STAFF WORKSHOP

BEFORE THE

CALIFORNIA ENERGY RESOURCES CONSERVATION

AND DEVELOPMENT COMMISSION

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| In the Matter of: | ) | |
| | ) | |
| Implementation of Alternative | ) | Docket No. |
| and Renewable Fuel and | ) | 08-ALT-1 |
| Vehicle Technology Program | ) | |
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IBM ALMADEN RESEARCH CENTER

AUDITORIUM

650 HARRY ROAD

SAN JOSE, CALIFORNIA

WEDNESDAY, FEBRUARY 11, 2009

9:00 A.M.

Reported by:
John Cota
Contract Number: 150-07-001

STAFF MEMBERS PRESENT

Jonah Margolis

Tim Olson

Joanne Vinton

Peter Ward

ALSO PRESENT

Dr. Winfried Wilcke, IBM Almaden Research Center

Dale Hill, Proterra LLC

Lewis Harrison, San Francisco Public Utilities Commission (SFPUC)

Karri Ving, San Francisco Public Utilities Commission (SFPUC)

Bob Garzee, Synergy EV and Silicon Valley Clean Cities Coalition (SVCCC)

James Robbins, Environmental Business Cluster (EBC)

Alison Kirk, Bay Area Air Quality Management District (BAAQMD)

Richard Lowenthal, Coulomb Technologies

Joe Dalum, DUECO

Robert Baertsch, Unimodal Systems

Jaimie Levin, AC Transit

Stephen Plocher, Yokayo Biofuels

Jon Erlandson, ZEV Power

Dave Head, County of Sonoma

Matthew Frome, Solazyme

ALSO PRESENT

Gene Walker, Golden Gate Transit

Don Magdanz (via telephone)

Roger Hooson, San Francisco International Airport, (SFO) (via telephone)

# I N D E X

P R O C E E D I N G S

9:15 a.m.

MR. WARD: Good morning everyone. I am Peter Ward, Program Manager for the AB 118 program, otherwise known as the Alternative and Renewable Fuel and Vehicle Technology Program. We are here for a public workshop on our Investment Plan as we turn the page to the program that we will be administering over the next seven years.

I want to first off thank our hosts here at IBM for having us here. Moiden was helpful in facilitating our being here. I really want to, I really do appreciate it. This is a lovely place. And from what I understand this is one of the first public events you have had here in about the 20 year history. I think this is terrific and we are really happy to be the first ones. Also I would like to introduce Winfried Wilcke who will be -- he is also our host at IBM and Winfried would like to share a few words with you folks before we get started.

DR. WILCKE: Thank you, Peter. We are very excited to have you all. And as Peter pointed out, it is the very first time that we are doing this, i.e., allowing a public event like

this here. And we recognize and thoroughly believe that, like most of you, energy is going to be the dominant subject for this planet for the next 30 or 40 years when we hopefully have settled and solved it.

We are an IT company but we are also a technology company. And we are starting to get really serious about becoming an ET, energy technology, company. So very specifically here in Almaden, which is one of the IBM research sites, the second largest, the largest one is in New York, we are having several projects in energy. We have one in nanoparticle-based solar cells. We are going toward something very cheap and eventually high-efficiency.

Yorktown Heights in particular, which is the East Coast site, is driving a Smart Grid effort. It is very startling, what I am reading. If one can improve the efficiency of the grid, the electric grid by just one percent it corresponds to a reduction of greenhouse gases, of taking ten million cars off the road. So there's a big potential there.

A third project which is starting now here in Almaden is to see how far one can push

battery technology for vehicles. And from the fundamental physics point of view, we think that given enough emphasis on that and a long-range focus, say five to seven years, it should be possible to create batteries that will be usable energy then for the entire drive power train, which is comparable or maybe even better than that of gasoline. Three hundred to 500 mile range cars later should be possible.

There's a lot of science to be done in energy to make that happen but there is nothing in physics which prevents that. We are going to have an event here called the Almaden Institute, which is a essentially a two-day conference on that very subject, on August 26 and 27 of this year.

Okay, enough about IBM. But I need to say a few housekeeping words. Since this is not a public facility there are some restrictions. Please do not wander off into the wilds of the lab without somebody from IBM. I don't know whether the agenda has a break for food. There is a cafeteria at the very end of the building, at the end of this hallway, but as I said, please go in with an IBMer there. Restrooms are across the hallway.

There is a Proterra high-tech bus out there in the parking lot. But I understand it is there only until ten a.m. this morning.

MR. HILL: Yes, 10:00 or 10:15.

DR. WILCKE: Ten to 10:15, very good.

MR. HILL: It's battery electric.

DR. WILCKE: Pardon?

MR. HILL: It's battery electric.

DR. WILCKE: Battery electric, outstanding. And finally I really want to thank everybody involved in organizing. We already said Moiden the original contact, he's an associate lab director, Wendy Fedde, Alex Deluca. And with that, let's get started. This mic here is for the auditorium and will be over there.

MR. WARD: I would like to briefly go over the agenda we are going to have for today. Also first I would like to recognize the CEC staff that are in attendance today. We have Jonah Margolis and we have Joanne Vinton up there who is our greeter up there.

Tim Olson, my colleague in the program. We are taking this tour around the state. We were in Fresno yesterday. Next week we will be in Diamond Bar and San Pedro. And these are the four

series of public workshops. We are trying to elicit suggestions on our, on our Investment Plan and suggestions for projects, ideas that you folks have as we move from the Investment Plan process to our program and actual solicitations that we hope to release in the spring.

We are going to have several additional presentations, not just on this Investment Plan and our program. And so the folks you see up here, Jim Robbins from the Environmental Business Cluster. And we have Lewis Harrison from the San Francisco Public Utilities Commission. We have Alison Kirk from the Bay Area Air Quality Management District and we have Bob Garzee from Synergy EV, and he is also representing the Silicon Valley Clean Cities Coalition.

And with that I think we can get started. I do want to mention though I was able to ride in that battery-dominant electric bus this morning just before we started. It's fantastic. I think that is a great development and you are to be commended, Dale. I think you worked long and hard in getting this thing pulled together.

And looking forward to the future I understand it is fairly rosy because he has

already talked to a good friend of ours, George Karbowski at Foothill Transit. He is interested in purchasing some of those when you go to more production, just not the one-up.

I don't know, we have kind of a full agenda. But if you folks would like to go out and just take a look before you have to leave at 10:15, I understand. It is certainly a novel looking bus, it rides very quietly. I'm thrilled that you were able to bring it for us today, thank you.

The program that we will be administering soon will be a very ambitious program, the likes of which we really haven't seen at the Energy Commission for transportation I dare say. Not in our state or in the nation.

The purpose is to develop and deploy innovative technologies and fuels that transform California's fuel and vehicle types to help attain the state's climate change goals. To provide immediate GHG reduction benefits and to help create the impetus for a long-term transition from petroleum to lower carbon -- to lower criteria emission vehicles and fuels.

The funding is up to, we are authorized

for up to $120 million a year through the year 2015. So this sends a good, strong market signal, the likes of which, as I say, we have never seen before. This year, this fiscal year that we are in right now, we have been appropriated $75 million. Next year it is, we are not sure of the final number but the number that has been forwarded in $101 million. So we will soon be about the business of developing solicitations for that, for that funding.

Part of our program and an important part of our program is that we build a framework for sustainability as we go forward. So we are decreasing the pollution on a life-cycle basis well-to-wheels, and we fund projects that will not adversely impact natural resources.

As you may note, in the last six months the economy as such is needing severe help. So the emphasis of our program has pretty much re-energized the economic development aspect of our program and the capability that this funding can provide for economic development and growth in California is highlighted.

We would like to attract and retain clean technology businesses, fund financial

incentives and private investment, encourage market creation and informed consumer choice and leverage the innovation that California is long known for. I think right where we are today is another evidence of the innovation that we have seen in a long history.

I think the panel we have assembled today also underscores that innovation. This is why I wanted to put this type of panel together in this location because we have some folks here that are very forward thinking and we will be hearing from them in a bit.

The Investment Plan is required by the statute. And it was put in the statute so that we would develop our priorities and opportunities for this program. It will describe how funding will complement existing public and private investments as well.

I think the leveraging aspect of this in identifying how funding will complement existing programs is key. Especially now as we hear that the economic stimulus package coming from Washington will bring a large sum of money to California and other states as well. We want to leverage our money with that money as well.

The initial Investment Plan will guide funding decisions during the first two years of the program, after that each Investment Plan will govern one year. But this is a relatively short time here, if you will. We don't have access to the funding yet so this Investment Plan covers this fiscal year and next fiscal year as well.

We have convened an Advisory Committee that helped us to guide the development of that Investment Plan. We had our fifth meeting with them on January 8 and we have taken quite a but of their input.

The staff Draft Investment Plan is now available for review. The Advisory Committee meeting, as I mentioned, was on the 8th of January. The workshops are Fresno yesterday, today San Jose, next Tuesday in Diamond Bar and next Wednesday in Los Angeles. I think it's actually in San Pedro with the emphasis on the Los Angeles Port.

The Transportation Committee at the Energy Commission is comprised of Commissioners Boyd and Douglas. Commissioner Boyd is the Vice Chair and Commissioner Douglas is the new Chair of the Energy Commission. Interestingly enough last

Thursday she gave birth to a daughter. That was in the morning and in the afternoon she was named the Chairman of the Energy Commission. So that was a very full day for Karen, the likes of which she probably hopes she doesn't see again all focused on one day.

The consideration of the Plan will be by the five member Energy Commission, the two Commissioners I've mentioned and three others. And we are targeting that adoption for March.

There are several different types of projects that are eligible for this. Alternative and renewable low-carbon fuels development and improvement.

Projects that optimize alternative and renewable fuels for engine technologies.

Alternative and renewable low-carbon fuel production in California.

Projects that decrease the fuel's life-cycle carbon footprint and increase sustainability.

There is that word sustainability again. This will be a focus of the program. We really don't want to go forward in lowering GHG and improving technologies and using renewable fuels

in a way that does harm to our natural resources in California. We want to make sure that the paths that we go forward on are much more sustainable than those we have been on.

The alternative and renewable fuel infrastructure, fueling stations and equipment are all eligible.

We will be improving light-, medium- and heavy-duty vehicle technologies for better fuel efficiency. We will be hearing from Joe Dalum a little later, from DUECO, on that.

Additionally we will have buydown programs, advanced technology warranty or replacement insurance, development of market niches and supply chain development.

Retrofits for medium- and heavy-duty vehicles, alternative and renewable fuel infrastructure development, workforce training, education and program promotion and develop technology centers and analyses to assist in preparing the Investment Plan and informing the program as we go forward through the seven years of this program.

We have been given a slate of funding mechanisms that are at our disposal. And I will

be mentioning there are grants, contracts, loan guarantees, revolving loans, consumer rebates, direct fuel subsidies. And this all-important phrase that was in the statute, other mechanisms to be defined, which really expands the latitude from which we can fund different projects.

We want to hear, and this is part of the reason we are here today. Is to get public and public stakeholder input on our plan as we go forward for the solicitations.

We want to hear about the projects but we would also like to hear about the funding mechanisms that would be most appropriate for those projects in your estimation. We understand there are gaps in funding that are being taken up and some that still remain. And we want to know those that remain and how we would best fill those with the appropriate mechanisms.

We will be co-funding and seeking strategic partners. Maybe some of those are in the room with us today, that would leverage our funds. I think we are all in this together and we would like to team up wherever it makes sense.

The funding preferences that we have been given shall provide preference to projects

that reduce life cycle environmental impacts, including air and water pollution, decrease life cycle greenhouse gas emissions by at least ten percent, do not adversely impact the sustainability of natural resources, use alternative fuel blends of at least 20 percent and use existing or proposed fueling infrastructure, provide non-state matching funds, provide economic benefit for California, and drive new technology advancement.

In summary, the Investment Plan was developed in two steps. We were asked to develop a framework so that we would be able to provide the best trajectory to meet the goals, both in 2020 under AB 32, the Global Climate Solutions Act signed by the Governor in September of 2006. That goal for that is actually in law. It is that we have to achieve 1990 GHG levels by the year 2020. We are far exceeding those now so that is an ambitious goal and a mandate.

Beyond that we want to set the trajectory to 2050. We would like to comply with the Governor, Governor Schwarzenegger's Executive Order that we achieve an 80 percent reduction from 1990 levels by the year 2050. I think that is

going to be very ambitious. We certainly can't get there until we achieve the 2020 goals. But that will be ambitious and that is basically the framework we have established for this program. To understand the necessary trajectory for fuels and vehicle technologies that could bring us those reductions in the year 2050.

