BEFORE THE
CALIFORNIA ENERGY COMMISSION (CEC)

In the matter of	)	
	)	Docket No. 13-IEP-1L
2013 Integrated Energy	)	
Policy Report	)	
(2013 IEPR)	)	

JOINT LEAD COMMISSIONER WORKSHOP
ON
INPUTS AND METHODS FOR
TRANSPORTATION ENERGY DEMAND FORECASTS

California Energy Commission
Hearing Room A
1516 Ninth Street
Sacramento, California

Wednesday, June 26, 2013
10:00 A.M.

Reported by:
Peter Petty

APPEARANCES

COMMISSIONERS PRESENT:

Andrew McAllister, Lead Commissioner 2013 IEPR
Janea Scott, Lead Commissioner Transportation
Jim Bartridge, Her Advisor
Robert B. Weisenmiller, Chair

STAFF PRESENT:

Gene Strecker
Aniss Bahreinian
Ryan Eggers
Laura Graber
Jesse Gage
Bob McBride
Gordon Schremp

Also Present (* via Phone)

PUBLIC COMMENT:

Tom Fulks, Mightycomm

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P R O C E E D I N G S

JUNE 26, 2013 10:05 A.M.

MS. STRECKER: Good morning. Thank you for attending today's workshop. I'm Gene Strecker, a Supervisor in the Transportation and Energy Office. We're going to be discussing the inputs and Methods used to prepare our Transportation Energy Demand Forecasts for the 2013 Integrated Energy Policy Report.

Before we get started, there's a couple of housekeeping items. The restrooms can be found in the atrium, go out these double doors and turn left; there's a snack bar on the second floor, look for the white awning and it's right by the white awning; if there's an emergency and we need to evacuate the building, please follow Energy Commission staff to the park across the street, we'll wait over there until it's safe to return to the building.

Today's workshop is being broadcast through our WebEx Conferencing System and that means that everyone should be aware that we're being recorded. An audio recording will be available on our website in about two days, and a written transcript will be available on our website in about two weeks.

We have a full agenda today and we ask that you hold your questions until the end of each presentation. We will also have a public comment period at the end of the workshop, and we'll take comments and questions from those of you here in the room, followed by those participating via WebEx, and finally for the phone-in only participants. For those of you in the room, please come up to the microphone at the center of the room so that WebEx participants can hear you and so that we can capture your comments in the transcript. It's also helpful if you can give the transcriber a business card so that we get your name and affiliation correct in the transcript. For WebEx participants, you can use the chat function to tell our WebEx Coordinator that you have a question or comment, and we'll either relay your question or open your phone line. For phone-in only participants, we'll open all the phone lines after we've taken comments from the in-person and WebEx participants. Please keep your phone line muted unless you intend to speak so that we don't get a blast of feedback when we open all the phone lines.

We're accepting written comments on today's topics until the close of business on July 12th. Today's workshop notice, which can be found on the table in the foyer, and it's also posted on the website, explains the process for sending written comments to the IEPR Docket.

Chairman Weisenmiller and Commissioners, do you have any comments, opening remarks?

COMMISSIONER MCALLISTER: Just very briefly. I know we have a very tight agenda and the three of us have five minutes total, which is a good strategy on the organizer's part, I think.

I just want to say thank you all for coming, really this is a hot area, transportation, and incredibly important for our overall policy goals, and we're happy to be having this workshop within the IEPR context. I'm Andrew McAllister, Lead on the IEPR for 2013, and again, welcome to those of you in the room and on the Web.

Just one quick housekeeping item. The Chair and I both are going to be out from just before 1:00 to just after 2:00, so apologies in advance for that, would love to be here for the whole time, but duty calls over in the Governor's

Office. So we'll leave it to Commissioner Scott to run the meeting for an hour there.

But I am incredibly happy to be here on the dais with both the Chair and Commissioner Scott, who is the Lead on Transportation, and I know brings a lot to the table on this topic, and certainly look forward to a good discussion on these issues and seeing what the presentations have to offer. So any other comments from the Chair or from Commissioner Scott?

CHAIRMAN WEISENMILLER: I certainly want to thank people for their participation today. As you know, if you look at transportation energy, it's a significant part of our resource mix and at the same time when you look at dealing with greenhouse gas issues, certainly dealing with air quality issues, transportation is front and center for that. And so certainly today is an important day to talk about what the needs are going to be and it's one which we're certainly going to have to spend a lot of focus on over the next couple of decades.

COMMISSIONER SCOTT: Good morning. I'm Commissioner Janea Scott and, as Commissioner McAllister mentioned, I am the Lead Commissioner for Transportation here, and I will just echo what my fellow Commissioners have said and I look forward to hearing and learning everything we'll hear and learn today, and thank you all for coming to participate.

COMMISSIONER MCALLISTER: All right, let's get going.

MS. STRECKER: Thank you. So yesterday some of us attended BP's Annual Statistical Review of World Energy in Sacramento and I think that was an interesting segue to today's topics.

According to the Energy Information Administration, in 2010, California's total energy consumption was 7,800 trillion Btus and 3,100 trillion of those Btus were used in transportation. So, as Chair Weisenmiller just said, transportation energy is a significant part of California's transportation energy or energy mix.

Today we're just going to focus on our inputs, what data do we use and what data do we need, and the methods -- how do we use that data? We'll be spending the next couple of months running our models and interpreting what the data tell us. We invite you to attend a workshop on

August 21st, where we will present our preliminary Transportation Fuel Demand Forecasts for 2013.

As a quick review of today's agenda, Aniss Bahreinian will discuss our models and a survey of light duty vehicles; Ryan Eggers will address our Transportation Energy Price Forecasts and the vehicle data that we use; Laura Graber will touch on our light duty vehicle attributes; and we have Jesse Gage discussing our aviation model and our challenges in aviation; Bob McBride will discuss our medium and heavy duty vehicles in California and the challenges involved in determining vehicle miles traveled in the state; finally, we'll have Gordon Schremp discuss liquid fuel balances; and then we'll open the floor to public comments.

So with no further ado, I would like to introduce Aniss Bahreinian and she'll get started on discussing our models.

COMMISSIONER MCALLISTER: I'll just chime in here to thank Suzanne and Lynette on the IEPR team, certainly Gene and Tim Olson and the whole Transportation team for all their hard work on this because I know there's so much substance here, as the Chair said, and a lot of expertise here at the Commission on this and really appreciate getting the ball rolling forthrightly and on this complex topic, so looking forward to the presentations.

MS. BAHREINIAN: Thank you very much. My name is Aniss Bahreinian and I say good morning to all you Commissioners and stakeholders in the audience. And today I will be going over -- I will provide you with a model overview and talk about some of the assumptions that we are making in these models. These models have a lot of equations and have a lot of input, so there is no way that we can exhaust all of the assumptions, but we are going to try to pick the key assumptions here.

We also present to you the scenarios that we are planning to analyze and, if there is any input from the audience on any of these, please feel free to provide, and we actually encourage you to do that.

We are going to start with the first slide, which is a pretty ordinary looking slide, Transportation Energy Consumption is a product of the number of vehicles, the number of miles each vehicle is driven on the roads, and on-road energy intensity per mile. If you multiply these things, then you are going to get fuel consumption. The problem is that not all miles are the same, they are not all made the same way. A mile in San Francisco is going to take longer to drive than a mile in Sacramento. A mile that you drive in Grapevines (*sic*) is going to be taking a different amount of energy compared to a mile that you are driving in Sacramento. A mile driven by a garbage truck in the beginning of the day when it is empty is going to take a different amount of energy compared to that same garbage truck at the end of the day when it is full, going back to the base. A mile in the grocery trucks in the morning when it is fully loaded, delivering the products to different places, is going to take a different amount of energy compared to when it is empty and going back to the base. A mile driven in summer could take a different amount of energy compared to winter. So there are all kinds of different miles that we have, and we have to create these averages that are going to provide us with the most accurate forecasts.

I should also say in the very beginning that we really don't have an accurate forecast, but this is going to also cast some questions on not just the forecast, but also the actual -- what we call the actual can also be subject to questions.

The number of vehicles are not all the same, we have smaller vehicles that take less energy and larger vehicles that take more energy, depending on what the composition of the vehicle stock is, then the total fuel need is going to be very different.

How about the number of miles? Well, the number of miles that are driven by a household that has four vehicles is going to be different than the number of miles that are driven by households with three individuals. The number of miles that are driven by those who work is going to be different than the number of miles that are driven by those who don't work. So we have all this diversity of individuals in the State of California, we have all this diversity of roads in California, and we have all this diversity of vehicles in California. So what we need is some kind of measure of what is happening on

California roads. California, is it the same as the nation? Could we use national averages for California? We know that the geography of California is different, we know what, well, a lot of other people in other states think Californians are different, they behave differently, we drive differently, we do different things; now, does that mean that our fuel consumption is also different? And that is what we are assuming, that is why we are doing this, otherwise we would use national averages.

Our demand models make an attempt to account for these differences, some better than others, while considering consumers' economic behavior. My colleague, Gordon Schremp at the end of the day is going to talk about how the fuel consumption itself is being measured. That, too, is not an easy thing. I had a simple question, I wanted to know the barrels of crude oil that is being consumed in the State of California, it's not as easy as it sounds because there are all these different products of crude oil that are imported, exported, and different types of crude oil that are being imported and produced in different places.

The demand forecasting unit operates a number of models that are used in transportation and energy demand analysis. These models are economic models. What that means is that they account for economic behavior of consumers in these sectors. What does that mean? That means that, well, if you're responding to the changes in prices, or that if your income is going to influence your consumption, that is your economic behavior, and so all of these models are really economic models. The models that we have in the demand forecasting unit do not include any supply models, and so, as such, then these models are not equilibrium models.

So what are these fuel demand sectors? Well, we are basically looking at the light duty vehicles, heavy duty vehicles, and light duty vehicles are used for personal transportation, for commercial light duty vehicle transportation, and heavy duty vehicles are used mostly in transit and freight. And we are also looking at the aviation fuel demand, so we have models for urban travel, for intercity travel, for personal vehicle choice which is the household sector for commercial light duty choice, which is the commercial light duty, as opposed to commercial heavy duty vehicle choice models. And we also have a couple of other modules that we use in order to generate these forecasts.

This diagram shows the flow inputs and outputs into these models. As we can see, the ovals in this model are representing the model, itself. The rectangles are representing either inputs or outputs. Starting from the top, we can see the set of input data that we use, that we obtain from different agencies. We obtain, for instance, crude oil price forecasts from EIA; we obtain economic, demographic, and other data from different data vendors. We use, for instance, IHS Global Insight, and MoodysEconomy.com for some of our income data. We use DOF and IHS and Moody's for population data. So there are a number of sources that we use as inputs to these models. These inputs are all exogenously forecasted, and then they enter these models.

As you can see here in this diagram, we also, if you look at the purple ones, we also use a lot of survey data. Survey data that we use are travel survey data, the most prominent of which is a California household travel survey, we also use vehicle survey data, which is the survey we conduct at the Energy Commission. We use a transit agency survey, which is also conducted at the Energy Commission, and we of course use a commercial vehicle survey, which is also conducted at the Energy Commission.

The data coming for the commercial vehicle survey is coming from the DMV. We use the DMV data as the sampling frame for that survey. We select our participants from those who have registered vehicle, of what we consider as commercial in the DMV registered vehicles.

