say, the truth to come out there. But
from our standpoint, we do know where we want to sell
the cars and we have enough data to now know where those
people have voted, you could say, as handraisers to
acquire fuel cell cars. Thank you.

MS. BARONAS: Thank you for your input. So
noted. Okay, so we do have a public comment period as
part of the CEC's process and, prior to that, I wanted
to give Michael the floor for his remaining questions
from the earlier session today. So please go ahead,
Michael.

DR. NICHOLAS: This is actually for Alex. I
don't know if you have time to answer. You know, maybe
you can't answer it to the point, and Steve answered a
little bit, it was about the existing customers and the
idea that you're leaving a few customers on the table
because of lack of capacity and such. That was one
question, like what's kind of your sense with the
existing locations and those small number of locations,
how much market is there, or how much market is kind of left? And then, how far away from those stations do you see that you gather customers? What's kind of your limit internally? Where do you stop considering people?

MR. KEROS: I don't think we're at a point in the market to be able to determine how far do you actually pull a retail customer from. I think there's certainly a lot of analysis from the gasoline side of things, you particularly have studied this question. So at this point in time, I don't think it's fair to say, the data is just frankly not there. Have we left customers on the table, I think, is what you're asking? Certainly, our program looks a little bit different than others, it has evolved from the customer facing aspect of it. I can reiterate messages that General Motors had to invest a significant amount of our own money to complement the infrastructure that was there and there's some sarcasm in that statement, we had one or two stations that were available, we had to put fueling at all of our clubs, we had to build Clean Energy LAX, we had to do a lot of, say, extraordinary measures to be able to give our customers a sense of the experience and, frankly, it wasn't always what we wanted. So fueling at the Burbank hub, which at one point in time was a lot of kilograms, I know it was the busiest
station in the world, yeah, we were beating you, Tim, sorry. But I think the "if you build it, they will come" expression that has been sort of perhaps tossed around today, I think there's certainly demand right now and we need to find a way to help satisfy it. How much of that demand? Is it 68 stations worth today? I think the answer would be no. But there's certainly pent up demand to be able to complement. I'll use us as the example, Clean Energy LAX is now sharing duties with the GM fleet and the Mercedes Benz fleet, General Motors does not want to be fueling Daimler, you know, Benz cars, in the sense of -- let me clarify -- I don't mean it derogatory -- we just don't want to be a station operator. A station operator for our own customers is one thing, to be able to manage and fill a gap, but I can tell you, there are Mercedes Benz customers who are using our station, who would like to find a normal retail station in their backyard. So if nothing else, that's a very clear example, there's the demand out there, I think Steve said it very well, and an immediate demand for like the Santa Monica area that needs to be addressed. So I've walked around the question, but, yeah, there's demand. I don't know how we quantify it today, but there is certainly some pent up demand.

MS. BARONAS: Thank you for that, Alex.
Appreciate it. I'd like to move into the public comment part --

MR. STAPLES: Could I just make one comment, that someone has made that sounds like it's directed to me?

MS. BARONAS: Okay, Paul, go ahead and then we're going to move --

MR. STAPLES: Just real quick.

MS. BARONAS: Okay.

MR. STAPLES: Real quick -- I never said "build it and they will come," although I don't think that that will be a bad idea considering what we've got right now, which is very little, okay? However, that was never an advocacy of what I was saying, okay? I just want to make that clear. Thank you.

MS. BARONAS: Okay, thank you for your input, so noted. So now we're moving into the part of the agenda for public comments. At this time, we will entertain comments from the public.

MR. PROVENZANO: Yes, this is James Provenzano with Clean Air Now.

MS. BARONAS: Go ahead, James.

MR. PROVENZANO: Good afternoon. I'm also a driver of a fuel cell vehicle and I've driven over now 22,000 miles on fuel cell vehicles, and I want to thank

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52 Longwood Drive, San Rafael, California 94901 (415) 457-4417
you for this opportunity to address all of you. I also want to thank and commend the CEC for having an encouraging and open process to discuss these important issues. Am I the only one representing the nonprofit public advocacy world here today? If I am, then maybe that suggests that the hydrogen industry needs to address and reach out to that important constituency. I want to thank the OEMs and the State of California, specifically the Air Resources Board, the South Coast Quality Management District, and especially in the last six months, the CEC for keeping the Hydrogen dream alive. The billions that have been invested by the OEMs are why we are talking here today. They have done their homework and they know what works, and what will take transportation on the solution equation. Remember why we are here, to protect the public's health from air pollution and to reduce greenhouse gas emissions, and to help reduce the expected impacts of global climate change.

I want to show support for the districts Dr. Miyasato's offer, or recommendation, for an ad hoc technical review committee, so to speak. That committee could do analysis on not only the locations proposed by the PON respondents, but they could also do analysis on the greenhouse gas and criteria pollutant reduction.
offered by the respondents, technologies, and particular
approaches. This committee should and could include the
OEMs and conduct the analysis while being (quote)
"blind" to the individual respondents. As stated by
Linde, the location of the proposed stations by the PON
respondents could be incorporated into the scoring of
the proposals, but if they are in the specified
locations as stated in the PONs, the proposals should be
evaluated, scored, and considered by CEC staff. I ask
the CEC to move quickly on all this, we are running
behind, as everyone knows, and I think you have gotten a
good idea of the frustration developing over the (quote)
"slow" introduction on the hydrogen infrastructure. I
don't know, is Gerhard still there?