We established these goals along the way. We were working backwards from the State Alternative Fuels Plan that was jointly adopted by the Energy Commission and the Air Resources Board in December of 2007. In that plan was the 2050 Vision, which was a plausible scenario to achieve the 2050 reductions. We have used that guide the framework that we have established using and populating those assumptions in that Vision with our CALCARS, consumer choice, light-duty model. And evaluate the vehicle and fuel efficiencies expected in the year 2050.

I think that there is a lot of work that can still be done on the 2050 Vision to more flesh out the assumptions for technologies, fuels and the costs of those. And to find out what would be the best trajectory to take us from now to 2020 and from 2020 on to 2050 for the ambitious goal of

an 80 percent reduction from 1990 levels.

We are categorizing the fuels and technologies in the Investment Plan under the following categories: super-ultra-low-carbon, ultra-low-carbon, low-carbon and additional fuel economy improvements. These are basically the categories of funding that the fuels and vehicle strategies fall in. Initially the low-carbon is about a 20 percent reduction at this point. Which could, and all of these could actually jump categories as they are improved and renewable resources are applied to their production.

The Step 1 results of our, of our analysis show that in the out years you can see electric drive and hydrogen are the scenarios under the 2050 Vision that give us the most reductions. But then there is an awful lot of development work that needs to be done on those technologies as they are zero or near zero emitting technologies.

Fuel economy improvements in the blue is a sizable chunk of the reductions that we need. These are, these are basically the GHG reductions that we would need to meet 2050. The advanced biofuels at the top in green are a considerable

chunk as well.

You can see along the bottom in the red are the natural gas, propane and renewable diesel as they exist today because they are low-carbon but not the lowest potential carbon. These technologies can advance and I expect that they will with the renewability of natural gas from biomethane. It also could be a source of hydrogen in the future as well so there's a lot of development that can take place. And actually there's an awful lot of interest in those particular technologies to improve those fuel/vehicle combinations.

The second part of the, the second step of our Investment Plan shows a Gap Analysis that was performed for us by TIAX and Mike Jackson is in the audience with us today. We were basically looking at where our opportunities are. In other words, where are the gaps in funding of public and private funds going into these development areas. And we would like to determine from that where are the gaps and where can our partners and stakeholders fill some of those gaps. And leaving what gaps remain that could be available and could be targeted for funding investments from this

program.

We reviewed the public and private investments and funding for alternative and renewable fuels, we determined the gaps and where additional funding is not needed, therefore leaving where our funding can be useful.

At this point I would like to call on my colleague, Tim Olson, who can take us through the funding recommendations for each of these four categories. I'll join you later, thank you.

MR. OLSON: Okay. Thanks, Peter, for going through that quickly. And I am going to try to do the same thing here so we give other speakers some time to give their insights.

So what I am going to do is kind of walk through some of the rationale and maybe give you some magnitude of how we are proposing to allocate funding. And we are using this kind of convention, this structure of the super-ultra-low, ultra-low, low-carbon to show a little bit of the categories.

And then also keep in mind that where a fuel or technology falls in one of these categories it actually may be in more than one depending on things like the efficiency of

vehicles and the origin of the fuels. So what we are describing here is kind of the ideal world in 2050, hoping to do this earlier than 2050.

So super-ultra-low-carbon needs. Basically this will be a preference area from the standpoint of our Commissioners. That we want to see more greenhouse gas emissions. As Peter pointed out, that is our really key goal in this.

There are other co-benefits that go with that. Some in-state, a preference for in-state development of biofuels, preferences for some petroleum reduction that may go hand in hand with the greenhouse gas emission reductions. And we are not, as Peter pointed out we are not, we don't want to backslide on criteria pollutants. So all of these things kind of meld together and help us in our objectives.

In our interactions in our program you are going to see some references to collaboration with the California Air Resources Board. They are also a part of this program. They have their own source of money out of AB 118 and they have some preferences that they have already stated some preferences in how they want to spend their money. For the most part we want to have one program for

the state of California even if both agencies have common interests and common preferences.

So we are working behind the scenes to kind of decide who does what. But for the most part just to sum of from what we know about the Air Board's preferences, they want to emphasize electric drive and hydrogen. And some of that is they have some restrictions in law that they can't spend money on infrastructure and fuel production. It's really the vehicle technologies what they are focusing on.

As we go through this you will see that we have some common interests. Our program, AB 118, is more flexible in allowing us to basically cover the entire development stream when you look at it from the point of fuel production, any kind of processing of the fuel, storage terminal blending, fueling infrastructure, the vehicle itself, the actual consumer use of the vehicles.

So we have a lot of ground to cover and spending a lot of time to figure out -- Not only do we have a lot of flexibility but we have a lot of challenges to figure out how to allocate all the funding and not miss good opportunities. We are trying to take a very balanced approach on

this but there are some guiding lights on this and that's this kind of convention of getting the most greenhouse gas emission reductions.

In that category, as Peter pointed out, the super-ultra-low-hydrogen and electric drive. And I am going to go right to the next slide and first talk about what we are proposing to do with the electric drive. And remember, what we are talking about today is a staff proposal to our Commissioners and our Advisory Committee. It is still open for changes by the Commissioners. They may not agree with us. We think they will in many of these cases but in essence there is still time to influence this proposal.

What we are planning to do with electric drive is to support several different things here. One is we want to see new products in the marketplace that could be battery electric vehicles, could be plug-in electric vehicles. We are not proposing to fund gasoline hybrids and we are not -- we are debating whether we should fund retrofits or refurbishments of vehicles. There are a lot of reasons there and I can go into some of those as we walk through this.

So technology, the vehicle technology

that are ready to go into the marketplace and kind of the early commercial market, we are suggesting a method, a mechanism as a rebate covering the differential, part of the differential cost between that, compared with the electric vehicle to a gasoline or diesel counterpart.

So we are spending a lot of time trying to estimate the differential costs. And we are factoring, the approach we take is to factor out the federal tax credits that might be available for those kinds of vehicles and then looking at the remaining differential as our, as our share to try to cover -- basically make this even with a gasoline or diesel vehicle and make it easier for buyers/consumers to buy the vehicles.

So that is one approach. And that tends to be mainly on light-duty vehicles but it also goes into the medium-duty, heavy-duty area in which we are looking at diesel hydraulic hybrid, diesel hybrid technology that we think is poised to go into the mass market here in the next couple of years.

In essence when we talk about these differential costs we are also defining a rationale for the government incentive. That

these new technologies are more expensive and we are trying to buy down or offset that differential cost. That is the idea we are trying to get to. So you are going to see some of those proposals from both the Energy Commission and the Air Resources Board and we are probably going to have a shared program for those kind of rebate efforts.

In addition to that we are -- the Energy Commission is proposing to provide some money as a cost-share on prototype development. And that means, as opposed to thousands, you know, a couple thousand, 15 thousand in any single year. It's going to be ones and twos of technology that is not yet in the marketplace in any kind of significant way.

This will be for the electric drive looking at things like, instead of a diesel electric hybrid maybe a natural gas. A different kind of fuel in electric hybrid or hydraulic technology. And then exploring some of the other, other types of kind of advanced technology. The series hybrids, the plug-in electric hybrids, the battery electric in the medium-duty and heavy-duty applications. So these are not yet in the marketplace in a big way and it takes in some

cases a proof of concept or a market demonstration. And we are looking for people, consumers to be the hosts of those projects.

Why are we interested in this? And again, these are more expensive than the diesel truck that is in the marketplace. Why are we interested? There are about 12 manufacturers, engine manufacturers, truck manufacturers that are very interested, poised, ready to make these projects, these technologies.

Accompanying the electric drive vehicle technology is our interest in co-funding some of the charge stations. And this would be commercial and municipal, public access charge stations. Not necessarily home recharging, even though we may be open to that. In essence these would probably be attached to or configured around purchases by fleets, whether it's a county or a private firm or some other type of local government.

And it is in this likely to be a cost-share. I am going to spend a little bit of time on the electric drive to explain a little bit. You are going to see the same kind of repeat kind of ideas throughout the rest of these technologies and I won't spend as much time on each one of

them.

But the idea is we would provide some kind of cost-share grant for some of those infrastructure problems of electric drive. How many? We were looking in the range of 100 to 200 in this round of effort. The rebate projects, we want to really reflect what is happening in the marketplace, whether it's a retrofit, refurbishment or a new OEM product. And we are willing to spend money on those rebates. And again this is coordinated with the Air Board.

The other fuel technology in the super-ultra-low category is hydrogen. We are not proposing to provide rebates for hydrogen vehicles in this early stage of funding. But we are proposing to provide funding for the same kind of thing like electric drive, the building of the network for the fueling stations.

And we would like to tie that to two different kinds of options. One, dedicated automaker rollout of vehicles over the next few years. And we also like to look at whether there are some multiple uses that maximize the hydrogen through-put that could involve automaker vehicles, transit buses, maybe distribution centers.

Are any of these projects co-located where the buyers or consumers are going to be? In essence we are interested in that. And this reflects what is happening in the marketplace, that these early, early stage projects are in these areas. Automaker OEM product, transit buses and things like forklifts that are used in distribution centers.

So that's kind of the approach we are proposing to take with hydrogen. We are expecting to spend in the range of, I think we were estimating about nine, ten million dollars for this kind of project. We have heard from stakeholders that they would like to see that increased and we are mulling that over and asking for more detail to support that idea.

What are the other categories? Ultra-low-carbon refers to primarily ethanol biodiesel, basically the biofuels. And it involves in some cases very limited vehicle incentives, mostly infrastructure and then there's some fuel production. And I am going to go through some of those in a little more detail here.

So with the biofuels we have several different things we are looking at. One, if you

are not aware there are about 400,000 FFVs, flexible fuel vehicles, on the road that can use pretty much various ranges of ethanol fuel. And right now we are using ethanol as an additive, E-5.7 in gasoline. That's expected to go to E-10 by 2012.

We want to look at what can you do to get more ethanol, to E-85. The higher fuel type of options. And when you go to that point you have got to have more, you have to have infrastructure to -- new pumps, new fueling infrastructure to use that, that E-85.

So when you look at, how does this happen over time. We are estimating that around 2,000 fueling stations are going to be needed to create the foundation network for the E-85 use. In mostly urban areas. It doesn't have to, it doesn't have to be 10,000 fueling stations like you have with gasoline but this is really the foundation building. And right now today there's maybe 20 or 30 total in the state. We are proposing that, we are looking at in the range of 100 to 200 projects per year for E-85 stations.

And there are some different business models out there on how to do that. In essence we

are looking at this is a good, we think this is a good option to initiate that, that ethanol E-85 fuel as a, as a significant greenhouse gas emission reduction option.

And for biodiesel because -- biodiesel/ renewable diesel because you can use the existing infrastructure we are not proposing anything significant in fuel infrastructure. But we are proposing that we provide cost-share money for some of the terminal storage and blending.

And why are we doing that? Well, it's not happening in the marketplace. And there are a lot of independent companies that are in this area and the financing just is not there to do this. As a result we have got this Northern California/ Southern California logistic problem of getting biodiesel/renewable diesel on the market. There are some other factors in biodiesel/renewable diesel but in essence that is a key thing.

I am also -- We also have this category of low-carbon fuels. For the most part this is natural gas and propane. Natural gas has a pretty significant, for alternative fuels a significant success in getting early-adopter demonstrations of transit fleets. Lots of heavy-duty, medium-duty

vehicles are being used using the natural gas. There is some more modest success with propane.

But these two options do give, do create opportunities for greenhouse gas emission reductions. Maybe not in the range of 70 to 80 percent like some of the other fuels but enough to qualify for the Low-Carbon Fuel Standard. We think there's a, there's a role for these low-carbon fuels and there's a role as transition into the ultra-low and super-ultra-low.

And just to give you kind of a range of ideas. We are willing to provide, again, rebate funding for the vehicles, light-duty, medium-duty, heavy-duty, covering the differential costs compared to either gasoline in the light-duty sector or diesel for medium-duty, heavy-duty.

And again, we want to look at what are the tax credits at the federal level. We don't want to duplicate that based on the factor that we see these options, particularly natural gas, as a transition to things like hydrogen, through hythane, HCNG.

We see options in the fuel production. Biomethane as a renewable source of natural gas. And in essence we think that in the case of

natural gas, blending hydrogen into a natural gas operation gets you some advance -- accelerates we think the hydrogen option and not having to wait several years before it is more cost-effective.

Our sense is with fueling infrastructure and natural gas we have got to look at a couple of things. We have got a lot of stations, close to 200 stations in California right now. Not all of them are at full capacity use so in essence we are not, we want to do a kind of more strategic kind of approach of, if we are going to fund new fueling stations we've got to get better capacity usage at the existing ones.