The data for our household vehicle survey this time around for the first time ever is coming from California household travel survey. We sampled our participants from those who participated in the California household travel survey. Some of these surveys provide input data to some of our models, but the vehicle survey that we conduct at the Energy Commission is used to estimate these models, so both household vehicle survey and commercial vehicle survey, they are used to estimate personal vehicle choice and commercial vehicle choice models. So our surveys' end result are the parameters that go into these models. We don't use it for other purposes.

Personal vehicle choice model generates forecasts of vehicle stock. This vehicle stock then feeds back into the intercity and urban travel. Now, notice that these are light duty vehicle stock that we are talking about. So they are fed into urban and intercity travel, combined with the VMT that is generated in that model, and distributed to different fuel types and vehicle types, and then it generates On-Route Transportation Energy Demand. Now, I called it On-Route because I really didn't know what else to call it, you could call it On-Surface if you are talking about rail and trucks, but we also have aviation. For all of you who have been traveling, you see all those curved routes that they have in the magazines that are under chairs, one of our colleagues, Jesse Gage, has actually come up with a formula, or has obtained a formula that actually measures those distances. So the distance from here to Los Angeles is not necessarily the same as what you are driving, it would be different.

We also have two models, the freight model

-- the freight model actually measures the movement of goods and services, measures the fuel that is consumed for movement of goods and services in the State of California. The freight model uses both truck mode and rail mode, so both modes are being used in freight.

Aviation model has actually two components, one that is for passenger aviation, and another one that is for freight aviation. These are two different separate models and they come up with the forecasts of fuel consumption for each of these two sectors.

Urban travel and intercity travel includes both transit travel, for instance, light rail we have here, and buses, as well as personal vehicles, personal auto. Intercity travel includes all the different modes, so it is open to all of the different modes that are used in intercity travel.

Commercial vehicle choice model also generates -- it has both vehicle stock, the output of that model is both vehicle stock and VMT, and the combination of the two is going to forecast fuel consumption for commercial light duty vehicles. All of these are then added up in the California On-Route Transportation Energy Demand.

So what do we do with it once we are finished? Well, we add off-road fuel consumption projections from other agencies, either EIA, or ARB, one of the two. We are going to add that to the On-Route Transportation Energy Demand, and we come up with total California Transportation Energy Demand. This total, California Transportation Energy Demand, includes electricity used for transportation, as well as natural gas used for transportation. What we obtain as forecasts for electricity consumption, we hand that over to our electricity office. What we obtain as forecasts from our natural gas transportation, we hand that over to our Natural Gas Unit, then they add that to their own respective demand and they come up with the total demand for natural gas, or total demand for electricity.

What we obtain as total demand for liquid fuels, we hand that over to Gordon Schremp, who is going to make sure that the supply forecasts are going to meet those demands that we are forecasting in what he calls Energy Supply Demand

Balance.

So what kind of inputs are we using? Well, I have divided here our inputs into two groups, one that are projections from other places, so you're using projections of input, and the other one is the 2011 Base Year Data. The 2011 Base Year Data is mostly what we call -- remember, I said we can even question the actual data -- 2011 Base Year Data is actual data. 2011 to 2050 are projections, of course. In 2013, we could also have some (quote unquote) "actual" numbers for 2011 and 2012. And whatever we have actual, we would use it. But if you look at the entire period, 2011 to 2050, that is going to cover our forecast period.

For the 2011-2050 projections, we use income, different measures of income and employment, that means personal income, that means gross state product, that means gross domestic product, that means household income. We use different measures of income and these income measures are coming from either Moody's or IHS Global Insight. Our Demand Analysis Office has presented some of this data in the past workshops and we have not included it here.

Economic activity in the Business sector is also included among our inputs. Economic activity is going to determine the flow of goods and services in the California economy. These economic activity projections also come from Moody's and IHS Global Insight.

Transportation energy prices are coming from EIA and the internal analysis of the fuel price data. Crude oil prices are coming from EIA and Ryan Eggers is going to talk about those, so I am going to let him get into the details of that.

Class Specific LDV, HDV and Aircraft attributes because if you want to project fuel consumption into the future, we also have to have projection of energy efficiency, energy economy of all these different vehicles that are being used. These class specific, that means by each class of vehicle or aircraft, are coming from Sierra Research and EIA and other data sources that Jesse Gage and others are going to talk about.

Population and Households, they come from Department of Finance, again, Moody's and IHS Global Insight, too, they have their own population forecasts. So we have a high, low, and reference.

The 2011 base year data, we have different measures of travel activity for people movement, that are multiple sources. HPMS is one, CHTS survey is another one, Energy Commission Transit Agency Survey is another one, so we use all of these different surveys to come up with a measure of travel activities in 2011. Bob McBride is going to talk about this angle.

Different measures of travel activity for goods movement also come from different sources, VIUS, which is Vehicle Use Survey, and FAF, Freight Analysis Framework, those are being used to measure travel activity for goods movement in conjunction with other data.

Vehicle stock, we are using Energy Commission analysis of DMV data, we use that as our actual stock of vehicles in 2011 to reach, recalibrate our PVC and CVC models. Ryan is going to talk in his presentation about the vehicle stock.

Fuel consumption in 2011 -- and we try to get as close to this total fuel consumption as we can. It's going to come from Gordon Schremp, from his analysis of 2011 supply/demand balance analysis.

Then the next slide is going to talk about the scenarios that we are planning to use. We have proposed five scenarios for three different purposes, to serve three purposes, one is that for the first time we have a set of shared scenarios with other offices within the Energy Commission, this is going to enable us to exchange inputs and outputs without loss of consistency, so we are consistent with each other. So for the first time we have three common scenarios with other offices within the Energy Commission.

In the past couple of years, we have only presented high and low petroleum demand cases, this is what we have done in the past and, likewise, associated with that we have used high and low petroleum prices, crude oil prices, and all of the other fuels. This time around we are adding a reference price scenario and, of course, our reference price scenario is also coming from EIA, the crude oil one, the rest of it is done internally.

So what this is going to do, some of the other agencies in their work, in their analysis, have relied on our price forecasts for their own work, and most other agencies need a reference scenario. This is going to enable them to use this referenced price scenario without having to process anything or take an average of the high and low energy prices which has happened in the past, so this is going to facilitate their work. We also -- the third purpose of this is to allow Transportation Energy Office to continue the past practice of forecasting high and low petroleum and liquid fuel demand scenarios.

For the purpose of planning the infrastructure, you need to know how high petroleum demand is going to go, and how low petroleum demand is going to go, that is why we have these two additional scenarios for us.

So these proposed scenarios, I have divided them into two groups you will see here, these are called -- or what I refer to, or what sometimes is referred to as "common scenario" -- I call it "shared scenario." This is Shared Commission-wide Scenarios. So in the Commission, all of the different offices that are doing this kind of work, we have agreed to have a high energy consumption scenario, a reference energy consumption scenario, and a low energy consumption scenario. All of us are using the same inputs and hence the consistency between different offices. The high energy consumption scenario, energy consumption, remember, in order to have high energy consumption you have to have low energy prices. And in this case, what we have done, we have combined the low energy prices with high income in order to generate high energy consumption. And with the reverse for the low energy consumption, we have high energy prices and low income and low population. So we are trying to capture the extremes.

So these are the three that we are sharing with other offices; all of us are using the same income projections. For high income, we are all using IHS Global Insight; for low income, we are all using Moody's Scenarios 3 and 5, which involves a second recession; and for reference scenarios, we are using Moody's Base Scenario, so Moody's Base Scenario is going to serve as our Reference Income Scenario. EIA's reference crude oil prices is going to be our Reference Fuel Price.

The two that we are adding, that we call -- that I have called it Transportation-Specific Proposed Scenario -- and if there's anything else, please propose to us, this is what we are proposing -- we are going to call it High Petroleum Consumption and Low Petroleum Consumption. With the High Petroleum Consumption, if you notice, we are keeping the high income the same as the high energy consumption, but when it comes to the fuel prices, we are making a change here. We are going to keep the low liquid fuel prices as low as they were in the high energy consumption case, but now we are going to use the high electricity CNG and Hydrogen prices.

This, we think, is going to generate higher fuel demand, higher petroleum fuel demand, or liquid fuel demand, that's what we expect to see, we haven't done the work, but that is our expectation. Why? Because then if the alternative energy, natural gas, electricity, Hydrogen, are high in prices, we expect our customers to do a substitution because fuel cost is going to be higher, they may not choose these vehicles, and therefore consumption is going to be lower. On the other hand, since they have to have a vehicle, then they are going to use more of the fossil fuel vehicles, or liquid fuel, I'm sorry, because some of those fuels are renewables.

In the low petroleum consumption, what we are doing, notice and compare that to the low energy consumption in the shared scenarios and you will see the same low income; both are using the same income scenario. They are both using the Moody's scenario 3+5.

We are also keeping the liquid fuel prices the same as you see in the low energy consumption. The change we are making is that, for electricity, natural gas, and Hydrogen, we are using now low CNG electricity and Hydrogen prices. The scenarios, we expect -- we can always be surprised -- but logically we would expect that this should generate even lower demand for liquid fuels, but higher demand for alternative fuels, in this case CNG, electricity, and Hydrogen.

All of our scenarios make two assumptions, these are common between all of them, we don't change them. One is that National Academy of

Science Technology Cost Curves apply. In our prior forecasts, our contractor has shown to us, and I think he made a presentation here, that NAS forecast of technology cost falls in between the manufacturer's forecast versus the EPA's forecast; in other words, those cost curves, manufacturers forecast the higher cost for increasing fuel economy. On the other hand, EPA forecasts a lower cost for implementing these technologies.

The other thing that we keep constant in all of these scenarios is that we assume that all of the laws that have been implemented and adopted are the law of the land, we are not changing them. So everything else, the CFS, ZEV Mandate, CAFE Standards, RFS, everything is going to hold.

Our input composition of scenarios, the inputs are going to come -- oops, sorry -- as I mentioned, the inputs are going to come from different sources. We use RHS Global, we use our natural gas prices that are coming from the natural gas unit, we use electricity prices, and they're coming from our Demand Analysis Office. And of course we use crude oil prices from EIA.

I should say that the source models of our inputs are mostly composed of equilibrium models, so EIA's models are at least pronounced equilibrium models; whether those models are actually used in forecasting EIA prices, I haven't looked into it, but the models are equilibrium models.

These external input projections, as I have talked about already, are being mixed and matched to create the scenarios that define the range of outcomes in California, so our intent is to cover this wide range of outcomes. We want to be able to measure what are the high and the low. One of the reasons for doing that is, well, it is used in infrastructure planning. If we are planning infrastructure, we need to know how low we can go and how high we can go.

How about the assumptions? What are these assumptions for us? Well, the main assumption in all these things, remember all the consumer surveys I said we are going to do, we are doing, the vehicle survey, we are seeking consumer preferences and, as I'm going to talk about later in the second presentation, we are asking them about their consumer preferences, then we use those data and we estimate the personal vehicle choice and the commercial vehicle choice models. Our assumption is that consumer preferences are going to remain constant from now until 2050. So that's a main assumption.

Another assumption that goes with it is that we are asking them, what are you going to buy? Are you going to buy a car? And when are you going to buy a car? Our assumption is that what they say is going to hold, that's another assumption.

We also, since we don't have a vehicle supply model to interact with our demand, we are making the assumption that vehicle manufacturers and suppliers will meet California consumer demand. So whatever we want, we are going to get. In essence, that is what we are doing. Now, is that a reasonable assumption? In order to respond to that question, we have to see one of the criteria we can use, what share of the market are we? What share of the vehicle market is California?