MR. ACHTELIK: I'm still here, Jim.

MR. PROVEnZANO: Hi, Gerhard. This is not
directed just to you, but to all agencies that could
bring weight to this, but I am not coming up with
solutions here to some of the issues crippling the
stations from coming on-line, but I think it is time for
the State to leverage its authority and help accelerate
the whole process. The State should be helping to meet
the needs of the OEMs and get these stations up and
running so they can bring out these cars that are so
important to the goals of the State. If the OEMs are
nervous about contract performance, or their ability to achieve the goals as stated in their proposals, then the CEC could require contractors to meet milestones that are indicative of sound progress, and if those milestones are not met, they would raise a red flag, and that would initiate a predetermined backup plan to ensure compliance with the rollout plans of the OEMs.

Now I would like to make a quick comment as a California resident, and a fuel cell vehicle driver. We need a station in Santa Barbara, one in San Diego, and one on the 395, half way between L.A. and Mammoth. So thank you so much for your time, I appreciate it. And thank you for all the good work that everyone is doing there.

MS. BARONAS: Thank you, James, for your input. Are there any other comments from the public?

MR. MAITA: Yes, this is Ben Maita.

MS. BARONAS: Please go ahead, sir.

MR. MAITA: Hello?

MS. BARONAS: Yes, we can hear you. Please go ahead.

MR. MAITA: This is Ben Maita calling.

MS. BARONAS: Yes, Mr. Maita, we hear you.

MR. MAITA: Okay. I wanted to speak about the renewable hydrogen potential that most of you heard the
presentation by Hydrogenics. I think it is a unique concept that solves many of the problems of the renewable industry, it brings the energy storage, it brings the carbon-free clean hydrogen, and it brings the stability, and many other benefits. So I highly recommend to CEC to look into this as a long term solution to California and many of the world's problems.

Thank you.

MS. BARONAS: Thank you for your input.

MR. SLEIMAN: Could I just add to that?

MS. BARONAS: Yes, please.

MR. SLEIMAN: Yes, this is Ghassan from Hydrogenics. One way also that this can help with the filling station is that this can solve the SB 1505 problem where we can put renewable hydrogen to natural gas pipeline, which can be later reformed to make hydrogen.

MS. BARONAS: Thank you for your contribution.

Please go ahead, sir. Identify yourself, please.

MR. BRAHMTHATT: My name is Dhaval Brahmtatt. I'm from PHYchip Corporation in San Jose, California.

My comment relates to suggesting that there ought to be a small business component to the infrastructure setup. I haven't heard that so far. I have heard big companies say we are going to run for 50 years, or whatever, and
that's fine, but we would like to see opportunities
being offered to small businesses. Thank you.

MS. BARONAS: Thank you for your contribution.

So noted. Any other comments from the public at this
time? Okay, thank you very much. So I would like to
move on to the agenda to the wrap-up and conclusion and
discussion of next steps by Jim McKinney.

MR. MCKINNEY: So again, I just deeply thank
everybody who has come today, who has made the trek to
Sacramento, and going back to this morning; so, the
agencies, the Air Districts, our academic partners and
colleagues, and then station developers and car
companies. This has been really useful for us and we
again deeply appreciate it. And I think it's been a
very informative discussion and we have different points
of view on a lot of tough issues, and that's to be
expected as we kind of continue to get this new part of
the alternative vehicle industry up and running.

I'm not really going to try to summarize
everything that happened this afternoon, there's just
way too much information and I think, you know, us -- us
being our staff -- need to go back and really kind of
think about this, reflect on it, and kind of gather our
thoughts for the next couple of workshops.

And with that, let me say we would like
everybody who has presented today to present your information to our docket, and the docket information is there on the workshop notice that all of you received. I think you've had some sneak preview of the June 29 workshop agenda, so I would like the last couple of comments on renewable hydrogen, we're going to work that into one of the next two workshops, I appreciate the comments on the small business aspect, and I would note that -- I don't think Hydrogen Frontier is a Fortune 500 company, so in your dreams, right, Dan? That's where you're headed, right? There you go. So that is something we're mindful of and thanks. Again, let me just say thanks very much for everybody and you've given us a lot to think about and I think we have a lot of work to do as we evaluate our proposal, solicitation, and scoring process. So, unless Jean, or other members of our staff have any other closing comments, observations?

MS. BARONAS: So, yes. I will just thank you also. I've really enjoyed your presence today and all that you've said. We do have a lot of homework to do, as Jim said. And one comment came up from a quite a few people -- who do you contact at the CEC now? Who should be the contact point? And so I think, right now, it's the docket that's listed on the workshop notice. Okay?
So there is a docket open until June 30th.

MR. MCKINNEY: Is that --

MS. BARONAS: Excuse me? Yes, that is -- we can extend that, but that's to prepare for the June 29th meeting. So that docket is available for you to email attachments, diagrams, anything you'd like.

And thank you very much for coming. Any other comments from the staff at this time? Hearing none, then this meeting is adjourned.

(Adjourned at 4:56 p.m.)