And we suspect that some of these projects may be more suited for loans or loan guarantees. In essence the idea of, is it a cash grant, is it a rebate, is it a loan. The closer you are to commercial availability we are going to be looking at loan options. And anything that is a very sizable investment, particularly for things like fuel production plants or these fuel blending terminals in essence we may have a limit on a project. We haven't set that but there may be a practical limit just based on the number, the kind of project ideas we get.

And I don't know what that is. But say we provide $3 million or $4 million for a project and it's cash and you have a $10 million or a $20 million project total capital cost. Will our money as a cash grant help you or can you take the same $3 million and leverage a $30 million loan debt pool. So those are some of the things we are asking people. What's the mechanism that works?

We also have this category of improved vehicle efficiency. I had mentioned a little bit about the hydraulic hybrid idea. This is an area that the Air Resources Board has a similar interest. This could be component part efficiency, it could be the whole system efficiency, it could be battery efficiency improvements.

We are looking at a whole range -- for the most part I think a lot of these are going to be demonstration. From what we have heard, ideas so far, mostly demonstrations and not a lot of commercially-available products at this point. But we are very interested in this area and we are looking forward to getting ideas.

There's a reference in the statute on lots of different component parts and things that

are eligible. Take a look at that closely. There are a lot of things that could be eligible.

And I think I covered some of that already.

We have this other category called non-GHG reduction categories. And that's things like the workforce training. We are having discussions now with different state programs, community colleges, local programs, different kinds of curriculum development. Things that might include operation maintenance.

In essence as we get new technologies in the marketplace we are going to need some new training. And we are going to need new people, new mechanics and new people in the field. And we are willing to provide funding. In fact there is a substantial, close to I think 16 or 17 million dollars, maybe a little more, set aside for this total category.

In addition we -- as Peter pointed out, sustainability is a big factor in this program. And I guess one way to sum this up is the environmental footprint is going to be a pretty significant screen in how we select projects. And sustainability tends to be focused right now on

biofuels because of all the issues of what the feedstock origin is, whether there are indirect impacts, what the direct impacts -- Plus you have got lots of different feedstock sources and configurations that need to be looked at closely.

So this goes into the area of how do you, how do you design a verification process that helps you track the greenhouse gas emission pathway, the footprint. And I personally think that we are going to have to track the origin of almost every fuel at some point as we develop this program. So that means we are going to need so performance tests, we are going to need some protocol development, we are going to need some kind of tracking system. And we are willing to spend money in this area to help develop that.

We also have several examples where there are challenges, barriers that restrict or impede the development of certain fuels. Two that come to mind are a need for standard ASTM standard development for hydrogen fuel and for biodiesel/ renewable diesel above the E-5 level. A lot of uncertainty in the marketplace if these things are not defined well. And we are willing to spend money in conjunction with some of our sister

agencies and other entities to clarify and provide some kind of guideline for these new fuels.

And we also have some -- We'll set aside money to do different kinds of analysis. We will have contract work to help us on troubleshooting project problems. I think another area is probably helping facilitate financing. We kind of look at it this way, over the seven and a half years of our program both the Air Board and the Energy Commission will be spending maybe a billion and a half dollars. And we estimate by 2020 we are going to need to see a $100 billion market investment. So that means we are not only spending our money but we are facilitators to help find other sources of money. And just as a matching requirement, but in essence these projects don't go forward until you have other, other investments.

And I think that -- One other category is this manufacturing and production incentives. So again this shows the flexibility of our part of the legislation. We are willing to provide incentives that help either retain, expand or recruit companies to build their manufacturing plants here. That could be a system plant, it

could be a component. So think in the terms of a battery manufacturing plant or a component part or a vehicle. This is kind of different from fuel production plants, it is really the technology.

And what types of things are we thinking of and how would we match this up? There is an existing Governor's Initiative to basically waive sales tax, exempt sales tax on equipment purchased to operate and build a manufacturing plant for what the Governor calls zero emission vehicles.

There's interest to expand that to all of these alternative fuel technologies. So our incentives combined with that, combined with maybe enterprise zone type of opportunities. We are very open to ideas of how to do this and why jobs and tax revenues produced from those facilities in the state.

And this is a summary of those categories. And I guess one of the comments here is this is our best guess reflecting what we think is practical in the marketplace. What kind of proposals we are going to get.

It reflects if we want to provide incentives for electric drive vehicles, are we going to have automakers delivering the vehicles

into our marketplace in the time frame of this two year cycle or are we going to have to wait for the third year.

The same thing with demand. Is there a demand to buy or purchase these different -- So we are trying to reflect what we hear and what we observe in the marketplace and balance that with our objectives to get more greenhouse gas emissions -- emission reductions. So I think, Peter, that goes back to you.

MR. WARD: At this point I think we would like to move on to our other presentations. But shortly before we do that I want to finish up with some program information about what we are doing. We have gotten Advisory Committee comments from the last Advisory Committee meeting and these are displayed here:

They want a better understanding of how sustainability criteria will be applied, more support needed for high-risk technologies, need to develop a more compelling argument for the program, we are going to cycle the returns from investments back into the program to stimulate additional funding and growth. Which is a bit problematic sometimes because it is a seven year

program and many times you don't get those results within that time frame. Need a stronger link between K through 12 education and workforce development.

They also suggested that we emphasize the 2050 goals. Some on the Advisory Committee suggested 2050 -- some suggested 2050 so we are sorting that out.

More dollars should be directed to the super-ultra-low-carbon category.

We have gotten mixed on that as well, mixed feedback as well on the benefit of funding retrofit and conversion projects.

Stronger support for EV fueling infrastructure and distribution-level infrastructure.

And more focus on the economic development potential of the program, which I guess you have probably have understood that we have gotten that message very clearly. The economic development will be key.

The schedule for implementation of the program is as follows: We are holding these public workshops this month. Next month we will be finalizing the revised Investment Plan for

Committee adoption in March.

And then in the spring we hope to release solicitations. Those are underway now being prepared. We are hoping to -- I said spring, I know that's a season not a month but I think that's -- please work with us on this because we are doing that on a parallel path.

I don't know if we really went into the regulations that were required here for this program in the statute to clarify the statute for us. And that is the critical element before our funding can be released. Those should, we hope if everything goes according to plan, would be enacted by the Secretary of State in late May.

But that doesn't mean we are holding back. We are hoping to prepare solicitations, release them, get the proposals back, evaluate those, set them for a Business Meeting, so that they can all be in queue for the day after these regulations become enacted by the Secretary of State. Then we can go ahead and release funds for these various projects.

That basically is our presentation for the day. I noticed that Dale Hill just left. I think he is about to leave with his bus. If

anybody wanted to go see it before he did I wouldn't blame you if you took a three minute hiatus from our program here. That having been said, I certainly don't want to undercut the presentations that we have scheduled from our guests here as well today.

Also I don't think I mentioned from the beginning. If you would like to make a comment during our public comment period, which will be after the presentations here, if you could fill out a blue card and get them to us. We would like to limit those to no more than five minutes as a public comment.

MS. VINTON: I have a stack.

MR. WARD: Yes. Joanne over there has a stack of the cards if you would like to fill one out and make a public comment.

There are ways to comment in our public comment here. We have a docket that is available on our website that I encourage you to give us your suggestions. That is after all why we are here today is to tell you about our Investment Plan, the potential for our program. We would like to get your comments on particular projects or aspects of the program as we have explained it

to you today.

But importantly I would also like to mention on our website you can sign up for what we call our list serve. And that means that you sign up and we will notify you for every action that we take. You will be getting an e-mail alert of that so you won't have to keep checking back with our program. We'll let you know, for example, when these workshops are being held. We sent out e-mails to all those people on the list serve.

The same way for solicitations, adoption of the Investment Plan, all the significant events that will be happening in this program. Once you are on you will be barraged -- Be specific in your request on your list serve, that's one advice I do have. Make it specific to this program. So be it. Energy is a very wide topic so you want to be as specific in your request, otherwise you will be barraged with all sorts of different activities that are going on at the Energy Commission.

Our first presenter for our program today, which I hoped we would design for a local interest here. And the local interest basically is the innovation and the technology development that is taking place in the Bay Area.

Our first presenter is Lewis Harrison with the San Francisco Public Utilities Commission. Just coming off the notoriety that they enjoyed at the biodiesel conference last week that was held in San Francisco. I would like you to welcome Lewis. He is going to speak to us about their biodiesel activities. Thank you.

MR. HARRISON: Thanks a lot. I am really excited actually to talk about this project. In a nutshell we are talking about recycling waste grease into a renewable fuel, into biodiesel. I have worked for 30 years for the City and County of San Francisco in the water pollution control, water pollution prevention field and right now I am the division manager of San Francisco's sewer system.

And within this division of 88 employees we have the responsibility of maintaining San Francisco's thousand miles of sewer and maintenance and cleaning the sewer, as well as my group has the source control group, the regulators, that control the industrial discharge of pollutants to our system in order to enable the treatment plants to do a better job of protecting the bay and the ocean.

So this is a pollution control program at its heart. This is where it all began. And traditionally you think of pollutants of concern as being something like cyanide or mercury, copper, lead, nickel. We have over the years had programs targeted specifically at these type of pollutants. But now we have a big problem with FOG in San Francisco and FOG stands for fats, oils and grease. And let's see if I can advance the slide here. It doesn't want to advance. The clicker.

In a nutshell the problem is that grease clogs our sewer system. And this isn't just San Francisco-specific, this is a nationwide problem. My friend on the podium here, Bob Garzee, has coined this idea of a municipal cholesterol problem and that really is true. The grease clogs our sewer pipes, constricts the hydraulic capacity, convey less flow, and as a result we wind up getting these overflows.

And this whole program of controlling FOG started in 2000 with EPA pushing nationwide this issue of reducing sanitary sewer overflows. And it turns out the EPA is estimating that more than 75 percent of the sanitary sewer overflows in

this country are related to grease blockages. So we were focusing our program first on just reducing those overflows.

But we were looking, because we are pollution prevention oriented, you don't want your pollutant that you have diverted from your problem to become a pollutant or a problem for somebody else. So we don't want that cross-media transfer of our problem to someone else. So what could we do with this pollutant? And conveniently, and unlike any other pollution that we have ever dealt with, we have this grease that can be used in an alternative way and it's a waste product that can be used as an alternative fuel.

And this stuff is hard, by the way, in the sewers. It is not mushy like Crisco, it's hard as a rock. It has to be jackhammered out. It's a huge maintenance problem. And we spend probably $3.5 million dollars a year dealing with this issue just in San Francisco dealing with grease-related blockages.

Most of the sources are from restaurants but the grease once it gets in the sewer also becomes an odor problem. It becomes a rat problem. The rats love to eat it. And even at

the residential level people think it's okay to pour that last little bit of grease down the drain when they are washing their pots and pans. And cumulatively this all adds up to a gradual coating of our pipes throughout the country and becoming this big issue with grease blockages throughout our system.

So this is just a GIS plot of the last year's worth of grease-related complaints. My unit, my division responds to 6,000 annual complaints for sewer service, of which almost half of them are grease-related. This is just in San Francisco. And the data, if you research it, nationwide it is a problem. That is why we think our solution to this could be something that could be replicated in cities around the country.

I would like to introduce our biofuel coordinator, Karri Ving, to talk about the project from this point.

I do want to say that one of the main points about the program is that -- and that makes it very unusual and almost a grassroots project is that the public down at the household level can participate in this program and they can see that their protecting of the sewer system and reducing

the overflows, kind of protecting water by not putting that grease down the drain, can actually create this fuel that powers their kids' school buses and improves air quality and improves our impact on the climate. So that's the sustainable idea behind this whole thing.

And I would like to introduce Karri Ving to talk about it from this point.

MS. VING: Thank you, Lewis. Good morning, guys. So as Lewis was pointing out, every single municipality across the state is dealing with their urban waste as disposal options become more and more difficult to utilize. Landfills are filling up. And also it is no longer acceptable for municipalities and towns to take a passive role towards waste. It is now you are responsible.

Cities are also grappling with working to achieve some level of fuel independence. Importing less fuel into their towns while still providing the necessary public services to run the fire trucks and street sweepers, muni buses. Now I have to learn this program. Here we go.

So what San Francisco is doing on a number of levels is trying to tackle fats, oils

and grease and work towards a level of fuel independence that is tangible and replicable. We are passing a sewer ordinance where we are going to be working with our 2300 restaurants and hotels to get them the latest recovery devices so that we can capture that FOG before it enters our sewers.