If you look at this table, you will see that on the left-hand side we have all of the numbers for hybrid, we have national and California. The national numbers are new vehicle sales, the ones that are for California are the vintage stock of the vehicles in that year, so please do not use that as new vehicle sales, it is not new vehicle sales, but is the stock of the 2011 vehicles in 2011, that's what it is. But we don't have a better estimate yet, that's why I'm giving you this one.

So what you can see here, if you look at all the vehicles in California, you will see that approximately -- this is in the second set under "All," you will see that approximately we're about 10 percent of the national market, even lower percent of the international market, of the global market. So here, we are relatively safe because vehicle market is a global market, they make cars for everybody in the world, they don't just make cars for California, they make cars for everybody. But look at PHEV and EV and Hybrids, there, what we see is that, well, in Hybrid in 2000, at least our numbers are showing, that we reached 34 percent of the national market. For EVs, we have 39 percent of the national market in 2011. For PHEVs, we have 16 percent of the national market in 2011. If I want to add -- if I want to put this in a global context, I was looking at another set of data, PHEVs for the United States, not just California, are 70 percent of the global market, PHEVs are 70 percent of the global market. So you can pretty much imagine how much significance the U.S. has in the international market for PHEVs. When it comes to the EVs, we have 26 percent of the global market -- again, a significant number.

COMMISSIONER MCALLISTER: Aniss, just a quick question, a clarification question on this. So with respect to the Hybrids, it seems like those percentage numbers bounce around quite a bit more than they do in the general market. I'm wondering if you could explain a little bit why that might be.

MS. BAHREINIAN: That's also a question, I think, something that Ryan can respond, at least to the California numbers, not to the national numbers. That's something that we also have been wondering why that is happening, and we're going to look into that. You are absolutely right. But also, you need to keep in mind -- we all need to keep in mind -- that 2008 and 2009 are not really normal years. You have recession, recession has had significant impact on all of our activities.

I'm not sure exactly when the Cash for Clunkers came in, but a lot of vehicles were purchased in that time period, too. But that also caught our attention here.

Now we also said that we don't have a behavioral fuel supply model, so then the question is -- that's also one of our assumptions, right -- the question is do we need one? Do we need a behavioral fuel supply model that responds to the prices and all the other economic develops? Well, if you consider the crude oil market, it's a global market. California consumption is less than one percent of this market, so we really are a tiny speck in the global crude oil market, you really don't have an influence in this market. By ourselves, we don't.

So is it safe to assume that the world is going to supply us with whatever we want? Pretty much, it is safe to assume, at least for the foreseeable future, I don't know; MoodysEconomy.com also has a Scenario 6, the Scenario 6 is going to raise the conflict in the Middle East, and what it involves is a very high crude oil price. So if the Scenario 6, which seems at least these days with the presence of multiple countries in Syria is escalating, maybe that scenario is actually gaining more probability. But that is not one of the scenarios in EIA.

So then the other question that we have to respond to is, do manufacturers alter prices only to sell to California consumers? If we want to see whether we need a vehicle supply model or not, we have to see, for instance, if the manufacturers are actually changing their prices in order to sell to California consumers. Nissan Leaf cited a number of factors including changes in the business model -- I think it was in 2012, if I'm not mistaken -- they lowered the price over $4,000. Are they responding to California? I don't know. So in order to find an answer, we can look at the price response at the national market and for all vehicles, not just for Leaf, not just for EV, but for all models. As you can see here, we have the average new MSRP, Manufacturer's Suggested Retail Price. I'm sure that all of you go to different stores and you see this MSRP, right? On the clothing items, on the purses and everything, and they never set it to you, really, at those MSRP, well, I shouldn't say "never," you can go and get your chips upstairs and it is MSRP, but when you go to the shopping malls, you are not really buying always at those MSRPs. But it seems like the same thing is true here. Look at the total discounts here. The total discounts in July 2012 was $4,941.00. The total discount in March 2013 was $5,467.00. Between the manufacturer's price incentive -- now, this is aside from everything that the State of California is doing, and the dealer incentives, then the two combined, people are getting a total discount of almost, well, 14 percent in March 2013, and 13 percent in July 2012. Are the manufacturers responding to the consumers' demand, lowering the prices so that the consumers will go ahead and buy it? We don't know that. These are national markets, not California markets.

So where does Leaf stay in this range? Notice Leaf price reduction is kind of along the line of the total discount here, or actually along the manufacturer incentive that we have here. So are they doing it for California? Or are they doing it for the global market? I don't know, I can't answer that.

For this reason, then, we have our own contractor, our own consultant, who is going to use their own vehicle supply model, they can use their own vehicle supply model, in order to give us the attribute projections. We need those supply models to be able to project the vehicle prices in the future. We need those vehicle supply models in order to be able to project fuel economy. We need those supply models to do all of these different things. And when I talk about projection of attributes, I mean projection of attributes, that is, prices, fuel economy, etc., which you are going to see a list of it later for every fuel type, for every vehicle class, for every year between now and 2050, you can see that that is a monumental task in order to get that. That is why we have a contractor that is going to do this work.

Going back to the assumptions, I said in the beginning that fuel prices are exogenous, that's what I said. I said that fuel prices are exogenous to our model, that's an assumption. In essence, that implies that we are making the assumption that no matter what we do, those fuel prices are going to be there. No matter what we do, those vehicles are going to be supplied to us at those prices. Income and employment cases, the other assumptions are that all these -- remember all these income scenarios that we have selected, all these employment scenarios that we have selected -- we also are making the assumption that all these income and employment scenarios are covering the plausible range of outcomes in the future, between now and 2050.

We are also making the assumption that the total composition and growth rates cover the range of all plausible outcomes. What does that mean? IHS Global Insight, for instance, has a very optimistic view of the manufacturing in the United States, they believe that manufacturing is going to grow significantly. The manufacturing share of the economy, the growth sectoral composition of the economy is going to change. So we are making the assumption that these sectoral growth rates are covering all plausible scenarios, all plausible outcomes.

We are also making the assumption that vehicle manufacturers will offer vehicles with the fuel economies described in our attribute projections. That's the assumption that we are making in different scenarios.

We are also making the assumption that fuel production and consumption in California -- this is implied by not having an equilibrium and supply model -- has no impact on long term annual fuel prices. Fuel and vehicle substitution by California consumers has no impact on fuel prices.

And we also make the assumption -- I should clarify at this point that some of these assumptions are implied by the model, some of the assumptions are forced onto us by the input data that is available to us. This is an example of one. There is a single growth rate for aviation fuel economy. Remember, my colleague Jesse Gage is going to talk about this growth path, and we are getting that data from EIA. That's the only source that we have at this point. EIA has just one case and so it is forced on us by data.

In our commercial light duty travel, we use VMT per vehicle. We are making the assumption that this VMT per vehicle for commercial and light duty travel remains constant over the forecast period, at least that is what we have done in the past, you're going to see if there is a need to change that.

We also -- since our commercial vehicle choice model and our household vehicle choice models are separate from each other, there's no bridge between them, we are making the assumption that LDVs do not migrate between commercial and personal market segments. That is, people in the commercial sector are not -- the vehicles are not really moving. We have seen, however, one of the interesting things that we saw, we have seen, is that some of the businesses actually were buying some of the Hybrids from the residential sector during the high prices of 2008 and 2009, so it has happened, it does happen.

Another assumption that we make, which is common to all of us, all of the different divisions, is that inflation is the same for all scenarios regardless of economic growth, so we're using money inflation rate.

And we are also making the assumption, this is another assumption that is forced onto us by our data, air passengers behave the same whether they travel for business or for personal reasons. Our model accounts for the differences between personal and business travel. We know that they respond differently, but the data that we have available does not make that distinction and we are not going to make arbitrary decisions to allocate it one way or the other.

What will 2050 look like? I think the answer will be it depends. There are so many changes between now and 2050 that we cannot really account for -- we cannot reasonably account for all of them. Products are socially constructed. Consumers also participate in this construction of the products. It was a woman who actually invented the windshield wiper. She was sitting in the vehicle, could not see outside, it was raining, she used the stick and a piece of elastic from the window and tried to wipe the window while driving. It was a consumer that did that. A female California teenager actually a month ago, they were giving us the news, invented this little chip for the cell phones to be able to charge her phone quickly, she wanted to take to her friends, she didn't want to wait until the battery charges. She did that. She is a consumer and she did that. So consumers are also participating in this construction of the product, it's not just the manufacturers that are imagining these things, consumers also participate.

Producers learn from each other. Thank about all the competition, all the staff that they hire from their competitors, for instance, they bring the knowledge of others to the market. So producers learn from the consumers, from each other, and from their own experience as they keep building more things, as they make more EVs, PHEVs, they learn more and they make better products from their own experience. The scale of their production is going to change and the price of these vehicles are going to change.

Consumers learn from each other and from their peers and from the suppliers. When suppliers and manufacturers are putting up commercials, consumers are learning what this EV is good for, and when they are talking to their dealership, they learn from them. But they also learn from each other. They go onto Social Media, they recommend X, Y and Z to each other, they learn, and they have a network and they do that.

Over time, markets change, markets

themselves change in size and structure. The vehicle ownership model can change from owning a vehicle to just pay-per-use. Zip Cars are one example. Vehicle insurance models can change from primarily fixed rate to one that is a variable rate based on VMT. Progressive is using that. All of these are going to influence VMT, Vehicle Miles Traveled, because if you have to pay more for every mile you travel, then you are more likely to travel less. And more changes in institutions, road, our regulations are going to change, the price and non-price competition, state and spread of knowledge in the fuels, it's a global market, knowledge spreads in the global market. People in different places are making inventions. They are doing things. And methods of converting knowledge into technology also changes.

So this is an example. These are a few. We are forecasting 40 years from now -- and these are a few things we didn't know about 40 years ago. So don't hold your breath. We didn't know any of these would exist. Actually, Facebook founder did not exist 40 years ago. And you see that little logo on the right-hand side at the bottom, that didn't exist 40 years ago either, but here we are, and we are thankful for it. Thank you.

MS. BAHREINIAN: So I don't have as much time, so I'm going to just go over these quickly. This is a presentation that I have made before, not in the same way, but I have made, so some of you are familiar with it, so I will go over it faster.

This is for the California Light Duty Vehicle Survey. Our survey is composed of two phases, one that we call Revealed Preferences Survey, when you reveal your preferences, for instance about vehicle ownership, you tell us how many vehicles you currently own. By telling us that, you are revealing your preferences about vehicle ownership. It is also called a Recruit, so we collect a lot of demographic and economic data and personal data on how many vehicles you own, do you buy new vehicles or old, or used vehicles, etc., etc., there's just too much detail and I can't go into every one of them.

Our models, we have two models, or two surveys, actually, one that is for households and the other that is for commercial sector, commercial light duty sector. We use our survey results to update these models. So we re-estimated -- every time we do a survey, we re-estimate those models because those parameters are going to reflect different preferences, or changed preferences of California consumers. This is how it works. We have the commercial and the household surveys, so what we call as California Vehicle Surveys composed of two surveys, one that is commercial, the other one that is household.

Both of these surveys have a stated preferences component -- and I'm going to get to it and see what that means -- and a revealed preference, recruit components. So you see the two on the two sides? Those are Revealed Preferences and the one in the middle is the Stated Preferences Survey, which is the second phase of this survey.

In the first phase, we ask all those other questions, and then we also ask you, well, if you are going to buy a vehicle, what is it going to be? And they give us something, they give us, X, Y, Z. Then in the second phase of the survey, we are going to give them a number of hypothetical vehicles. Why do we need these hypothetical vehicles? Why do we need these stated preferences? Because, well, stated preferences are going to seek your insight, or seek your preferences under things that are not commercially available in the market. If we want to seek revealed preferences, we can only get information about the vehicles that are currently available commercially on the market. So if you are interested in any vehicles that are not available in the market at the present time, we are going to have to use the stated preferences survey. There are also other methods that are being used by others.

These hypothetical vehicles are described and presented to respondents in a set of 12 attributes, these are the attributes that we include on each of the choice instruments we have here. We have the vehicle type, the fuel type, which is going to tell us which fuel type it has, we have the vehicle makes and models -- we haven't had that before, so the highlighted areas are the ones we have added this time -- we want to see the number of makes and models in a specific class of vehicles, how is that going to influence purchase behavior. We have the model year, whether it is new or used, or how many years old it is, we have the vehicle price, which is provided to us by our attribute contractor, we have purchase incentives that comes from the practice in California, we have MPG and fuel economy, we have cost per 100 miles. In the last IEPR, there were continuous comments as to why are you not using cost per mile, because we were using annual fuel costs. So this time around, we changed it in response to the comments that were made in the IEPR process. So we have cost per mile, but we have multiplied it by 100 because we thought that maybe too many decimals are going to confuse respondents, and it's going to make it easier so that they can kind of calculate in their own head how much it is going to cost for 5,000 miles that they drive, etc.

We have refueling station availability, whether they are refueling at home or at work, and one of the things that we do, that is not on this slide, is that we also tell them how many minutes it is going to take to get to the fueling station, so we provide them with that information to see how the number of minutes that it takes to get to a fueling station is going to influence their choices. We have refueling time, how long it takes to refuel, and we have the vehicle range, how many miles you can go on a full tank. We have trunk and cargo space this time, as compared with last time. It's important for the commercial participants, but it is also important for household participants. We have the annual maintenance costs and we are going to see later why we have that. And we also have acceleration at the end here, asking them to choose one, and we are forcing them to choose one.

Vehicle and fuel types in the survey, we have a total of 11 vehicle types and 11 fuel types. The table here is not matching the two together, what you need to do is you want to see how many fuel and vehicle types we have. You have to multiply the 11 vehicle types by 11 fuel types, so you are going to get 121 fuel vehicle types.

Now, this time around we have added some more fuel types. So Hybrid is something that we have added. Now, this is something that is currently not available in the U.S. market, but it is available in the European market, and it is due to arrive in the U.S. in a couple of years. So we have added that. We have added CNG because, well, we have a lot of natural gas and we want to know, if we give them different CNG choices, how would they respond? And, of course, our Commissioners asked us last time to include Hydrogen, and we have done so.

The Incentives and Refueling Options, you can see all of them here. Refueling options would be refueling at home, at work, at charging stations, "fast fills," etc. Incentives are going to cover the range of incentives that we have available for these cars. In the last survey, we also had another incentive that was called Reduced Toll Rate. In our last survey, in our last model, it did not prove to be significant. And so we took it out this time and we limited it to these four categories. Keep in mind, remember, because if you are talking about rebates, some people, what they do is they just apply the rebate to the price and reduce the price, and then see what the consumers are responding to. The problem is that rebates are not received immediately, so we are telling them, "You're going to receive it in approximately six months" to kind of differentiate between a price reduction and a rebate.

New for 2012-2013 in the California Vehicle Survey is extensive collaboration and coordination. Our household vehicle survey participants were selected from California Household Travel Survey participants, from those who were going to buy a vehicle, whether they currently had a vehicle, or not, it didn't matter, and were willing to participate in our survey. We have 3,500 plus households selecting from 42,000 plus households that participated and completed California Household Travel Survey.

There is extensive collaboration in this effort that should not be underestimated. We designed and executed as a result of this a shorter add-on survey instead of our long Revealed Preferences and Recruit Survey that we had last time, and in order to fill the data gaps. We collaborated and coordinated with Caltrans on survey design, so we integrated the two designs, on execution of survey and on data collection for our household surveys. I'd like to take the opportunity at this point and thank Caltrans for taking the lead in this and for their initiation of the initial conversations about collaboration back in 2008. We have been working together since 2008 and the survey was completed on June 14th of this year.

I would also like to thank our own Commissioners and Management because they fully supported our effort, both in terms of funding and staff time.

We have also in this survey collaborated extensively with ARB. And our collaboration with ARB has been mostly on the survey design and the survey instrument design and the vehicle attribute values. So we gave all these different attribute values to our consumers on those choice sets. We worked with ARB and we came to an agreement on what the values of those attributes should be.

So this is the relationship between Vehicle Survey and the Travel Survey. And these are some key differences in design. CHTS, California Household Travel Survey, is an address-based survey. What that does, it's going to enable us to include cell phone only participants, so we don't have as much bias as ones that are based on landline phones. This time around, we combined the two phases of our survey into one for our online participants. We built an algorithm into the design, into the Web, so that they go in once, they take the survey, and they are complete, they don't have to do it twice.

We changed a measurement of refueling station availability, we added those minutes, we added and revised other attributes, we added questions on solar energy, this is resulting from our collaboration, our work with PH&EV Center at UC Davis. Their studies showed that the people who are buying EVs are also the people who have solar panels -- not all of them, but a good percentage of them. To make sure that we are capturing that angle of it, then we added questions on plans of the households to buy solar panels, or their existing solar panels. We also differentiated this time between leased vehicles and the vehicles that have been purchased in the Revealed Preferences Survey data.

For the first time, our focus group was conducted in Spanish, so we had one focus group that was conducted in Spanish. And for the first time, our main survey was conducted in both

English and Spanish.

What I have here, as you can see the source, this is coming from California Household Travel Survey. What it does, it tells you the percentage of households that have zero vehicle, one vehicle, two vehicles, or more. As you can see here, the majority of people, 64 percent, have two or more vehicles. But look at the column on the left side of the first table. You will see trips per household, per person, per day. If you look at that, you would see that the people who don't have vehicles, and those who do have one vehicle, have the same number of trips. But on the other hand, when you have two vehicles, the number of trips are going up. But if you have three or more, the number of trips per vehicle, per day, per person, is going to go actually down. So it is not a linear relationship, you cannot really make an assumption that the more vehicles you have, the more trips you are going to have. It is a non-linear relationship, the relationship is not linear.

On the right-hand side, what I'm giving is the reasons for no possession of a vehicle, why is it that you don't have one. In this case, well, they are telling us it is too expensive to buy, you just can't buy it. And look at the third row, it says too expensive to maintain for gas, insurance and repairs. So 33 percent of those who don't have a vehicle, they don't have it because they don't have money, in essence. Other reasons relate to land use and health reasons, etc. Among the other, I should add, there are three percent, I believe, who did not have vehicles for environmental reasons, so there is also that portion of the population. You can see the full result of California Household Travel Survey, they have a lot of interesting data on that.

From our focus groups, we have learned a lot of stuff. I can't go through the whole thing, but you have this data and you can read it. What we can say is that people in the Bay Area behave differently. Even the businesses in the Bay Area are using more hybrids. We had some business participants in the San Francisco focus group who came in and they were telling us that they were buying hybrid vehicles specifically because, first of all, it's smaller and they can park it on San Francisco streets better, but also, more importantly, because they were going to save on fuel. Now, these are businesses doing this.

We also had another aspect, there were two of the businesses who were realtors, one was a realtor and the other one was a salesman, and they wanted to just buy BMW and Mercedes, they were after style, and you can't really associate that readily with these group, but that's what happened in that area; if you have clients, you want your car to look good.

Our commercial focus group are actually more focused on fuel cost, and particularly in the San Francisco area, they switch over to hybrids in order to save fuel, and they are open to alternative fuels. And they also see, some of them in Los Angeles, they see permit and process issues as a barrier to obtain and provide refueling and recharging options at work. So that was something that they noted.

Then, as some of you can read -- I'm sorry I have to go through this fast, but if anybody is interested, I can respond to those questions -- our focus groups also had an input that was actually, I think, important for a lot of people. Both businesses and households showed little awareness of public policy and incentives -- that's important. They suggested -- this is our focus group participants -- they suggested to us to use billboards, social media, talk radio, Internet and media, to communicate public policy and incentives. They also suggested, rather than you telling us what these incentives are, have manufacturers and dealers communicate fuel and vehicle incentives to us. Their current awareness shows that there is definitely a need for education, and we keep finding this over and over in different surveys, they did not want to be guinea pigs.

Our 2009 models showed that vehicle price is the most significant, both to households and businesses, so if you really want people to buy things, make the price competitive, that's the first thing. Households in San Francisco have higher preferences for Hybrids and EVs; that's not a surprise. Households in Los Angeles have higher preferences for sports cars. Tax credit was significant to all households. And all incentives, except reduced tolls, were significant to households with more than one vehicle. So it seems like tax credit is really the winner here.

Agriculture, manufacturing, construction, and utilities industries prefer diesel. All industry groups have higher preferences for standard trucks, followed by compact trucks, SUVs, and vans. You see, these are all big cars. Interestingly enough, what we didn't expect was that HOV lane use was the only significant incentive for businesses, and it makes sense because, well, time is money for business, and HOV saves them time.

I have to quickly go over this. I just wanted to also show some of the complications in defining what a household is. A household is defined by Census and everybody meets a standard practice composed of the number of people occupying a house and sharing a kitchen. As you know, many of you know, during the recession a lot of the households, a lot of the family members huddled together into one house, so if you really define household in this way, what that means is the number of households have declined during the recession, that's what it means. Now, what do we do with these things? Well, we have identified for our models, for fuel consumption there are four factors that are important, that we include in our equation: household size, number employed, household income, and number of vehicles. Right? So what we do, we take all of the California households, the many millions of households that we have in California, we can't run them each individually, we have to compose them into what we call Synthetic Households, and this is how we are filtering everybody through these funnels and we are creating our 362 Synthetic Households. That is going to enable us to forecast what their numbers are going to be in the future, and then we make the assumption, the implicit assumption here is that all of the people in the synthetic households have the same set of preferences.

Next steps. Our survey is currently in progress, we have not yet completed the Household Survey, but we soon will be, we have good numbers right now. We are evaluating a number of modeling options, so what we want to do, the integrated travel and vehicle survey, the work that we did with Caltrans is unprecedented, it's a pioneering work, there has never been a travel survey that has been integrated with a vehicle survey. What that means is that we have both detailed travel data and vehicle preferences data for the same households -- not for different households, some of them in 2010, some of them in 2006, some in 2013 -- all of them in the same year for the same group of households, residing in the same places. This has actually magnified our ability to create better models. It's not going to be part of the 2013, but we are looking into ways -- into different options of using models that truly integrate the travel and vehicle choice. In other words, we are going to convert those from separate models into one model, and call it Vehicle Choice and Utilization Model. And we are now working with UC Davis in order to examine different options that we could have for 2015 and beyond. Any questions?

CHAIRMAN WEISENMILLER: Yeah. Do you get any of the high speed rail market surveys? And how does high speed rail fit into our forecast?