And then we have through a PIER grant with the California Energy Commission a fats, oils and grease biodiesel demonstration project. That is going to be converting brown grease, restaurant trap grease, into biodiesel.

The important aspect there is not that we are proving a technology. It is that we are dealing with proven technologies and working to bring those technologies to market. So on a private side you have some very exciting technologies for producing sustainable biofuels that need to identify a commercialization pathway to bring their costs in line to that of traditional number two diesel and other traditional fuels such as bunker fuel, heating fuel.

So the benefits of co-locating a biodiesel processor within the sewage treatment plant are numerous. I am not going to go into

them all but I essentially want to give you the understanding of the fact that every single town and city has a sewage treatment and what we are showing is that you can leverage that existing infrastructure. The latent heat, hot water loops, transportation corridors, the permitting. And be able to co-locate a biodiesel processor within those walls and bring the costs of production in line.

I actually don't know if I have enough time to show the video but I am going to go into this. So the purpose of the next three years' demonstration is to achieve an overall goal of reducing discharge into our sewers, recovering energy value of fats, oils and grease, there's organic BTUs, and reducing San Francisco's reliance on fossil fuels, including their greenhouse gas profile.

The technical goals are essentially to produce an ASTM certified biodiesel made from brown grease and to utilize the marginal off-spec fuels that may not be roadworthy but are suitable for fuel extenders and bunker fuel. And then the overall economic goals are really to bring these costs in line. Because there is no point in a

demonstration that produces fuel at $17 a gallon, it is just going to stay in the laboratory.

Can I get a time check? I just want to make sure that we have enough. Peter, how are we doing?

MR. WARD: How long is your video?

MS. VING: What?

MR. WARD: How long is your video?

MS. VING: It's a minute.

MR. WARD: We have a minute.

MS. VING: All right. So the point of this video is just to kind of give you an understanding that the brown grease to biodiesel technology is that first rung that we are reaching for. And we actually want to just change the role of the traditional sewage treatment plant. Green government by identifying all sorts of resources that are traditional wastes, clarifier scums, slime, food waste into compressed biogas. And really, really redefine wastewater treatment as more of an energy recovery facility. And this is just going to give you kind of a vision of where San Francisco wants to head in the next few years.

(Whereupon, a video clip was started.)

MS. VING: And this would be located on our port property, exercising our municipal and maritime components since we are a port.

And so we are starting with traditional biodiesel, moving into also a compressed biogas and reducing the City's energy reliance as well as its fuel reliance.

So I am going to just probably spend about 20 seconds talking about each component. But essentially the -- I'll let it finish up. Great. And to get back to the slide.

So it would be a bioenergy park working to develop a number of public/private partnerships to really find and identify commercialization pathways for a lot of the emerging technologies that may not sit well in the venture capital community because they may need a little bit more time to mature. Government can play that role. They can be a bit more patient and allow their return on investment to lag on further than the private sector might allow.

But just to go over the specific brown grease to biodiesel program. We have got a recovery facility that would accept brown grease, which is about 12 million gallons of waste, true

waste that is exported out of the city currently into surrounding communities. We would keep that in San Francisco. It would be brought to our recovery facility.

Three percent, three to five percent of that is the material that will be turned into biodiesel. And that biodiesel, again, to accomplish a zero waste program, the all-spec material or material identified that would not necessarily be suitable for converting into ASTM biodiesel could be utilized for biobunker fuel extenders, fuel additives, boiler fuel and co-digestion to actually help run the treatment plant and the facility.

But that 97 percent is also equally important, it's water. Because the brown grease that I am talking about is what is rinsed down the sink, the spaghetti sauces and all when the kitchen staff are cleaning the pots and pans. And that 97 percent water in the private sector would normally just be considered a byproduct or a liability of doing business.

Instead, for a sewage treatment plant it is more considered fortified water that only a treatment plant could love. And we can utilize

that white water to increase our anaerobic digestion producing more methane and giving us the opportunity and the option to produce compressed biogas to run our existing compressed natural gas fleet on compressed biogas.

And then just the -- It is just such an interesting tie-in in how the natural byproducts of the production process of biodiesel are also really well-suited for a treatment plant. The glycerine can be used as a grease discharger to help us clean out our sewer laterals. We can recover 100 percent of the methanol in the water. And even liquify methane gas to produce methanol so we are not even using traditional fossil fuel methanol in the production of our biodiesel.

And so just to bring it back to the closed loop that we are working towards. This material, this biogas, biodiesel, bunker fuel, boiler fuels, they would all be operating diesel vehicles in San Francisco, utilizing our existing diesel fleet, about 1500 vehicles, but keeping, keeping the source of that biodiesel a renewable source that came essentially homegrown in San Francisco.

So to deploy this technology, which is

what the California Energy Commission is going to allow us to do, is to bring the costs in line, develop a business case, and then outsource all of that model to surrounding communities in California so that every single town and city is importing less fuel, exporting less waste. Thank you very much.

(Applause.)

MR. WARD: We are pleased to have with us today Bob Garzee who is the CEO for Synergy EV in the Silicon Valley. Bob, who I have known for many years in the Clean Cities Coalition here in the Bay Area. He is representing the Clean Cities Coalition here today. He probably is going to speak a little bit about electric too, I wouldn't be surprised. Bob.

MR. GARZEE: Thank you. Today I am fuel neutral representing the Clean Cities organization, which is an extension of the Department of Energy. We are 86 locations across the United States with Clean Cities organizations and we are the Silicon Valley organization. We believe in teaming, in synergy and we have brought together Breathe California, which is a 100 year old health organization focusing on helping the

lung issues. Because we think clean vehicles not only address fuel prices but also a dependency on foreign oil but also health reasons.

Let me read what DOE/Clean Cities stands for:

> "We strive to advance the nation's economic, environmental and energy security by supporting local decisions to adopt practices that contribute to the reduction of petroleum consumption."

And I read that because I want to be sure you understand what our charter is.

Breathe California, as I said, is 100 years old. It has 60 years in school outreach, 30 years in service training, 10 years in delivery of air quality programs. So they are certainly qualified to be our partner.

Today I am going to address three projects that we recommend from the Silicon Valley Clean Cities. One is a CNG project, one is a battery and one is a solar fueling of electric vehicles.

We have the talent on our team. We have developed what we call a center of excellence,

which again is teaming of public and private entities. And we have fleets in Silicon Valley and throughout California that can use the solutions that we develop.

First of all our philosophy of teaming. We think those of you in the first section can read that, it might be a little bit hard in the back.

But we are focused on the synergy, the teaming, the center of excellence by bringing public and private organizations together. These are environmental groups like our Electronic Transportation Development Center that Jim Robbins is going to speak about. Also our relationships with Bay Area Air Quality Management, EPA, Silicon Valley Joint Venture. We will always bring in at least one of 11 Silicon Valley cities to be part of the project.

We have 27 technology companies, including the IBM company, that's involved in the projects that we are involved in here. We have brought in order financing of $200 million to help support these projects in addition to what California Energy provides. And we are always teaming with the nation's number one incubator,

which is called the Environmental Business Cluster of San Jose.

The first one, number one, is the CNG project. We believe CNG is a solution, it's a low-carbon solution. In this valley we have what we consider the major example of doing it right with over 500 vehicles being fueled every day with a station already in and paid for that has the capacity to include others. To show people how and fleets how to use CNG effectively. And a CNG education center that would apply for people that wanted to come as fleet managers to learn how to do it. And it's important that we teach the fleets how to effectively use CNG because it is today a now solution.

As I say, the fueling station is in place. Buses, taxis, pickups, cutaways fuel there every day. We have 17 locations in the valley. That makes it easy for fleets to use the fuel.

Our experts on the Center of Excellence team include the $200 million financing for projects in CNG, and including what we consider our world expert in CNG, which is Tom Stoflet. Tom is in the back of the room. If you would hold your hand up, Tom.

The second project as you saw out front is a battery-dominant school bus outreach. It is zero emission. It was basically developed with the partners of the Electronic Transportation Development Center, which are 19 Silicon Valley technologies, and using that bus as our base to add technologies to.

Friday we introduced this bus as you see in the picture. And we brought in school children because that is what this is about, is to give them clean air to breathe on their buses. And this company, Proterra, is considering moving to San Jose and building buses that are battery-dominant for California.

We are going to brief 3,000 Silicon Valley children and decision-makers on battery buses and why they are important.

We are going to do everything we can to motivate this company to move from Golden, Colorado to Silicon Valley to bring in those 19 Silicon Valley technologies, including IBM, and to produce jobs here in Silicon Valley.

The health benefit will be the focus but we also will train on affordability, ease of operation, early payback and available funding.

We will do 500 school district administrators, board members and transportation managers and 2500 students.

And we will bring the expertise of Breathe California to bear with their 215 volunteers.

The third project is taking solar, which is zero emission, and charging and fueling electric vehicles, which are zero emission. This Valley is really one of the centers of solar development and we want to take that technology and those partners and bring them together to show that.

The picture on the left is the bus you saw out front, which is a school bus version. Panels that are 42 feet wide and 20 feet high can basically provide the energy to run that bus for a typical duty cycle in a school. And then of course there's many other types of electric vehicles that can be charged the same way.

The team at the bottom, Clean Cities, Breathe California, a local city, the EBC and the AAraya Group will be the ones putting that program together.

To provide an example for other fleets

in California to use solar to generate the energy to fuel electric vehicles is our objective.

We expect strong support from DOE Clean Cities across the United States and especially the ones in California.

We believe that's zero emissions, zero fuel costs, zero imported oil, and it is economically available today.

We believe that our $200 million in order financing will allow cities, fleets, municipalities of all kinds to put in the solar panels as well as the vehicles. No matter what kind of electric vehicle they are and spread those investments over 12 years.

That summarizes our three program and our philosophy of teaming called the Center of Excellence. If you would like to contact me that is how to do that. We are very active, as Jim Robbins will explain, in our approach to working together with the Environmental Business Cluster. Thank you very much.

(Applause.)

MR. WARD: Our next presenter is Jim Robbins. Jim is the founder of the previously mentioned Environmental Business Cluster here in

San Jose. He has been a PIER contractor. Basically I got to know Jim a couple of years ago. I have been excited about what he is doing.

He is actually trying to shepherd companies from applied research to pre-commercialization to commercialization and helping them through what is commonly known as the valley of death. So here is the pathfinder through the valley of death, Jim Robbins.

MR. ROBBINS: Thanks, Peter. I am here today not to advocate any particular project but to talk about what I think some of you, as well as myself, are interested in, which is that money that Peter was talking about and how it might be applied to projects and to tell you a little bit just about two programs that might be partnership opportunities for you.

So when you think about how are we going to move ahead when these solicitations come out, to let you know that there are some organizations in Silicon Valley that are already organized and trying to position themselves to take a part in this. And our interest is partnering with others to put together proposals and programs.

So there's two organizations that I

would just like to talk about briefly. One is the Environmental Business Cluster. So this is a nonprofit organization located in San Jose. It is an environmental incubator. It is a place where people are starting up clean technology companies.

As such, as Peter mentioned, we are under contract, have been for four years to the California Energy Commission to commercialize technology. So we are working with PIER and other research funded technologists and helping them take their technology to the market. And how that AB 118 is coming along we want to be well-positioned, and I think we are, to try and help people like some of you that are early stage companies work to try and move your technology to the market and maybe take advantage of some of this funding and do it in partnership with the Environmental Cluster.

We work with about 25 or 30 companies at any given time and we have both resident and non-resident programs. So we are working with companies throughout California, not just in Silicon Valley, although we have a kind of Silicon Valley focus. And we have formal partnerships with the National Renewable Energy Lab and with

the City of San Jose.

The goal of the cluster is to -- It's a nonprofit. It's goal is to increase the success of startups and accelerate their growth and help reduce barriers to commercialization. So the EBC is just there to help people who are trying to develop successful clean tech companies or license technologies and bring those to the marketplace. So I think we are a resource and can help some people like some of you in this room look at these issues.

We work with companies that are receiving research grants and we help move that technology to the marketplace. As some of you may know the track record is not very good for research, kind of grant-funded applied technology and we are trying to work on that problem with the CEC and kind of improve the commercialization rate.

And we have had some success. There was a study about 18 months ago of 110 clean tech centers around the world that were commercializing clean technology. And all they looked at is how many technologies did each of these centers actually get into the marketplace and the

Environmental Cluster came out number one. So we are working hard on this problem. We are pleased to be partnering with the California Energy Commission as we do this. And so we are a resource as people are looking at kind of more transportation, clean transportation solutions.