MS. BAHREINIAN: Our previous forecast did not include high speed rail, and this time, because our models do not include high speed rail in the existing models, for the future models we will, but for the existing models we don't. And so we are going to have to do some kind of post-processing in order to get numbers for high speed real projections; that's the only thing we can do at this point. And our models have to calibrate to, say, 2011, but high speed rail is not there yet, it's not going to be there until 2017, so whatever we do is going to be problematic. But we're going to do something, we are going to make some effort using some kind of post-processing to account for that.

CHAIRMAN WEISENMILLER: Yeah, and I would just encourage you to reach out to the High Speed Rail Authority so we can build off of the analysis they have done.

MS. BAHRAINIAN: Sure. Any other questions?

COMMISSIONER MCALLISTER: I just wanted to understand a little bit more your sample and sort of who were in those focus groups that you did. So did you make sure to sort of include owners of all the different kinds of technologies in that and sort of drill down into their sort of group-wise behavior issues, you know, how they chose their cars and how they use their cars?

MS. BAHRAINIAN: We tried to include them, but for us the most important factor was whether or not these are going to buy a vehicle in the future, that was the fundamental criteria that we used, and then keep in mind one of the things that we also wanted to alert everybody is just don't use all of those focus group results that I have said at its face value because those are just focus groups composed of 10 people in each group. We had six groups in Northern California in San Francisco, in Sacramento, and in Los Angeles, they included both businesses and households. But there were only a few people in those focus groups. So we just wanted to kind of test the instrument and see how the instrument looks to them, whether it is clear, whether they understand, whether they think -- one of the things that we learned from them is that, you know, in our past survey what we had in terms of fuel availability, fueling station availability, was like one in 50 stations, or one in 20 stations. We kind of tossed that to them and said, well, how does that sound? They didn't like it because, well, how could you judge one in

50, what does that mean to me? So what we asked them, all right, what is it that matters to you? And they said, "Well, how many minutes does it take me to get to the fueling station?" And hence we have added that element to it.

COMMISSIONER MCALLISTER: Okay, yeah. I mean, I think it's understood that focus groups don't produce sort of statistically meaningful results --

MS. BAHRAINIAN: Yes, yes.

COMMISSIONER MCALLISTER: -- and that's fine. I guess I'm interest --

MS. BAHRAINIAN: And for others I was just mentioning.

COMMISSIONER MCALLISTER: -- yeah, so for the modeling, I can see how it wouldn't be completely relevant and I think moving forward and sort of thinking about market transformation and policies to promote it, you definitely want to be a little bit more in ahead of the people who are actually leading the charge to adopt some of these vehicles, and so I think there is some work at UC Davis and other places about that sort of behavior of the adopters, themselves.

I guess one other question I would have, so you talked about the Caltrans work, which I think is great, and is that related in any way to the Transit Agency Survey? And I wanted to get a little bit of a sense for what the relationship between this work and the RTOs is, say the -- regionally in how relevant this is, and is there a resource being developed here that we could push to them to help them in their regional planning?

MS. BAHRAINIAN: I should say that one component of the travel survey was what was called Travel Diary, and in that Travel Diary they were inquired about if they have used transit, did they use transit subsidies, how many times did they use it, in one day did they use it for the whole day, or did they use it for just part of the day. Did they use it for their work, or did they use it for other activities, too?

So there was an extensive transit component and one of the -- I should also add, in addition to CEC that was one of the partners, there were a number of MPOs that participated in this collaborative effort, and one of those MPOs actually had an onboard transit survey that was added onto it, just like ours was, and they also added another component that was purely focused on onboard transit survey.

In response to your earlier question, I should also say that -- a lot of people have forgotten about it -- but as part of our efforts, we also added -- CEC added -- funding to Caltrans to conduct what is called a GPS OBD augmented vehicle survey. What we did, we paid for OBD devices and GPS devices to be loaded onto people's vehicle so that we can see how their driving behavior is, we can have data to measure fuel economy, and do a better job of measuring fuel economy. And CEC's contribution to that, because it was part of the overall survey, CEC's funding was specifically focused on renewable and alternative fuel vehicles. So as a result of our funding, we have an increased number of participants in this GPS OBD Survey that have renewable fuels vehicle, and the data came from our own DMV data and we sampled from the population of the people who currently own EVs, PHEVs, and other alternative renewable fuels.

COMMISSIONER MCALLISTER: That's great. That's going to be a great resource. I hope we can leverage that to do some learning and figure out -- sort of shape our overall suite of transportation policies going forward.

I would just point out, SANDAG is the transportation planning organization and the MPO and I think that gives them kind of a special case because they do marshal a lot of funds and work very closely with Caltrans, and I think in a case where the transportation planning is being done, well, just those organizations really -- it could be a bidirectional flow of information and work that could really help on both ends, and so would encourage that. And I know you're doing a lot of that already.

MS. BAHREINIAN: Actually SANDAG, SCAG, Southern California Association of Government, SACOG, MTC, all of these were participating in a survey, everybody participated in the design, and they also had participants from SANDAG, as well.

COMMISSIONER SCOTT: I had a couple questions also. One was on the survey that you did, the survey instrument.

MS. BAHREINIAN: Yes.

COMMISSIONER SCOTT: And I noticed that you had one model available of battery electric vehicles and I was just wondering why you picked one, I know that there are several options out there.

MS. BAHREINIAN: Well, the way we do the survey is that we give them eight of these -- the sheet that you see in front of you is just one of the eight sheets that they will see, one of what we call "choice sets." So in the next choice set, in other choice sets, what we do is we change this from one to two to three to four, to whatever we have decided, and then we see if they are going to respond differently.

COMMISSIONER SCOTT: Thank you for that. And then the other question I had was actually from your first presentation. And it was an assumption that the commercial vehicle miles traveled was going to remain flat across out to 2050, and I know reducing vehicle miles traveled is a good strategy for reducing emissions, but typically it seems like vehicle miles traveled go up, and so I was wondering why you made that choice there.

MS. BAHREINIAN: It's just in the absence of any other projections, that's the only reason, otherwise there is really no good reason to make that assumption. But we don't have any good source for a protection of commercial vehicle miles -- light duty vehicle miles traveled. That's why we are doing it. If anybody else has any other source, we are all ears, tell us. Any other questions?

COMMISSIONER MCALLISTER: I think we're good. Thank you very much.

MR. EGGERS: Good morning, Commissioners. My name is Ryan Eggers. I'm an Energy Commission Specialist in the Transportation Energy Office and I'm here to present our Proposed Crude Oil Prices and Transportation Fuel Price Cases for the upcoming 2013 IEPR.

Just a recap of what we discussed back in February, the process by which staff has chosen to go about making these different forecasts is to first assess the different crude oil price forecasts that were out there in the industry. After looking at all of these different crude oil prices which we presented to you back in February, Staff chose to use the EIA's Annual Energy Outlook 2013 Price Projections as having three cases that best fit the Energy Commission's forecasting needs to this upcoming IEPR. We then told you that we intended to use historical analysis of the difference between Refiner Acquisition cost, which is another word for crude oil prices, and the different petroleum retail fuel price pre-tax price points in order to come up with some sort of margin to add to these different crude oil prices in order to take it to a its pretax retail level.

We also consulted with other offices within the Energy Commission on prices for natural gas and Hydrogen, as well as electricity rates for EVs. We also talked to outside experts from the Commission in order to get advice on different retail fuel prices, especially for alternative fuel prices, and these are most noticeably shown in the Hydrogen fuel price points.

So moving on to our Refiner Acquisition Cost Cases, these came from the EIA and they all started roughly about $100 a barrel of oil in 2012, inflation adjusted dollars, and the case is a high case, we do have a near term quick rise in crude oil prices, and they finish off at just under $300 a barrel of oil in 2050.

In the reference case, we again start at that $100 a barrel of oil price point, and then it gradually increases to just under $200 a barrel of oil in 2050, and then in the low case we have a near term drop in crude oil prices, roughly in the $70 a barrel of oil area, and then that price point is kind of maintained until the end of the forecast out into 2050, finishing off just under $75 a barrel of oil.

As you can see below, there is a table of the actual price points of these different forecasts, inflation adjusted in 2012 dollars that you and the audience can view at your leisure.

Just looking at these different proposed refiner acquisition cost cases and compared to natural gas price cases produced by the Electricity Analysis Office, what you quickly notice is that our price cases are much more widely varied than those being produced by the Natural Gas Office or the Natural Gas Unit. And that's not to say that the spread in natural gas prices are inappropriate in any way, it just shows you how much these two markets have changed over the last five or six years.

Previously, these two different markets were at some level closely linked with rising and falling in sort of the same sort of manner, but with the increased use of hydraulic fracturing in the natural gas market, there's been a glut of natural gas supply in the North American market, helping to depress natural gas prices, thus they become less responsive to demand. This is not the case in the crude oil market, where prices for crude oil here in California are still very much linked to the world crude oil market. And because of that, things such as geopolitical events, world supply demand fundamentals, and the increased development of emerging economies and the added demand that those economies would place on the demand for crude oil, have a great influence on different crude oil price cases, and thus you have much more variation in future price points for crude oil.

That being said, now that we have some crude oil prices to work with, the next process or the next step that staff goes through in creating our retail price forecasts is first to derive from retail prices for the three primary fuels derived from crude oil. And these would be gasoline, diesel and jet fuel prices. And as I mentioned before, we used historic analysis of the difference between Refiner Acquisition Costs and pre-tax retail prices for both gasoline, diesel and jet fuel, and we calculated those margins at different times and then used an average of certain time periods in order to come up with margins for the three different cases. After we come up with those different margins, we then add the proper California and Federal tax fees to the end of those prices in order to generate a final price for gasoline, diesel, and jet fuel.

A quick note: gasoline and diesel taxes have changed in recent years. Back in 2010, the excise tax for gasoline was increased, whereas the excise tax at the state level for diesel was decreased in 2011, and I'll show you what those new values are, a few slides from now.

There are some assumptions we do make in doing these particular forecasts, the first in real terms, we do keep the margins for these particular fuels constant in 2012 dollars throughout the entire forecast. That's not to say that they wouldn't be growing nominally, it's just any sort of growth that would occur would be occurring from inflation pressures, and I'll show you why we did that on the next slide.

We also made the same decision as far as excise taxes and fees, and the reason for this is, even though history shows us that these excise taxes don't change very often, most of the transportation infrastructure both in California and at the U.S. level are paid for through these excise taxes, and thus when you factor in inflation, their relative value seems to erode over time. Keeping them real in constant dollars increases these values due to inflation pressure, and thus models in the need to raise these taxes over time in order to help pay for those infrastructure improvements.

We are also assuming that current gasoline and diesel formulations remain constant throughout the entirety of the projection. We are aware that there is talk of E15 entering into the market, but there are some legal insurance and logistics difficulties in going to that E15 blend. And until those difficulties are worked out, we have just chosen to keep the current gasoline and diesel formulations constant through our entire forecast.

We have also included in these prices both carbon prices and, in the future, once we have some sort of adder for the Low Carbon Fuel Standard, we'll be putting those in, as well, at this time, we don't have that. That being said, we are using the same carbon price forecast produced by the Electricity Analysis Office and we are making an assumption that 100 percent of that carbon price is being passed through to the consumers of these different fuels. That being said, if any stakeholders have any thoughts or comments, or even the Commissioners have any thoughts or comments on this particular subject, we would be interested in hearing those.