A little more specifically to today. We also have a project within the Environmental Business Cluster called the Electronic Transportation Development Center. And I help manage that project for the EBC and Bob Garzee is the ETDC applications manager and the originator of the idea of this center. So between us we are working.

And this center is not just focused on early-stage companies. It is focused on bringing all-stage companies together to work on clean transportation solutions by focusing primarily on Silicon Valley technologies and helping to diminish our reliance on fossil fuels. So to address the very kinds of issues that Peter and Tim talked about.

It is a place where we have got established and early-stage companies working together and we are trying to do a series of

prototype and demonstration technology development. So create vehicles where people like some of you can bring your technology and partner with other people.

So the Proterra bus that was out here. Proterra is a company that participates both in the EBC and the ETDC. And I am going to describe our first project. That Proterra bus is the base for that project but we have got a dozen other or 15 other Silicon Valley technologies that are going to layer on top of that bus for our first project.

So people bring in their technology, they protect their intellectual property, but they are able to collaborate with others and work together to try and get demonstration projects out so people can actually get on the vehicles and drive them and see them and see how all the technology works. And so groups of people can jointly solve problems that we couldn't solve individually.

And we are -- Efforts are underway to create a facility where we will have labs and the ability to do prototype manufacturing. So this is a regional effort. Our hope is that as a region

we can capture a healthy share of this AB 118 money over the years and show how this region can be a leader in this field.

Well, what you are supposed to see here is a photo of the Proterra bus that was sitting out there. It worked on my computer. Anyway, I'll show you more of what is inside it in just a second.

So the first project we are doing, just to give you an example of the kinds of things that we are putting together and we hope to do -- an example of something that could be, something that receives AB 118 funding, is we are taking this battery-dominant bus that was parked out here if you happened to see it, and we are layering on a set of technologies to create an electric school bus.

So since we don't seem to have the photo I don't know if you can see all this. But just -- It is conceptually not so important all the details but conceptually, if you think about that bus that was parked out there, then inside there's technology that is added. Flat screen training, air conditioning technology, gensets, advanced batteries, lighting, LED technology. So it is

layered on to kind of create the first all-electric, new generation school bus in the country.

And the goal there is to bring the partners together and this is an example. This project is underway. We have about 80 technology companies that are participating in ETDC already. The technology is kind of logged in a database and then available for multiple projects as they move forward so we are able to track your technology if you join the program. There are no costs to join. And the way to think about this is that when you go to look at this AB 118 funding, partnerships are always important to show the strengths of the organizations applying.

So what do we have? We have the Environmental Cluster, we have the Electronic Transportation Development Center. Another partner is San Jose State University, the City of San Jose, the tenth largest city in the United States, are partners. And then we have already got 80 technology companies signed up with their technologies. So the goal is to create a place where all this can happen. And then we can individually partner, come together and go forward

putting together applications that are stronger because we are all working together.

If you couldn't see the diagram from where you were sitting, this kind of shows you what kinds of technologies. Battery alternatives, solar monitoring and fueling technologies. All these are going into this first project, which is just an example of what can be done. Genset range extension, energy reduction technologies.

We have also, because it is a school bus there's child safety and training issues that are addressed. Data storage and global positioning. All these technologies layered onto that bus that was just out here as an example of just a kind of project that could go forward.

And then the school district order financing that Bob mentioned. So when you think about implementation of this project, the school districts can actually get loans. And if they wish, pay the majority of the loans back through the fuel savings so that these things can actually penetrate the market once they get started.

And we feel that these are just the kinds of ways that we need to look at how to put projects together under AB 118 to get funding so

we can have a maximum impact, not only for the state but for our region to participate.

So that is just a very brief overview. If you are interested in participating, partnering or just discussing the possibilities of partnering on future projects this tells you how to get a hold of me. And as I said, Bob is involved in this as well and we have got some staff people here from the EBC so we are glad to talk to you about it. And we are really excited about what you have proposed in terms of moving this project ahead.

The only thing I would mention from what I heard today is I was a little concerned and I would like to go on the record as saying that if you are having a debate about whether or not to do retrofits, that really concerns me. It's kind of like saying, we are going to do energy efficiency for commercial buildings but we are going to exclude all the buildings that already exist and only work on the ones that, you know, don't exist.

I would just recommend to you that you don't assume what the technology solutions can be for retrofits. If you have concerns, which I am sure people do, about what the environmental

implications are of retrofits, then address those and tell people what standards they need to meet if they are going to do retrofits. But don't assume that the retrofits can't meet the necessary standards.

I think it is really important for us in transportation to try and address the problems that already exist on the highway. Not everybody can afford a new car and we need technology solutions for existing vehicles. Thank you.

(Applause.)

MR. WARD: The next speaker is Alison Kirk from the Bay Area Air Quality Management District. I would like to mention that in each one of our workshops we are including our potential partners of the Air Quality Management Districts, as we have in the past worked very cooperatively with the Air Quality Management Districts. We have a similar vision and similar missions and so I think it's a very compatible thing. She is going to tell us about what potential we have for partnership with the Bay Area Air Quality Management District. Alison.

MS. KIRK: Thank you. I am going to talk very briefly about the Bay Area Air Quality

Management District; the current structure of our grant programs. And we are headed in a new direction that really works nicely with CEC funding and other opportunities out there available through AB 118.

The Bay Area Air Quality Management District is obviously the Bay Area's air district. We comprise all of seven counties. That's Santa Clara, San Mateo, San Francisco, Marin, Contra Costa, Alameda, and then the southern portions of Solano and Sonoma Counties.

And we are interested in funding projects that reduce emissions within that area. We are also interested in multi-district projects and projects that would help more than just our Bay Area. But that is really the core.

So I am going to talk a little bit about the Strategic Incentives Division and to give you a little history. This I think will help you understand where we are coming from. And when you work with us, and we hope to reach out to a lot of partners, you will find that briefly a background of where we have been will help understand some of our frameworks. We are also trying to move forward and really expand what we are doing. And

that's where I see AB 118 funding working and really helping with that expansion.

So we have been the grants program section and we have part of another division within the Air Quality Management District for a long time. Beginning in 2008 we have become our own division and we are in the process of working through all the new directions we are going to go.

This sort of symbolizes the fact that the Air District really is beginning to see their incentive programs as central to their mission and that we are incorporating a lot of new things into those programs.

For example, our board of directors has directed us to integrate climate protection into everything we do. We are working on greenhouse gas emissions inventory and we are filtering that perspective through all our programs, including our grants programs.

So in fiscal year '08-09 we are giving away $88 million. And a lot of these programs represent the more traditional approach that we have taken. We have both local dollars and state dollars. Our local dollars are through DMV fees and also through our regulatory fees that we

collect.

We have used this money, the local dollars to do things like offer incentives for gas inserts for individuals who have fireplaces. We have used these dollars for vehicle buy back programs for light-duty vehicles. And we have also used this money for what I would call broadleaf transportation projects such as shuttle services, ride share programs, also bicycle facilities.

Some of that money has also gone towards retrofitting diesel engines. Repowering those engines with cleaner engines or alternative fuel vehicles. But also we have -- Those funds can also be used for purchasing cleaner-than-required vehicles. So those were our local dollars.

Our other dollars, some of them also from DMV, we work with the state quite a bit. We have something called the Carl Moyer Program. And that is for vehicle-based -- sorry, excuse me, engine-based projects. And that has funded over the years a lot of different project types. Everything from on-road projects, off-road, marine vessels, agricultural equipment. And again, the focus from these funds had always been to take out

existing diesel engines and put in cleaner engines, either diesel or alternative fuel vehicles. Sorry, alternative fuel engines.

But what is significant here is that these traditionally have always been about certified and verified technology. And that has meant that we have had limited funds to do demonstration projects. Although we have had that money we haven't had as much as we really would like. And so we are really, with the Strategic Incentives Division we are really pushing the boundaries.

And what we are going to see in the next year is that we are going to have, we are estimating about 144 million and we are going to divide our division into two arms. And I really see AB 118 money and the money from the CEC portion of that funding both aspects of that. And this is where I think we are looking for partners. A lot of you are here today and I have heard some people speak. We are really looking for partners who are interested in the more innovative things.

We will have our Mobile Source/Advance Technologies Program. And some of those local dollars that we have spent more on certified and

verified technology we would like to move more into demonstration projects. So there will be money through our local dollars for that.

Also we are going to have money for more alternative fuel. We have funded alternative fuel projects in the past. We have worked with a lot of local jurisdictions to develop alternative fuel fleets. And we would really like to -- our vision is to continue doing that and also work on infrastructure. So that is one area where the CEC program fits really nicely.

And again, also workforce training. We are interested in that aspect as well. And what we are hoping to do is to work with partners with AB 118 funds and also reach out, we have hopes of receiving federal stimulus dollars as well and really using our local dollars, our state dollars and federal dollars to really co-fund projects and leverage the funds we have to create more projects than we would otherwise.

In addition the second arm of our strategic incentives division will be the Strategic Endowment for Energy Development, what we are going to call SEED. And this is another area where we are reaching out in new directions.

We have not in the past funded wind, solar or tidal power. We really see a lot of opportunities here. And again, some of the things that we will be funding under this arm will work nicely with the CEC program.

And also rolling in what is going on in the state in terms of AB 32 and also the companion legislation, SB 375. SB 375 really takes 32, which is the global, I think it is called the global solutions -- I forget the exact title but it has to do with greenhouse gases. So 375 really ties in land use and smart development and smart growth to limiting greenhouse gases.

And we are hoping to roll that into our programs as well. When we evaluate projects we will be really interested in what aspects of land use planning are there, if that's in fact the type of program it is. And where we see our Mobile Source/Advanced Technology Program focused on not only criteria pollutants but toxic air contaminants and also greenhouse gases. The SEED side will be much more focused on greenhouse gases.

So that is kind of an overview of the framework. We are still working on this and open

to suggestions. And here's a list of contacts. Our manager is Damian Breen and here is his contact information. I am the contact for the CEC portion of AB 118. Geraldina Grunbaum is working on the ARB portion which is called the Air Quality Improvement Program. And then we are also working on the BAR part, which is the fleet -- let's see. Enhanced Fleet Modernization Program and Michael is the contact for that.

So we are interested in partnerships. I am just going to keep saying it, partnerships. And working with people to leverage the local and state and hopefully federal funds we have in order to really advance the projects that we can do in the Bay Area.

And it has been said and it seems kind of redundant but I am just going to say it again. We are such a center of innovation and technology that it makes such good sense to us that we would also, we would roll that into innovation in terms of energy as well. And we see a lot of potential for workforce development and I think that we are really in a good position to take advantage of different sources of funds and really work together to make things happen. Thank you.

(Applause.)

MR. WARD: Thank you, Alison. I think we are all singing the same song it seems to me.

At this point we are going to be going to our public comment section of the workshop. First off if we could have Richard Lowenthal present. I would like to keep these presentations to about five minutes if we possibly can because we are also going to be getting comments.

For those of you that are on the phone we have not forgotten about you and there will be an opportunity for you to post a comment as well.

If we can keep the presentations to five minutes that would be great. And to queue up, Joe, can you be ready next? Thanks.

MR. LOWENTHAL: Thanks very much. My name is Richard Lowenthal; I am the CEO of Coulomb Technologies. We make network charging stations for electric vehicles. We, of course, would like to get a little bit of help from AB 118.

The issue that we would like some support on is to break what we call the chicken and egg problem for electric vehicles. This problem is caused by the fact that we want everybody to buy one of these electric vehicles

and they're clean, but in the US there's 247 million cars and only 54 million garages. So a lot of cars are not parked in a garage at night so have no place to charge. As an example, in the city of San Francisco 51 percent of the cars park curbside at night and yet there's no curbside charging opportunities. So we want to solve that problem.

So there's the problem. That's the problem that we would like to help solve. We have developed products and a network to do that. We have deployed our network and products in the City of San Jose and would like to do more in California.

So the reason it's a chicken and egg problem is once people buy cars it will become evident that we need charging stations. Then communities will buy them and apartment buildings will buy them and condominiums will buy them. But in the short-term everybody says, well where's the cars, why do we need charging stations.

So we have a little dilemma because when you are making your car buying decision and you live in San Francisco you won't buy an EV if you can't fuel it. So this is a short-term problem.

We think it is gone by 2011. But AB 118 money could make it go in time so we can accelerate the acceptance of electric vehicles.

So we have a couple of specific suggestions of how money could be spent. There are about 700 stations left in the public from a trial that was done ten years ago that was really instigated by CARB. It was a trial to promote zero emission vehicles with certain goals by certain dates. And the automakers came out with cars and charging stations and they were deployed essentially as a result of mandates from CARB at the cost of others.

We would like to upgrade those stations because as the automakers will do, every one of the new cars will not plug into the old stations. So we would like to see those stations be appropriate for the new cars.

There are two standards being adopted for charging cars for the interconnect. One is good, old fashioned 110 volts. My plug-in Prius uses that. And electric motorcycles and small, neighborhood vehicles all use 110.

But the major automaker cars will use a standard called SAE J1772, which is used primarily

to charge the car at 220 volts. So we need to upgrade the stations that are out there to J1772. That will cost us about $3 million to go to the 700 stations that are out there and either augment them or replace them with new stations.

Second we would -- The best way we have seen of moving ahead with electric vehicles is for cities to indicate sort of a welcoming message to electric vehicles by installing a small number of stations saying that this city will be friendly to electric vehicles and in this city you will be able to fuel your electric vehicles.

And we would like to spread that more broadly. We are doing it one city at a time on our own. But with $11 million in grants we could, we could ensure that every city has at least five charging stations. So they have indicated to the car-buying public that when they make their decision to buy a car they can buy an electric car and be able to fuel it.

So we would like to have every city participate in this. AB 118 could help by simply funding the cities. We don't want the money directly, we want our customers to get it. And of course, if you do it that way you are not prone to

get one particular supplier. So we like the ring of that.

This could also be done with a loan program. With these electric vehicle charging systems they all should have a payment system so that the driver who is getting value from putting the fuel in the car will pay for that value. And that gives you a way to pay back this cost. So if it was done with a loan program that's okay too. As the cars come on-line and start paying for fueling their cars we could send that money back to Sacramento to refill the AB 118 bucket again. So it could be done with a loan program.

Unfortunately the stimulus bill, both the Bush stimulus bill and the Obama stimulus bills both had tax credits in there for electric vehicle infrastructure. But they are only tax credits. And 50 percent of our market are cities and cities can't very easily take advantage of tax credits. So that's sort of the preferred mechanism out there is using tax credits to incentivize people to build infrastructure but it doesn't work for municipalities, which is where the action is. So some help from AB 118 would be particularly good.

Finally we think that there are some requirements on a charging station. If you get people to just put electrical outlets out there I think we are not accomplishing the goal so I would ask that the AB 118 money come with some restrictions and requirements and these are the ones that we list:

If you want to plug in virtually every car you need to support SAE J1772 and 110 volt household electricity. That will cover 99 percent of all vehicles so we think that those should be required.

We think in acknowledgement that in California we have had our share of issues with the grid with blackouts and brownouts that the charging stations must be integrated with the utilities. And so that if the utilities need to moderate charging they can do that. So we think that should be a requirement. Otherwise we are going to get some backlash as we plug in cars and the grid has problems. So we think this money should require that.

We think that there should be a revenue structure associated with the charging stations so it's a sustainable investment. Because we don't

want to come back to you folks again and ask for money again every year to build more charging stations. We want to see the drivers through paying for their fuel fund this over time. So we think that whatever charging infrastructure goes out there must have a revenue stream to pay for the electricity, pay for maintenance and ultimately pay for capital when there are enough cars. So we think that should be a requirement.

Similarly, if it is a loan we need to have a loan payback model. We think that should be the driver who gets the benefit of getting fuel from the electric stations. And that's my presentation, thank you very much.

(Applause.)

MR. WARD: Thank you, Richard. I did note, working for the government, that you asked for more restrictions. We'll note that and see what we can do about that.

(Laughter.)

MR. WARD: I would like to call up Joe Dalum with DUECO. DUECO, as we have come to note very recently, is involved in the heavy-duty hybrid area for new vehicles and I believe retrofits too.

MR. DALUM: Correct.

MR. WARD: Retrofit hydraulic hybrids. So Joe.

MR. DALUM: Thank you, Peter. I just have comments and then if you have any questions you can just go ahead and ask me.

So good morning and thank you for offering DUECO the opportunity to share its views on the California Energy Commission's Investment Plan. My name is Joe Dalum and I am vice president of DUECO.

DUECO, headquartered in Wisconsin, is one of the largest, final stage manufacturers of utility trucks in the country. We have been in business for over 50 years and have produced thousands of vehicles over the past ten years. Our aerial devices, digger derricks, cranes and other trucks are sold to electric utilities and gas utilities. DUECO also provides equipment and services for the telecommunications market, other industries and the government. Our affiliate, UELC, with locations in California, rents and leases trucks to the same markets nationwide.

In 2006 DUECO began to assess alternative hybrid technologies and in the fall of

2007 we introduced the utility industry's first, commercial, plug-in hybrid medium-duty truck.

While my written statement will be submitted later this morning I will focus on our development of plug-in hybrid medium- and heavy-duty trucks. Those are trucks that are way over 14,000 pounds. And opportunities to accelerate deployment of these vehicles in the near future.

The truck in the photo is unique in that a very large battery system of approximately 35 kilowatt hours, more than 15 times larger than one used in a conventional hybrid. It provides power to help propel the vehicle along with the diesel engine, and provides power for equipment on and off the truck, including the on-board electrical air conditioning system.

When the truck returns to the garage, domestically generated electricity recharges the battery system, offsetting the need for petroleum. The size of the battery system and the ability to recharge using grid power differentiates the plug-in hybrid system from a conventional hybrid.

Using energy from the large battery system reduces fuel consumption and emissions during driving and provides for an all-electric

stationary mode. The system completely eliminates fuel consumption and emissions at the job site for a typical day, while also significantly reducing noise.

Medium- and heavy-duty trucks consume a disproportionately large amount of fuel. Fuel savings and corresponding reduction in greenhouse gas emissions are dependant upon the application and duty cycle of the plug-in hybrid truck.

A typical utility application is estimated to reduce fuel consumption by approximately 1400 gallons of fuel per vehicle per year, resulting in an estimated reduction of approximately 15 tons of CO2 per vehicle per year.

Medium- and heavy-duty trucks are typically manufactured and marketed to customers much differently than cars and light trucks. Most medium- and heavy-duty trucks are typically built in multiple stages and are designed to accommodate a high degree of customization.

Due to these manufacturing -- Due to these differences, hybrid drive systems can both be installed during the manufacturing process or can be installed as a retrofit, depending upon available payload and other factors.

Since the first vehicle in 2007 DUECO has continued to develop and deploy plug-in hybrid trucks. We have produced 17 vehicles for testing and for use by several utilities around the country such as PG&E.

Our recent acquisition of assets from ODYNE corporation and our plans to expand production further demonstrate our commitment to plug-in hybrid technology.

DUECO commends the CEC staff for developing a sound, comprehensive investment strategy. There are several challenges that affect wide-scale deployment of plug-in hybrid trucks. We strongly encourage the CEC to aid in the demonstration and deployment of commercial plug-in hybrid electric medium-duty and heavy-duty trucks by assisting hybrid drive manufacturers, chassis providers and final stage manufacturers such as DUECO.

It is recommended that the CEC consider providing financial assistance to cover the differential cost of plug-in hybrid electric medium- and heavy-duty vehicles, fund market demonstrations, including a possible demonstration program in partnership with final stage vehicle

manufacturers, charge station providers, utilities and electrical contractors. Fund development and demonstration retrofit kits for medium- and heavy-duty plug-in hybrid trucks. Defray costs of chargers and their installation for both private fleets and public access.

DUECO also encourages R&D support to improve both the first generation plug-in hybrid electric medium- and heavy-duty trucks, as well as longer-term advancements such as combined electric and hydraulic hybrid systems and other hybrid technologies.

The plug-in hybrid technology developed by DUECO will enable California to more effectively achieve its 2020 and 2050 goals. In addition, the development of this technology would provide opportunities for job creation, reduce greenhouse gas emissions and emissions of other pollutants, reduce dependency on foreign oil, reduce noise within our cities, and potentially improve productivity for certain applications such as electric crews that could perform work at night in residential areas.

This is potentially an historic opportunity to develop and deploy the technology

needed for the electrification of medium- and heavy-duty trucks. That's the end of the presentation. If you have any questions just let me know. This is also a little background on how the system works.

(Applause.)

MR. WARD: Next we have Robert Baertsch from Unimodal Systems for a five minute presentation.

MR. BAERTSCH: Hi, my name is Robert Baertsch. I really started this project while working with NASA. We are partnering with a company that has shown, that is developing a technology that has a high -- we think is the highest potential for reducing greenhouse gas emissions. The ARB looked at this technology and in the ETAC report they identified this technology as one of the highest potential for reducing greenhouse gas emissions and they recommended demonstrator projects. Now ARB doesn't have, didn't have much funding for demonstrators so we would like to fund a demo project at NASA Ames and use the technology that they have at NASA to show this -- show the technology and also do safety analyses.

So who are our partners? We are working at NASA Ames in Mountain View. Our first vehicle will be delivered the end of this month. So we are going to have a delegation of cities that are interested in seeing this technology and also we would like to invite the CEC to come down to NASA and see the vehicle and the guideway.

Our grant is funded by the US DOT and we are also working with the University of California on the power electronics. This is -- And a company called One Cycle Control, which has developed this technology for the military. We're sort of spinning it off to transportation.

So one of the problems with electric vehicles is that even if we have a zero emission vehicle we still have to confront the problem of congestion. Our technology, called Personal Rapid Transit, is a way to solve the congestion problem. Which a lot of mayors call us about this problem.

The problem with trains is that they might have a high top speed but their average speed is actually quite slow. Light rail systems average about 11 miles an hour. I think the BART averages 33 miles an hour. And people don't like trains because they stop at every single station

along the way and that has limited their penetration into the market.

Plug-in hybrids are a great technology. We still have not, there still are not any on the market. And the problem is that current gasoline vehicles cost around $15,000 and the plug-in hybrids are probably going to cost more than $30,000. So there is a significant challenge to get these into the market.

And I think we need to think about how to, how to also -- the problem of funding our highway system. Because as we use less and less gasoline the gas tax is going to take away highway funding dollars to repair the highways. And also a lot of these car sales are not buying cars that are made in California.

So what is SkyTran? It is basically a high-speed system. When you get to your destination you are going nonstop. You don't have to stop at every station along the way. It uses off-line stations. So when people get off the system they are not holding up everyone behind them. Basically the architecture of this is similar to the highway system, off-line freeways. This mimics the freeway system in its

architecture.

This is sort of the main slide, which shows the pluses and minuses of the ULC, which is the plug-in hybrid technology. Transit, which has very high capital costs.

And SkyTran, which actually -- People think it is a lot of infrastructure to install. But actually if you look at the total cost it is actually less than replacing our entire auto fleet. Over the next -- These numbers I put up are to achieve the 2020 goals identified in the, in the report. It is going to cost around $100 billion in new cars. To do that equivalent greenhouse gas emissions would take $450 billion to do it with BART or light rail. And with this system it would only cost $45 billion.

Also operating costs are the highest with transit. Cars are about 50 cents a mile. And we are targeting 25 cents a mile for users of SkyTran.

One of the things with tax subsidies. One of the goals actually of AB 118 is to reduce vehicle miles traveled. The problem with reducing vehicle miles traveled is it forces people onto transit. And transit does not pay for itself so

that means cities are going to have to pony up more money in tax revenues to pay for more people using transit. And cities are already strapped trying to fund their transit budgets. And this technology, since it is profitable, will actually reduce tax subsidy, tax burdens on cities.

The goal of this technology is to make it through public/private partnerships where investment banks will fund the system just like toll roads are funded. And our goal is to reduce tax burdens on cities.

So we have got quite a few -- Marin is very excited about this technology. San Jose is looking at it and a number of other states. And I'll try to finish up here.

The second line is the CO2 emissions per mile.

And finally the most compelling reason is the user experience. The reason people don't like transit is because they are crowded in cars with other people. Women don't like to be in crowded buses. This is a private vehicle, you have your own space and you are not locked behind a steering wheel. You can surf the Web. And because the system is fully automated I think it

is going to revolutionize transportation.

And finally, we want to really build factories in California to build the system.

A little bit on the through-put: 14,000 passengers per hour on a single guideway, which is equivalent to three lanes of freeway.

And just a little bit on the visual impact. These are very small guideways that can disappear into the cityscape and lower the visual footprint of this transportation system.

So I really challenge the CEC to look at this technology and fund a small demonstration at NASA so that we can show the world that California really is a leader in transportation. Thank you.

(Applause.)

MR. WARD: At this point we have three blue cards. And you need not stand up if we can get a microphone to you. Okay, they can go there. Jaimie. You have a presentation. Is it loaded already?

MR. LEVIN: It should be.