Now, back to the retail margins. One of the reasons why we have kept gasoline, diesel and jet fuel margins constant through time is, as you see here by the bars, these are the margins for these different fuels at different points in time from 2000 to 2012. The green line you see on this particular graph is Refiner Acquisition Cost or the price of crude oil and, as you quickly notice, margins for both gasoline and diesel have sort of stayed within the $.70 to $.90 range, sometimes getting above $1.00 in certain cases. But for the most part, in comparison to the increases in crude oil, they remain fairly constant once we adjust for inflation. Crude oil during that time started off at just under $1.00 per gallon in 2000, then rose to just under $2.50 a gallon in 2008 before dropping in 2009. Now, in 2011 it's back up to $2.50. And as an economist, my natural inclination is to put these sort of variables into some sort of regression formula, and when you do that, you find that roughly about 95 to 99 percent of all the variation in retail fuel prices comes from the price of crude oil, thus we've made the decision to keep the margins, which is a much smaller percentage of the variation in these retail prices constant for our forecasting purposes.

So here are the margins we generated. In the case of all three of these fuels, we use the same historic averages in order to create these different margins. In the case of the reference, it was a 2003 to 2011 time period which generated the reference case margins for both gasoline, diesel, and jet fuel. And in the high case, it was a time period between 2003 and 2008, which gave us our high case margins. In the low case, it was an average margin value between 2009 and

2011, which generated our low case margins.

As I mentioned earlier, after adding the carbon price forecast into these calculations, we then add in the proper Federal and State Excise Taxes. In the case of gasoline, the Federal excise tax rate is 18.4 cents a gallon, then there is a $.36 State Excise Tax which rose from $.18 back in 2010. The sales tax on gasoline was then lowered to roughly 3.25 percent, adding all that in along with a $.02 underground storage fee gets us to our final retail price for gasoline.

In the case of diesel, the Federal Excise Tax is a little bit bigger, it is 24.4 cents. The State Excise Tax in 2011 was lowered to roughly $.10 with a State sales tax of 10.44 percent added to get to our final diesel price. Also of note, the $.02 underground storage tank fee was added into that calculation, as well.

Our jet fuel numbers are untaxed, and the main reason for that is common carrier jet fuel is tax exempt per Federal law, thus we don't put in any sort of tax on our jet fuel numbers.

So to see the gasoline forecast that results from this methodology, what you see is all of our prices in 2013 in inflation adjusted

2012 dollars started roughly $4.00 a gallon. Looking at the solid unbroken lines, in the case of the high case, which is the red line here, it quickly rises to roughly about $5.50, and then continues to rise matching the rise in crude oil prices, all the way to roughly about $10.00 a gallon in 2050. In the case of the reference case, the near term growth is not as great, and thus you have a much more gradual rise in crude oil prices, resulting in a 2050 price of roughly $6.00 a gallon, in the low case, again, matching the crude oil prices, we have a decrease in the gasoline prices down to around the $3.50 area which has been maintained through the entirety of the forecast.

Now, all three of those forecasts are in inflation adjusted dollars, which doesn't account for increases in inflation over time; instead, the prices at the pump that most people would see would have inflation factored in. And when we do that calculation using a CPI forecast given to us by the Demand Analysis Office, what we see is that in the high case we have a price point of $4.00 a gallon starting in 2013, and then on the price point that people would see out in 2050 due to inflation would be closer to $22.00 a gasoline gallon. In the reference case, again, we have started that $4.00 a gallon level and then it would rise to $16.00 a gallon. In the low case, you would never have that decrease in gasoline prices, instead you would have a little bit of an oscillation in the early years, and then the $4.00 gallon level would rise all the way up to $8.00 gallon in the low case.

Looking at diesel and jet fuel prices, because the margins are so similar for diesel and gasoline, much of the change in the diesel prices are similar to those seen in the gasoline prices. That being said, the jet fuel prices, because they have that lower margin, as you saw a couple slides ago, and because they in fact started at a much lower level, instead the price of jet fuel starts at just under $3.00 gallon, and in the high case rises to just above $7.00 gallon in 2050. In the case of the reference case, again, this pattern of price growth matches what we see in the crude oil prices, rising to just above $5.00 gallon in the reference case in 2050, and then in the low case we have a deep decrease in jet fuel prices from just under $3.00 gallon down to the $2.00 gallon area, where that price point is maintained all the way until 2050.

After calculating the retail prices for the three fuels that are derived mainly from crude oil, we have three other prices that seem to be linked on a retail level to the price of crude oil, these would be E-85, B5, and Propane.

Starting with B5, since B5 is a perfect substitute for diesel, and our limited historic information tells us that, on average, it tends to be priced the same price point as diesel, in our forecast we have chosen to price B5 as the same price as diesel in our forecasting methodology.

Moving on to Propane, Propane is a derived fuel from both crude oil extraction and natural gas extraction. That being said, the limited historical information we have on retail Propane seems to indicate it's a little bit more closely linked to crude oil. And in order to get to our final Propane retail numbers, we first multiply the crude oil prices by 84 percent in the case of the high end reference case, to get us to a propane gallon wholesale price. In the low case, we multiply the crude oil price by 73 percent in order to get to that wholesale price. In all three cases, we then add a $.58 retail margin to that particular price in order to get it to a pre-tax Propane gallon price. Excise taxes and then sales taxes are then added in order to get it to its final dispensed transportation retail price.

In the case of E-85, historic information tells us that sometimes it's related to the crude oil prices, more specifically to gasoline prices. Other times it seems to be more linked to commodity prices, or the commodity price for ethanol. But because at the retail level the users of E-85 flex fuel vehicle owners are indifferent between both gasoline and E-85, we have decided for our price projection methodology to just price E-85 at the same energy content price equivalency level as that of gasoline. And in order to get to that particular price, you basically divide the final gasoline price with tax by 1.37 in order to get to the E-85 energy equivalent price.

The resulting price is based on this methodology. As you can see, the B5 price is perfectly overlapped with what would be the diesel prices. But because of this forecasting methodology, both the Propane and E-85 prices start at a price level more equivalent to what we saw for jet fuel. Both start at that $3.00 gallon, and that's for native unit level, and in the low case, both of these, both the Propane and E-85 forecasts, sort of overlap each other at roughly the $2.50 area.

In the reference case, both of these forecasts rise, both the E-85 and Propane rise from $3.00 gallon to $5.00 gallon in the case of the E-85, and a little bit under $6.00 in the case of the Propane gallon. In the high case, once again, matching the rise we saw in crude oil prices, we have E-85 increasing to roughly about $7.00 a gallon in inflation adjusted dollars where the price of Propane rises to roughly $8.00 a gallon in 2050 in inflation adjusted dollars.

That concludes the six fuels that are related to crude oil prices within our forecast. The next three prices are tied to natural gas forecasts done by our Electricity Analysis Office. We are proposing to use the same methodology we used in both the 2009 IEPR, as well as the 2011 IEPR and the methodology is very similar to what you saw used for gasoline and diesel, where we have that base commodity price and then add a given margin to that price to bring it to a pre-tax level.

In the case of CNG, we are using the California PG&E Hub prices provided to us by the Natural Gas Unit in the Electricity Analysis Office; in the case of the reference case, we convert the Hub price into a therm price, and then add a $1.32 per therm margin to the reference price. In the case of the high, it's a $1.45 margin we add to the natural gas price. And in the case of the low, it's a $1.13 margin we add to the low case per therm forecast. We then convert these different forecasts into their GTE equivalency price, and then we add an 18.4 GTE tax for Federal road excises to that price, and then an 8.25 California sales tax is added to that particular price.

In the case of electricity, a lot of the feedback we got from different stakeholders is that they did not want to penalize electric vehicle users for higher rates that their electric vehicles might incur from their use, thus we have just made the decision to use the

GDE conversion of the Demand Analysis Office's retail price projections, and we're just going to put those into our transportation models as the price of electricity for electric vehicles.

Finally, in the case of Hydrogen, Hydrogen currently in the United States is produced mainly from natural gas, thus we've made the decision to link it to natural gas prices from the Electricity Analysis Office. We'll be using the same PG&E Hub price cases that we used for CNG. In this particular case, we have two different methodologies we use, one methodology we use for both the low in the reference case, and this comes from actually a 2012 EIA study, not a 2009 EIA study, it was based on 2009 data, but it comes from the EIA. And in that study, we were able to tease out different margins for the two different cases. In the case of the Hydrogen reference case, we are using a $2.46 per kilogram margin to add to our Hub price in order to get it up to its pre-tax kilogram price level. And in the low case, we're adding a $2.26 margin. But before that happens, we multiply the cubic foot Hub price by .39 in order to turn the natural gas into a wholesale Hydrogen per kilogram level, and so once that calculation occurs, then we add the margins, and then we add an 8.25 percent California sales tax to bring it up to its final retail level.

In the high case, we're utilizing the same methodology we used back in 2009 and 2011, this methodology starts off as adding a .24 percent reforming adder cost to the Hub price. We then add a $3.06 GGE margin to that particular cost in order to take it to its pre-tax retail level, and then we add sales tax to get it to its final Hydrogen price.

These different methodologies result in these particular forecasts. What we see here is, because of the relatively low natural gas prices, CNG prices in all three cases are less expensive than their gasoline counterpart. In the case of the high case, Hydrogen starts off as the more expensive option on a GGE basis, earlier in the forecast, and then this dynamic sort of changes in 2020 where then Hydrogen becomes the least expensive option on a GGE basis for the rest of the forecast.

In the case of the reference case, for much of the forecast Hydrogen is more expensive than gasoline, but then in 2040, this relationship changes where Hydrogen then becomes less expensive than gasoline on a GGE basis for the rest of the forecast.

In the case of the low case, because of the low crude oil prices, the price of gasoline is always less expensive than Hydrogen in this particular case, with a difference of around $2.00 a GGE out in 2050 occurring at the end of the forecast.

In the case of electricity, electricity prices within using this same methodology and once we turn the demand analysis forecast into GGE levels, in every case electricity is always more expensive than gasoline. In the case of the high, the difference is very small, close to 20 to 30 cents, but as we move down into the reference and low case, the gap becomes bigger and bigger, the difference becomes roughly about $2.00 a GGE in 2050 in the case of the two reference cases, and in 2015 the case is low, it's closer to about $4.00 a gasoline gallon.

Now that being said, all the calculations I've presented to you do not account for the efficiency of the vehicles in any way, shape or form. These would just be energy content similar basis for the most part. That being said, as Electric Vehicle advocates would be quick to point out, if we were to use, say, the EIA 2013 Annual Energy Outlook miles per gasoline gallon equivalent projections for new vehicle forecasts -- in this particular case it would be the compact vehicle forecast -- we find that Electric Vehicles tend to be closer to four to three times more efficient than their gasoline counterparts. And once we add that into our calculation, we find on a cost per mile basis, many of these different relationships tend to change.

The most noticeable relationship to change if we were to add into the efficiency of the model is the difference between electric prices and gasoline prices on a cost per mile basis. Before, on the GGE basis, Electric Vehicles were always more expensive to drive as far as energy content, but when we factor in the efficiency of the vehicle, now electric vehicles in all three cases become a more efficient vehicle to drive on a cost per mile basis. The same sort of swap occurs for Hydrogen where, before in the high case, in the near term, it was more expensive than gasoline; now, once accounting for the efficiency of the Hydrogen vehicle in the high case, it's always less expensive on a cost per mile basis to drive a Hydrogen vehicle, as opposed to a gasoline vehicle, and this would be for compact vehicles specifically.

The same sort of swap happens in the low case, or in the reference case where for much of the forecast on a GGE basis, Hydrogen was more expensive than gasoline. Now, once we account for the efficiency of the vehicle, our cost per mile basis in the reference case, Hydrogen will always be less expensive to drive than its gasoline counterpart.

Now, also the same sort of swap sort of happens in the low case, as well, where in the near term Hydrogen vehicles are less expensive to drive once accounting for the efficiency of the vehicle in the low case. Then in about 2020 this relationship changes as crude oil prices drop, and the efficiency of gasoline vehicles in this particular forecast improve. Then towards the 2020 to 2040 timeframe, gasoline vehicles become more efficient in the low crude oil price case to drive, then, their Hydrogen counterparts.

So taking this cost per mile basis calculation into mind, I have two graphs here, one showing a retail or a GGE basis of our different price forecasts, along with what their cost per mile basis counterparts would be if we were to use the efficiency values of compact vehicles found in that EIA forecast.

Our retail basis and our reference case, electric vehicles on a GGE basis, our electricity would be always more expensive than gasoline, followed by transportation Hydrogen would be the next most expensive option in the near term than later in the forecast, both diesel and gasoline overtake the Hydrogen price, becoming the more expensive option on a GGE basis in order to drive.

The crude oil-based alternative fuels come next and they're all very closely lumped together within our forecast, and then CNG because of those low natural gas prices are the least expensive per GGE option as far as fueling. Once we account for cost per mile, now gasoline is the most expensive with diesel being a very close second, especially towards the end of the forecast.

Hydrogen is the next best option as part of this drive, but because of the relatively decent efficiency values for transportation natural gas, compressed natural gas, it is the second most efficiency vehicle to drive as far as using these particular price forecasts, electricity being the most efficiency to use.

We see the same sort of similar results in our high energy price forecast. The only little caveat here is diesel is the most expensive fuel on a GGE basis in our high price case on a retail basis. Hydrogen in both hydrogen and natural gas have relatively flat values, mainly due to the natural gas forecasts we are currently using with, again, our alternative fuel prices that are linked to crude oil falling somewhere in between. That being said, in our high price case, because of those high fuel prices, gasoline and diesel on a cost per mile basis are the most expensive vehicles to drive in this particular case with electricity once again being the least cost alternative in our high price case.

Finally, in our low price case, again, electricity, the most expensive option, with now the crude oil derived alternative fuels being our lowest option. Gasoline and diesel fall sort of in the middle of these different price bands as far as this particular price case. But, because of those good efficiency values, once we go to the cost per mile basis, electric vehicles are the most efficient to drive, somewhere in the three to four cent a mile basis. Hydrogen now in this particular case, towards the end of the forecast, would be the most expensive option to drive.

The finally three slides I don't plan on presenting, these are just the reference price cases that we intend on putting into the system, they're both in native unit, or GGE unit, whether they're specified, and then we have a reference price table as well as a high price table and a low price table.

At this time, I would like to open it up to questions for the dais, and then to the audience as a whole.

COMMISSIONER SCOTT: Hi. I had a question about the very -- about the third slide that had the low price case for imported crude oil, kind of really steady all the way out for 50 years, and I was wondering just a little bit more about how you came to the conclusions that put that to get --

MR. EGGERS: Well, these price cases come directly from the EIA, and what's driving this particular price case is low world demand in this case. When I looked at all the different supply scenarios for these three different cases, there wasn't a lot of change, especially here for the North American market. There's not some sort of fracking revolution that we're seeing worldwide that's depressing that price, it's really emerging markets not coming into play and really forcing up demand, and thus the price of crude oil in that particular case.

COMMISSIONER SCOTT: Thank you.

COMMISSIONER MCALLISTER: So I guess I'm wondering, 2050, boy, looking at even six months for some of this stuff is difficult, and 2050 is a long way off. So I guess I'm wondering where sort of functionally what the cutoff date decision looked like, you know, how did you decide to make it 2050 and not 2030 or some other year.

MR. EGGERS: Well, I didn't actually make that decision, the decision was made at a higher level than me that we were going to compare our work, or our forecast to more --

COMMISSIONER MCALLISTER: I'm not saying there's a fundamental problem with that, I'm just wondering.

MR. EGGERS: Yeah, 2050 was more of a necessity to meet. That being said, the EIA's forecasts only go up to roughly about 2040. I did use some linear extraction techniques to get this out to 2050 and it's basically based off a five-year compound average growth rate for the last couple of years of each forecast in order to get it out to that location. But it was really something that was kind of imposed upon me from upper Management that we wanted to go out that far.

COMMISSIONER MCALLISTER: Okay, so, yeah, I don't remember making that decision, but maybe somebody else did. But, really, it's almost like a self-preservation, right? You just get more wrong the further out you go, so --

MR. EGGERS: I agree with that in --

COMMISSIONER MCALLISTER: But this is an incredibly difficult -- nobody has the crystal ball and it's a difficult thing to do, just fundamentally, so I'm sympathetic. On the operating costs chart, I just noticed, I mean, it's obvious from it that obviously both the kind of mid-range prices are quite different, well, at least certainly electricity is lower, and then the range for the fossil cases is much wider than for the electricity and the hydrogen. And I guess I just want to confirm, is that essentially both of them are -- I mean, the electricity presumably is the forecast for the electricity forecast, and then natural gas is driving the hydrogen cases?

MR. EGGERS: Precisely. That being said, both of these were the latest versions I had of those two forecasts, both are looking to be revised by both the Demand Analysis Office and the Electricity Analysis Office. But in the case of hydrogen, yes, it's being driven by that relatively narrow price band occurring in the natural gas prices, where electricity to a certain extent is also linked up with natural gas prices and, again, that tight band is sort of giving those very narrow results.

COMMISSIONER MCALLISTER: Yeah, okay. This is an interesting piece of this puzzle. I guess then you've got sort of the cost of ownership overall, which is a much broader question, and I think to the extent that we're concerned about figuring out adoption and sort of long term scenarios, you have to kind of do both, so rolling that up.

MR. EGGERS: And our models do kind of wrap all of those different issues kind of into one calculation and we also look at things such as range, price on the general performance of the vehicle, usually we measure this in acceleration. We also notice, you know, when looking at the survey work that Aniss does, that vehicle owners tend to have a preference towards dual fuel-type vehicles, those tend to score very well in our surveys mainly because they give consumers options as far as what type of fuel that they want to use.

COMMISSIONER MCALLISTER: Right. Yeah, great. Well, thank you for the clarifications. I appreciate it.

All right, well, thank you very much. Does the agenda include some questions from others than us? I know we're a little bit behind schedule here, so I want to kind of keep things moving.

MS. STRECKER: So it's noon now. Do you want to break for lunch now? Or do you want to plow through Ryan's second presentation? I think that should only be about 15 minutes.

COMMISSIONER MCALLISTER: I tend to want to go ahead and finish, get through the morning and actually maybe that will be good for the Chair and I to not be gone during presentations and only be partly gone during lunch, so if you will bear with us.

MS. STRECKER: So we will plow through, then.

COMMISSIONER MCALLISTER: Great. Thank you.

MR. EGGERS: My next presentation has to do with the 2011 California Vehicle Stock estimates that we plan on using for the 2013 IEPR. The reason we're using 2011 is it's our base year for most of our other information, especially our demographic information. Most of our demographic information is usually two years behind, thus we try to calibrate to that 2011 or two years behind timeframe for each and every IEPR.

As Aniss mentioned earlier, our vehicle counts come from the Department of Motor Vehicle Registration Database. We get copies of this particular database twice a year, once in October and the next in April. That being said, every year's worth of vehicle stock calculations tend to be or are calibrated to the October file. The reason we have an April file is to correct some pending statuses that we see within the information, in order to make sure we have as many registered vehicles in our counts that are likely out on the road in any given year.

That being said, there are some differences between our DMV reports on vehicle counts and the Energy Commission vehicle count estimates, and most of these differences arise from how we approach the status codes as opposed to the expiration date. In the case of DMV, they use status codes in order to generate how many currently registered vehicles are out on the road in any given year.

Here at the Energy Commission, we use the expiration date as the basis for deciding whether a vehicle is registered. If a vehicle then has a pending, but an expiration date that is before a particular timeframe, we then look at the April file in order to add them back to see if they've actually during that time period re-registered their vehicle.

Now, here at the Energy Commission we perform a lot of different types of analysis with this information. This includes obviously the vehicle counts that I'm presenting today, but we do vehicle fuel type distribution analysis, as well as ownership type distribution analysis. This information also forms the base information for our vehicle preference surveys and numerous other studies are done with this information. This work has occurred here at the Energy Commission for the past 20 years, sometimes via contract from an outside contractor, recently it's been moved in-house and now it's performed by staff here at the Energy Commission.

And finally, one note of caution, any information that comes from this particular work does require DMV approval before we publish the information from this database, it is a confidential database and we do hold this information at a very high confidentiality level.

Our primary uses for this information is first these vehicle reports feed our different models, and there's three different models that this information sort of feeds into. In the case of our medium- and heavy-duty vehicle counts, they go into our freight model, which then forecasts the amount of fuel consumption that comes from heavy- and medium-duty vehicles. Our light-duty vehicle counts are then bisected into two different ownership categories, the personal vehicle stock then goes into our personal vehicle choice model. Our commercial vehicle stock estimates then go into our commercial vehicle choice model.

Now, what do we know about where vehicles are in California in 2011? Well, a good proportion of them are in Los Angeles County, close to seven million of them. And as you can see, it kind of overpowers all the other counties. As a matter of fact, when we look at the Greater Los Angeles area, we find that just about over 45 percent of all vehicles here in California exist in either California, or Riverside, San Bernardino, or Ventura County, which kind of --

COMMISSIONER MCALLISTER: I thought that

was just on the 15 and the 415, but maybe --

MR. EGGERS: That could very well be. But that's not to say that people in Southern California like to own more cars than anywhere else in the state. You know, when we do the per capita people per car calculation, we find out that more of the urban settings have less cars than their rural counterparts. As a matter of fact, San Francisco has the lowest amount of cars per people as anywhere in the state, and it's pretty easy to find out why, considering the very close urban density of that particular location, along with all the different mass transit options for transportation that occur in that area.

Los Angeles has a lot of cars mainly because there's a lot of people there. That being said, they have roughly around .7 vehicles per person sort of rate, and they're not overly high by any stretch of the imagination. That being said, there are a few counties within the State of California that have more cars than people, or more cars registered than people, most of these counties tend to be in Northern California out in what I would consider woodland sort of areas, Alpine County, Sierra County, counties that seem to have large forestry industries tend to have more cars than vehicles on average, but it's not just a rural/urban split, say Kern County, for example, has below a .6 cars per person level, so it's not necessarily rural environment that determines how many cars exist in a particular county.

Moving back to vehicles over time, what we see here are the different vehicle class estimates at different points of time, here 2003, 2007 and 2011. And what we've seen in the vehicle stock is more of a shift towards compact and mid-size vehicles by California ownership. There has been a noticeable drop in sub-compact vehicles and sports car vehicles. We've also seen a rise of the Cross-Utility Vehicle and a little bit of a downward trend in the purchasing of Sports Utility Vehicles likely due to increased fuel prices. Now, if you want to know what the difference between a Cross Utility Vehicle and a Sports Utility Vehicle is, since many of them look the same, the main difference there is Cross Utility Vehicles are a unibody construction vehicle as opposed to Sports Utility Vehicles which is a body on frame construction, and that's what bisects those two particular populations.