MR. WARD: Okay, I didn't know that. Jaimie Levin who is the father of the hydrogen bus in California and an old friend of the Energy Commission as well.

MR. LEVIN: Right. Who has financially supported us. Thanks very much, Peter.

I direct the alternative fuels policy program for AC Transit and oversee our hydrogen development program.

First I would like to commend the Energy Commission staff for recognizing the value of hydrogen and fuel cell technology and the importance of looking at demonstrations to advance any of these new alternative energy programs.

I will quickly review the status of a program that we have been developing now for ten years showing the success of that demonstration and the importance of AB 118 to maintain a continuity and continuation of what we have accomplished.

So just a little bit of background. AC Transit is the East Bay's service, public transit service, that serves from Richmond to Fremont and then with bus service across transbay bridges to San Francisco and the Peninsula.

We have been working with hydrogen since 1999. I'll go back here. We have been members of the Fuel Cell Partnership and these different organizations. But I think most importantly we

are members, we were the first transit members of the California Climate Action Registry. We file an annual report with them and soon with the Climate Registry. So we are -- Our goal as a transit agency is to reduce our carbon footprint.

Our First Phase program, which we are in place with now, was a $21 million program with 26 different public/private partners, including the Energy Commission.

And the performance to date has been, I think, phenomenal. We have carried over 360,000 passengers over a distance of 142,000 miles. And that third bullet is really important. We have achieved on average around 72 percent better fuel economy than a diesel bus. In some cases over double the fuel economy of a diesel bus.

And that is in spite of the fact that these test buses are 8,000 pounds heavier than the control diesel fleet that we are testing against. Our new generation vehicles which are under production now will be several thousand pounds lighter. And significantly, we think significantly better in terms of efficiency.

And then with respect to well-to-wheel emission reductions. While the fuel cell buses

are absolutely zero emission, taking into account the source of fuel which is reforming natural gas, we are still reducing. With these three buses we have reduced our CO2 emissions by over 174 tons. And then of course significant reductions in the use of petroleum fuel as well. And this is all the while we are reducing significantly our local criteria pollutants, NOx and particulates.

The public loves us. You can see by this recent survey that we completed with NREL, the National Renewable Energy Lab. Eighty-four percent of our public loves what we are doing, 81 percent supports expanded activities related to this.

Our first station, which was built in Richmond in partnership with the California Fuel Cell Partnership, we produced over 7,000 kilograms of fuel. The station that we now have in operation has now produced over 31,000 kilograms of fuel. No safety incidents, no loss of fuel. It has been a very constructive program of supply and demand between the demand of the vehicles and the production of the fuel.

The next phase of our program is a $45 million project. It involves not only ourselves

but four other transit operators, Golden Gate, San Francisco Muni, SamTrans and VTA. With a fleet of, a combined fleet of over 2500 vehicles we will be testing these 12 next generation buses with great expectation that we will achieve much better efficiencies.

I don't expect you to read the details here. But what I do expect you to recognize, that in order to come up with the $45 million we have tapped into 15 different grant sources. So those columns across the top are different grant funders from the federal, state and regional levels to keep this program going. And we have been very successful. That's probably one of the biggest challenges we have is getting, getting the funds. It all doesn't come from one source.

Our next station, which we just received local community approval that is being funded in part by the Air Resources Board will be a combined light-duty and heavy-duty fueling station in Emeryville across the street from the Pixar Studios. The light-duty portion of this station will be completely renewable hydrogen made from solar installations on the rooftops of AC Transit buildings. So we will be generating over one and

a half megawatts of power to support that portion of the station.

So our advance demo has some remaining aspects to it that we have to pursue to implement it as well as where do we go from there. I mentioned the 12 net generation buses in service by June of 2010.

Additional grant funds are needed to support hydrogen facility development and specifically the Oakland station. We want to integrate that fully within the diesel bus operation. Presently it is apart from the diesel operation. So our plan is to enhance that station, make it larger and integrate it within the same production or operation line of all of our diesel vehicles.

Those next generation buses are going to be tested in terms of how they perform with the other four operators in addition to ourselves. Additional or enhanced fuel economy. Reliability is a major factor. I'm a big advocate of plug-ins and electric, battery electric technology. But our biggest challenge is not the fuel cell, it's the batteries. We run hybrid vehicles and ensuring reliability with batteries is a

challenge. And then of course testing hydrogen production.

We are a Center of Excellence. And the need to fund our center and other Centers of Excellence with next-stage vehicle development, as many as 50 operating out of one location, we think is extremely important. Testing again reliability, durability of components, and again hydrogen production. Funding that Center of Excellence or additional Centers of Excellence, that's where programs like AB 118 and federal support are going to be critical. Thank you very much, appreciate your time.

(Applause.)

MR. LEVIN: Oh, one last slide here, just so it's understood on an international basis. Recently the European Commission funded, committed to over a billion Euros funding hydrogen and fuel cell technology. So we want to maintain in California the lead that we have already established worldwide, it is recognized internationally. We want to maintain that reputation with continued funding from programs like AB 118. Thank you.

MR. WARD: Thank you, Jaimie. I guess

you can probably tell Jaimie could talk about this for quite awhile and I really appreciate you being so succinct this morning.

MR. LEVIN: Thanks, Peter, I'll remember that.

(Laughter.)

MR. WARD: Our next commentor will be Stephen Plocher. If you could use that microphone there, Stephen, five minutes.

MR. PLOCHER: Yes.

MR. WARD: Appreciate it. Stephen is with Yokayo Biofuels.

MR. PLOCHER: Yokayo Biofuels. I don't have a presentation. I strictly want to share some comments from our company to the Commission. My name is Steve Plocher; I am the CFO for Yokayo Biofuels. And I'll read our two page blurb here.

Yokayo Biofuels is a biodiesel company located in Ukiah, California. For those of you who don't know that's a couple of hours north of the City. And has been in business for seven years. We collect waste vegetable oil from over 800 restaurants, process it into biodiesel and sell it to retail and wholesale customers in the North Bay area.

Presently we produce and sell about 350,000 gallons of fuels per year. We would like to grow that production capacity to over a million gallons per year and that's why we are here. We would like to benefit from some of this program funding. We are one of the original developers of the biodiesel market in Northern California and our CEO, Kumar Plocher, has long been a champion of sustainable fuels.

Our comments will only address the production of biodiesel. We feel strongly that the Commission should support in-state companies to implement this program. This would extend to the ownership of applicants as well plant locations. Funding and incentives meant to promote and improve California resources should not be drained off to corporations whose centralized operations are in other states.

Next. Your primary funding allocations should first be for existing plants and operations as compared to planned locations, equipment or programs. An operating plant is more ready to increase biofuel capacity by growing and improving operations than a new or concept plant, which still has many obstacles to overcome before

production, quality and volumes are confirmed.

Risk should be minimized by first focusing on existing businesses and programs to help reach your goal of maximizing the effect of the program in the next two years. But a bigger reason for funding existing plants might be this. With only three to five million to spend on biofuel production plants you can't substantially help any new plants get started as it takes that much just to build one plant.

We also feel that local biofuel feedstock is a critical element of any program to encourage increased biofuel production. While large quantities of biofuels must presently be imported from other states or countries to meet demand, California has outstanding resources to develop the appropriate plants for biofuels, including world-class agricultural research programs, venture capital centers, fertile lands, sunshine and a moderate climate.

With funded and focused research and development California will ultimately meet the future domestic demands of biofuels. A demand that will over time be decreasing as we achieve greater miles per gallon vehicles, greater battery

power in electric vehicles, more mass transportation and higher efficiency in our trucks and trains.

Significant feedstock crops will take some time, but acreage will be developed as the fuel and feedstock markets become a more attractive goal for farmers and investors. To get there we need programs like yours.

Lastly, look for shared commitment to your goals from the applicants you consider. Sustainability is not always sexy and certainly does not have a quick return in these difficult times. You should work with people and firms who have shown enthusiasm and determination in their fields with a true understanding of sustainability, carbon footprint, lifecycle impact, et cetera. Check the results so far, check their track records.

We are very pleased that California is taking these steps to combat global warming and to provide secure and sustainable energy for our citizens. We laud your work and hope you will make the right productive choices as you fulfill these duties. Thank you.

MR. WARD: Okay, thank you, Stephen.

(Applause.)

MR. WARD: The next commentor is Jon Erlandson.

MR. ERLANDSON: Yes. Hi there. I'm Jon Erlandson, I'm with ZEV Power. I had a question for Tim on the super-ultra-low-carbon solutions.

You have managed to, you have offered to fund electric drive vehicles for, you know, prototype development but you haven't considered hydrogen internal combustion engines for the same type of prototype development. I am at a loss to understand why, with all the interest in the Hydrogen Highway and all the hydrogen as a solution, that that hasn't been addressed.

MR. OLSON: I guess the way we look at the kind of prototype development is that if someone steps forward and proposes a project we are interested. We haven't heard this yet in the last six months, seven months, from any manufacturer or any vendor so that is why it was not highlighted.

MR. ERLANDSON: Okay.

MR. OLSON: But, you know, look across the board, not just hydrogen, not just electric drive. We are open to advancing, funding advances

in technology that have some improved efficiency, lower greenhouse gas emissions. We are willing to co-fund some of the prototype development. So it really comes down to who is out there that has a product or wants to pursue this.

MR. ERLANDSON: Well you are about to hear about it.

MR. OLSON: Okay good, good.

MR. ERLANDSON: We have developed a hydrogen engine that is a step above the -- Honda has come out with the Clarity and BMW has internal combustion hydrogen engines. We have got a step above that. It actually has double the horsepower of their vehicles. It has certain advantages.

We have solved the problem -- There's certain problems that they have, we have solved those. I won't go into the details now. But one of the benefits to this vehicle is that it can idle, it just stops, it doesn't keep running. So if you are talking about the port --

And one of the applications that we are very interested in is all those trucks lining up at the Port of Oakland that are in line with their vehicles idling. We can, we can put a stop to that. And so we could look at a retrofit program

as well as -- But what we need is the funding for some more development. It also works on off-road, on-road vehicles, planes, trains, automobiles. So I just wanted to let you know that we are here and we will be submitting a proposal.

MR. OLSON: Okay, very good. Just to kind of, Peter, to kind clarify. We are still at this workshop and our interactions with many of the companies, we are still in a very informal stage here of hearing ideas. And there are a couple of ways you can do this. You can talk to us in person, you can do a summary of your project and give it to us just to show us that there is some kind of defined project. Or you can also take that same kind of written description and put it into our record, into our docket. In essence, if we don't hear from you then the perception is it is not out there.

MR. ERLANDSON: That's right.

MR. OLSON: So we look forward to hearing from you.

MR. ERLANDSON: Thank you very much.

MR. WARD: I would like to follow-up with Tim's comment there. I think it would be useful for the internal combustion hydrogen engine

to actually submit that to the docket. We have not heard. But that's the formal way to do that.

But I also would encourage you to discuss this with the Air Resources Board who has the Air Quality Improvement Program and, of course, they are the administrators of the Hydrogen Highway too. So you know you are going to have an interest in that discussion. They have funding for this too. It is for -- Vehicle technologies primarily is what their focus is going to be so I would encourage you to contact them as well.

MR. ERLANDSON: Thanks very much. Thank you.

MR. WARD: Next we have Dave Head, who is the fleet manager from the County of Sonoma. Welcome, Dave.

MR. HEAD: Good morning. My name is Dave Head, I am the fleet manager for the County of Sonoma. The County of Sonoma operates a fleet of about 1500 vehicles and pieces of equipment that ranges everything from compact cars up to heavy construction equipment.

We have a number of initiatives we are working on at the County. One major difference is

that we are the consumer in this, not the manufacturer or a service provider. So we are looking at a number of different projects and we have talked to Tim on some of those.

A couple of things that we are looking at specifically is expanding our plug-in electric vehicles and EVs. We are looking at having EVs in the fleet by the end of 2010. We are working with a partnership of city/county agencies within the county and are looking to expand that substantially.

Which brought up another concern of ours, EV infrastructure. You were talking about maybe funding 200 charging stations in the first round. Sonoma County is looking at 200 charging stations in the first round in the county of Sonoma. And we hope to have between public and private entities working together over 1,000 EVs operating in the county by the end of 2011. So 200 statewide isn't really doing us a lot of good there so considerations there would be very helpful.

Also on the retrofits of plug-in electric vehicles. We have one in our fleet now. Our Sonoma County Water Agency has five. I am

working on getting another five in the fleet and then more beyond that. But funding for those plug-in conversions, that's important to us, assistance in that. The County has tight budgets just like everyone else. I could fund the cost of a hybrid, the plug-in part of the technology is a little different.

There is technology out there that is approved by CARB and I think that that's a standard that should be put in place if there's a question about having people that aren't meeting state standards. If CARB certifies that this vehicle meets that technology or that the conversion meets their emission standards then I think that that should be an approved conversion for this project.

And then the last thing I want to talk about is tax credits. As Mr. Robbins mentioned earlier, tax credits do me no good. As a county agency I don't get tax credits.

So any program, and I have been saying this for years, state, federal, air district, whatever, if it is a tax credit it doesn't do the municipality or the county any good unless that credit can be brought back through maybe the

supplier of the product and we get the credit there or another way to get the credit.

So our view is if the supplier of whatever we are buying doesn't get credit for it and pass that on to us then the credit shouldn't be considered as part of the reimbursement and we should get the incremental cost, the actual cost of what we paid and what the upgrade was. So those are my comments, thank you.

MR. WARD: Thank you, Dave. I just want to mention also when we mentioned there's the bit of discussion about the retrofits, those were comments from some on our Advisory Committee and it is a mixed reaction. Some support, some don't. In all cases though they would be CARB-certified retrofits or up-fits. We wouldn't violate any other -- any of that, we would definitely go forward with that.

I was also -- To your point about the tax credits. I don't know if Richard Lowenthal is still here from Coulomb.

MR. LOWENTHAL: (Inaudible, responded from the audience.)

MR. WARD: Your associate, yes, his associate is here. I'm just wondering, is there a

possibility for a tax credit to be parked with your company and the benefit go to people that you would assist with infrastructure?

MR. LOWENTHAL: There might be.

MR. WARD: You would have to have a whopping tax liability to take full advantage of everything though.

MR. LOWENTHAL: Yeah. I think the tax liability has to be with whoever ends up owning the charging station.

MR. WARD: I see.

MR. LOWENTHAL: You may need to come up with a scheme where you resell it.

MR. WARD: I see, okay.

MR. LOWENTHAL: Or you retain ownership.

MR. WARD: Okay.

MR. LOWENTHAL: Maybe the county or city doesn't actually own it but allows it to be there and somebody else actually owns it.

MR. WARD: I think it's a --

MR. LOWENTHAL: Like a lease.

MR. WARD: It's maybe something we can discuss and hopefully work out. Because I think it is going to be a critical issue if most of the federal incentives are in the form of tax credits.

And we from California have long awaited federal support for many of the things that we are doing and we certainly want to take advantage of the federal money first.

Before we apply our funds to any of these projects we want to make sure we can squeeze out as much of the federal money as possible. After all, we are paying into that federal, into that federal money and into that federal debt that our grandchildren will be paying off.

Our next commentor is Matthew Frome from Solazyme. I hope I pronounced that right, Matthew. Welcome.

MR. FROME: You are not the first person to pronounce it that way but it's Matthew Frome.

MR. WARD: Frome.

MR. FROME: But you got the company right, Solazyme. That's really what matters.

MR. WARD: Okay.

MR. FROME: So Solazyme is a Bay Area biotechnology company focused on developing next generation biofuels, particularly ultra-low-carbon fuels in California from very-low-carbon feedstocks. So usually people think about cellulosic ethanol as the cellulosic technology

but the reality is that you can break down cellulosics and turn those into oils. And we have demonstrated that process of turning that into renewable diesel, biodiesel and a number of other fuels.

And so really I am just hear to comment and say that we are very supportive of the program and really thing that staff did a fantastic job on the Draft Investment Plan.

But also very much want to support the Advisory Committee's comments. Rather than through them I will just say that we are supportive all the way down of everything that the Advisory Committee says in terms of focusing on ultra-low fuels and sustainability issues, things like that.

The one question that I did want to have, that I did have is I didn't quite understand the process for breaking down the Draft Investment Plan. It just seemed to me that since the focus is on reducing greenhouse gases that the fact that -- and this is just the one that popped out at me. That, you know, low-carbon fuels get 62 million yet ultra-low-carbon fuels, which should provide a better greenhouse gas reduction, only gets 22

million. And so I didn't quite understand the analytical process that you went through in terms of trying to break out the funds in the Investment Plan. And so hopefully I'll be able to, you know, get additional information on how that breakdown actually occurs.

MR. WARD: Briefly, if I can -- I can address that right now. I think when we went through the analytical framework for the various categories and what would be needed in 2050, that was the step one. The step two is the gap analysis found out what is being funded, what gaps remain and what opportunities are out there.

And then we take both of those results and come up with a funding amount. So it isn't just a true trajectory for ultra-low everything would be funded under that. It has to be also married up with opportunities for that funding exist now as well.

Obviously the low-carbon fuels have a commercial space beyond what say hydrogen fuel cell vehicles, plug-in hybrids or battery electric vehicles have now. They have vehicles that are available, there are fueling facilities available. There are technologies that will be developing

those fuels to jump into higher reduction categories for GHG. So it's the two-step process that I mentioned, just to kind of briefly address your question.

MR. FROME: Okay. But overall we are very, very excited about the program and really thank you for the efforts that you guys are doing.

MR. WARD: Great, thanks for your comment. Next we have Gene Walker with Golden Gate Transit. This is the last of the blue cards we have. So if anybody in the audience would still like to make a comment, and those who have been patiently waiting on the phone, if they would like to make a comment after Gene. Welcome.

MR. WALKER: Good morning. Thank you for the opportunity to speak here today. I am Gene Walker. I am the director of maintenance for the Golden Gate Transit, I work for the Golden Gate Bridge District. I also work with the American Public Transit Association. I am the chairman of the Bus Technical and Maintenance Committee and also serve on the Clean Propulsion Committee. I run around with the father of the hydrogen fuel cell but I am a lot less-spoken so I'll make this quick.

You know, public transit everywhere in the United States, not just California, have always been, for lack of a better term, guinea pigs for technology. We have a great track record of our internal recordkeeping. Certainly of adhering to regulations. That must, must be a constant factor today because we are bombarded certainly with every kind of widget and gidget that you can put on a bus to test.

One of the important things that happened with the ZEBA Project, that is a Zero Emission Bay Area that has a partnership with AC Transit, SamTrans, Muni and Golden Gate and VTA is certainly the localization of that funding. Originally some funding before we were able to sit down and certainly lobby with the California Air Resources Board and others, there was more of a shotgun approach to bring that technology to many places in California.

Well there's a large cost in infrastructure associated with running a hydrogen fuel cell bus. We have the infrastructure here, we have the technology here and we are willing to partner here. So we certainly appreciate the help with funding of these projects, certainly for the

ZEBA project and to prove this technology and keep the Bay Area as certainly the forefather of the hydrogen fuel cell in the United States and certainly number one in California.

But that approach will certainly get us the most bang for any dollars we do get and allow us to continue testing this new technology and hopefully bring it into the commercial market. Thank you.

MR. WARD: Thank you, Gene. If there are any other comments in the room? And any of those that are on the phone, if you can figuratively raise your hand on the phone. Don Magdanz. Don, are you there?

MR. MAGDANZ: Yes I am. Can you hear me?

MR. WARD: Yes, loud and clear.

MR. MAGDANZ: Thank you. My name is Don Magdanz. I live in San Rafael, that's part of Marin County. I am on the BPAC, which is the Bicycle Pedestrian Advisory Committee for San Rafael and the County and also I am associated with the Marin County Bicycle Coalition, the San Rafael Green Ribbon Committee and we have a group up here called PRT, Personal Rapid Transit for

Marin and we are promoting the SkyTran system for a pilot project here in San Rafael and Marin County. I am speaking for myself today.

PRT and specifically the SkyTran system is as convenient as using an automobile. It is 24/7, it is on demand and it is point to point, which is different than any other public transit system. If this is installed we could reduce vehicle miles significantly, less congestion and much less greenhouse gas emissions.

This is the only transit option that I have ever seen that has the possibility of competing with autos for trips. This is a way to get people out of their cars.

I use a bicycle all the time for errands. I work out of my home so I don't commute. I take my car out about twice a week. The PRT system will be very effective for me because it has the capability of carrying a bicycle. So people can actually bike to the PRT terminals in the neighborhood, put their bike in the vehicle and then bike at the other end. I know people who are commuting all the way from Marin County over into the East Bay, into San Francisco, that could make very effective use of

this system as it grows.

The other thing that I think is extremely important about PRT is that it has the capability of dealing with freight in the future. I have extensive experience in working in warehouses throughout the United States. I have seen automation in a warehouse and I know how it works. What PRT could actually be is an extension of that automation from the warehouse to the distribution to stores, to trucks for delivery like for example for FedEx or UPS packages. The freight in this thing is phenomenal. What you can do to increase the ability of moving goods around and eliminating a lot of delivery trucks and those kinds of things.

Also the other thing that is very interesting about this SkyTran system is they are looking at private financing as opposed to government financing in the future for this system. This would be -- Virtually all transit today is financed by the government and it loses money in the operating to a substantial degree. And this system has the potential of being of a profitable nature, a profitable function for private enterprise.

Marin is asking for a grant for the demonstration project that we would like to run in this county. This would -- This PRT or actually PRT in general has not been implemented in the United States since the Morgantown system about 30 years ago, which is very old technology. The technology you are talking about in this system is already developed. It is a matter of engineering it to making it work for a public transit system.

I urge you to consider AB 118 funds for this demonstration project. Thank you very much.

MR. WARD: Thank you, thank you, Don. Next will be Roger Hooson with the San Francisco Airport, I believe. Roger, how are you?

MR. HOOSON: Yes, good. Can you hear me?

MR. WARD: Yes indeed.

(Whereupon, a recorded message was heard over the telephone line.)

MR. HOOSON: I am hearing a commercial message.

(Laughter.)

MR. WARD: That's what I am hearing too. Congratulations are in order. Go right ahead.

MR. HOOSON: It's over. Okay. Are we

good?

MR. WARD: I think we're good.

MR. HOOSON: Okay. I am the clean vehicle coordinator at SFO and I have been in that role for about a decade now. In that time we have implemented a clean vehicle policy that has resulted in about 1,000 CNG vehicles operated by several dozen at least commercial fleets.

In addition there are quite a few electric vehicles on the airfield operated mainly by airlines and the airline contractors. So we have quite a bit of experience with technologies that are practical for commercial operators.

And we are, of course, very interested in the AB 118 funding going forward. In particular the staff recommendation that near-term practical technologies that are reliable receive a focus in the funding package.

Now having said that, we are also interested in breaking technologies such as hydrogen and hythane and we are pursuing a joint hythane/hydrogen station at the south end of the airport. So we do want to be part of new opportunities in the future. Plug-in electric vehicles as well.

But we think that the practical near-term focus is critical to make an impact at our airport and other similar facilities. Our commercial operators use a lot of fuel, unlike the municipal vehicles here at the airport. So our commercial focus has the potential to reduce emissions and greenhouse gases very significantly and that's why we kind of place the emphasis there.

So just to say that, for example, rebates covering the full incremental cost of vehicles is particularly important for our operators. One example of why it is needed would be the Ford E-350 van that is now available as a conversion that is very expensive as a conversion. And even with the federal tax credit and the air district funding there's a gap.

So we do plan to have virtually our entire door-to-door van fleet here operate on CNG or equivalent emission vehicles within several years now that they are available once more but we do need to make the operators whole for the additional cost of those vehicles.

That's a summary of where we are at and we support the, we certainly support the Energy

Commission staff recommendation for a balanced approach with the AB 118 program.

MR. WARD: Great. Thanks very much, Roger, appreciate your comments.

MR. HOOSON: Sure.

MR. WARD: Are there any other comments from anyone in the room? Anyone on the phone?

Seeing none. Again I want to thank our hosts, IBM, for having us, Winfried and Moiden and all the good folks here at IBM.

I appreciate all you folks coming here to this beautiful spot in the Bay Area, I am really impressed.

And I want to thank all the folks that were on the phone for these three hours. I'm sorry we went one minute over time. I apologize and we'll do better next time hopefully.

Thank you again. Our next road show will be from the South Coast Air Quality Management District in Diamond Bar next Tuesday. Again, thank you all for your interest and we are signing off.

(Whereupon, at 12:01 p.m., the Staff Workshop was adjourned.)

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CERTIFICATE OF REPORTER

I, JOHN COTA, an Electronic Reporter, do hereby certify that I am a disinterested person herein; that I recorded the foregoing California Energy Commission Staff Workshop; that it was thereafter transcribed into typewriting.

I further certify that I am not of counsel or attorney for any of the parties to said workshop, nor in any way interested in outcome of said workshop.

IN WITNESS WHEREOF, I have hereunto set my hand this 16th day of February, 2009.