We have also seen a decline in compact vans within the California population from 2003, as well as standard vans. Compact pick-ups have also declined over that time, while standard pick-ups have increased overall, but have decreased from 2007 into 2011. Also, what we notice here is medium- and heavy-duty vehicles, which are gross vehicle weight 3 and above, they have sort of maintained the sort of general levels over this particular time, and this particular population of registered medium- and heavy-duty vehicles, which are solely registered in California, has always been roughly about a million vehicles during that timeframe.

Now, from 2002 to 2003, we have seen a bit of an expansion in alternative fueled vehicles during that particular time. Back in 2003, roughly 96 percent of the population was an internal combustion gasoline engine, the next used population were diesel fuel vehicles. Flex-fuel vehicles were still below one percent at this particular time, and Hybrid Vehicles were just sort of coming onto the market. Hydrogen vehicles and Plug-in Hybrid Vehicles didn't exist during this time, so they didn't inform any percentage of the population at this particular moment. But alternative fuel vehicles such as natural gas, Electric Vehicles, and Propane Vehicles were also below in roughly just .1 percent of the population as a whole.

Moving on to 2011, gasoline market share has fallen roughly four percentage points from the 96 percent to 92 percent. Diesel has filled in a little bit of that gap, rising .8 percentage points from 3.1 percent to 3.9 percent. Flex Fuel Vehicles have really increased, about 1.4 percentage points from that .7 percent to 2.1 percent. Hybrid vehicles have increased even more, increasing 1.7 percentage points during that time. But these are still for the most part gasoline vehicles, especially when we look at flex ethanol vehicles and hybrid vehicles, since both can use gasoline. Any sort of alternative fuel vehicles, natural gas, electric, propane, still remain the same sort of percentage of the entire population in 2011 as opposed to 2003.

COMMISSIONER MCALLISTER: Do you think that the electric -- just a quick clarification

-- we were just talking about how electrics aren't that different between the two -- is that because many of the electrics are on the road since 2011?

MR. EGGERS: The reason hasn't changed that much, is most electric vehicles registered on-road in California in both these time periods are neighborhood electric vehicles, so they're mostly low speed vehicles. And we don't see the Leafs start to really come on the market until obviously December of 2010, and so in the timeframe between December until October, there hasn't really been a ramp-up of sales to overpower a 27 million vehicle population --

COMMISSIONER MCALLISTER: Okay, not that it would have come up a lot, but it seems like it would be more than one in 2003 --

MR. EGGERS: -- but this isn't the right timeframe to really see that increase.

COMMISSIONER MCALLISTER: Yeah, okay. No, I think that's right. And then in 2010, they kind of started to get on this -- not the radar, but --

MR. EGGERS: Exactly. You'll probably see a boost in those numbers in our 2012 numbers, once we're finally able to produce vehicle stock totals for that year.

COMMISSIONER MCALLISTER: Perfect.

MR. EGGERS: Moving on to ownership. As I mentioned earlier, we also do ownership analysis here at the Energy Commission and in 2011. What we saw when we do our vehicle ownership analysis is that a good portion of the fleet is personally owned, roughly about 22.5 million vehicles, or 82 percent of the vehicle stock here in California has a personal ownership, or just a person on the particular registration. We also estimate roughly about 4.5 million or 16 percent are of commercial ownership of some sort. This also takes out any sort of daily rental vehicles, those also have their own ownership category for which we think there's about half a percent of daily rental vehicles owned here in California, and these would be Avis, Hertz, U-Haul, those type of particular corporations owning those vehicles. We also estimate that there's roughly 400,000 governmentally owned, or Government owned vehicles here in California, and they form about 1.5 percent of the population.

Now, the reason why we go through the

effort of trying to tease out these different ownership categories is, as Aniss said before, they have very different ownership sort of preferences, and what you're seeing here is the percentage of each particular fleet where that particular model year, what percentage that model year forms of that particular fleet. And quickly, what you see here is commercial owners of vehicles have a preference towards newer vehicles, and then they start to get rid of them after four or five years, is you see the numbers for those different model years sort of decrease over time.

Personally owned vehicles tend to be held on much much longer and there is a little bit more of a preference towards a used car in the personal fleet, with vehicles of five, six, seven years being the biggest population for that particular portion of the fleet.

We also see differences in the preferences for the actual classification of the vehicles owned. The personal ownership vehicle fleet tends to favor smaller cars as opposed to the commercial ownership. On the flip side, commercially owned vehicles tend to be more of pick-up centered or van-centered, the real preference for those type of vehicles seem to be for commercially owned vehicles.

One quick note on heavy- and medium-duty vehicles. Most of the fleet for the heavy- and medium-duty sector tends to be a diesel powered vehicle. That being said, as the gross vehicle weight sort of increases, that's when diesel starts to take over as the primary fuel for those type of vehicles. As a matter of fact, roughly 95 percent of gross vehicle weight rating eight vehicles are diesel powered, while in the gross vehicle weight and gross vehicle weight for three and four sectors, there's still a preference towards gasoline, the split is more closely associated with 55/45 between those two different fuels.

Finally, here's a table for our 2011 vehicle stock bifurcated by both vehicle class and fuel type. As you noticed from that December point to October, we estimate there was roughly about 1,312 PHEVs sold during that time. We also have some hydrogen fuel cells registered here in California, there are roughly 95 registered. That being said, we do not think that's the amount of hydrogen fuel cell vehicles on the road here in California. What we noticed, and especially when we saw the presentation of vehicles a couple weeks back here at the Energy Commission, if you notice what kind of plates they had, you'll quickly find that they were Michigan plates on those vehicles, and so they're not registered here in California, and so I can't track them. But at the end of the day, still most of the fleet here in 2011 is gasoline powered.

And that concludes my presentation on this subject. Again, I would like to open up questions to the dais first, and then to any stakeholders as a whole.

COMMISSIONER MCALLISTER: Thank you. That was interesting. You answered all our questions, so we don't have any. Let's see, I'll pass it back to Lynette. So we're actually almost caught up. And I'll pass it back to Gene or Lynette.

MS. STRECKER: Do we have any other questions from the audience? Okay.

COMMISSIONER MCALLISTER: Do we have some built-in time for any public comment? Or is that at the end of the day?

MS. STRECKER: We'll do public comments at the end of the day, as well.

COMMISSIONER MCALLISTER: All right. Great, let's break for lunch.

MS. STRECKER: Break for lunch, okay. And come back at about 1:20.

(Break at 12:20 p.m.)

(Reconvene at 1:20 p.m.)

MS. STRECKER: Welcome back. I hope you all had a chance to have a brief lunch somewhere. I think there was a little bit of confusion this morning about questions and answers, so we're going to open it up to the Commissioners, the audience, and our WebEx participants for any questions or comments you have on this morning's presentations. So if there's any -- Commissioner Scott, do you have any additional comments?

COMMISSIONER SCOTT: I do not. I just wanted to welcome everybody back and thank our presenters from this morning for coming back down to take a couple questions. I thought what we might do was just spend about maybe 10 minutes on that if there are that many questions, and then remind folks that of course you can put your comments in to your docket and we will be sure to see them there, and then if there are some really sort of detailed types of really trying to dig in and kind of understand, it might not be appropriate to have that kind of back and forth here, but the staff is willing to speak with you, their phone numbers are on the presentations that you saw, as well as their email addresses, so I just wanted to put that out there. And after we do the five or 10 minutes for this morning, then what we'll do is go into our afternoon presentations and make sure that we have some time for a few questions after each.

MS. STRECKER: Thank you. Is there anyone in the audience that has any questions?

MR. FULKS: Okay if I just come up here?

MS. STRECKER: Please.

MR. FULKS: My name is Tom Fulks. I work with a company called MightyComm. We represent the Diesel Technology Forum in Sacramento, Robert Bosch Diesel Systems, Neste Oil and some others. And I just had some really quick questions, one for your economist, and it really isn't a question so much as it is a request of your staff to be maybe a little bit more precise in the words it uses when describing types of fuels and types of powertrains. For example, in doing the forecasts of California E-85 and B5 and Propane prices, and so forth, that's fine if you go ahead and do those projections, but I wanted to remind your staff that the number one bio-based diesel fuel that is being used for Low Carbon Fuel Standard compliance today is renewable diesel fuel. Renewable diesel fuel is not biodiesel fuel. Renewable diesel fuel is fatty acid -- excuse me -- is non-ester renewable diesel fuel based on vegetable oil. Biodiesel is fatty acid methyl ester based on vegetable oil, same feedstock, different chemistry. ASTM or B5 or biodiesel is designated by ASTM as D6751. Renewable diesel fuel is D975, which is the same spec as diesel fuel. And so there was some confusion over at the Cal EPA Building with the Water Board, who didn't seem to understand what the difference was between renewable diesel fuel and biodiesel fuel, so I wanted to make sure that, moving forward with the IEPR, that the words are used more precisely in talking about different types of fuels because it's a really important distinction. And so thank you for that.

And then secondly, on the market research stuff, I'm sorry, I wasn't prepared to do this so quickly, and so I don't have my notes in front of me, but I will just go ahead and ask the question about your market research, and that was I was curious about the thinking that went into the descriptions of powertrains versus platforms that were offered to the respondents. And the reason I was curious is because the powertrains -- it was a curious mix of powertrain to platform in that these are not typical mixes that the industry uses in doing its own market research into projecting out five, 10, 20 years, in terms of what consumers are going to be buying. And so I'm just curious how those choices were made and what the methodology was. So that's my question. And I guess I could go sit down and respond later, but --

COMMISSIONER SCOTT: Staff, is there an answer on that one?

MS. BAHREINIAN: I'm sure that Ryan can respond to the Biodiesel question, but I believe you are talking about the vehicle types --

MR. FULKS: Yeah, vehicle types --

MS. BAHREINIAN: We have had a history of classifying vehicles and I think that Ryan probably can also respond to that because he works with the DMV data, and we have been using the same classifications that we have used in the DMV data. As we said before, because our forecasts are going to have to be calibrated to the base year, then we have to identify the same types of vehicles in the survey as we do in the DMV data for calibration purposes.

MR. FULKS: Okay, well, I guess my response to that would be that's fine, I understand the methodology that you chose to use, I'm not too confident that's actually a very good way of doing it primarily because that's not the way the industry does it, and it just seems to me that if you're going to be asking people choices, you know, pick a car, and what would you like to see in it, you might want to try to better mix the powertrain to the platform. For example, a heavy-duty SUV would probably be a better recipient of a diesel powertrain than what you've got down here now, which is a CNG. There aren't any CNG offerings right now and I don't know of anybody who is planning to offer any heavy -- the large SUV CNG powertrain offerings. So it just seems to me that you may want to try to sync up the mix, or the proper duty cycle and use of the powertrain with the platform to get a more realistic response back because right now the responses you've got, as far as I'm concerned, are just not going to be that useful because they don't really match up to anything real that's going to be happening. It may be something that your staff at some point would like to see happen, that doesn't necessarily mean that's going to happen. So I just wanted to add that in. I don't really have any specific questions for your economist, I just wanted to make that statement about being more precise with the use of language.

COMMISSIONER SCOTT: Okay, thank you for that comment.

MR. FULKS: Thank you.

MS. BAHREINIAN: I think Ryan will take that one, but we also had consultants, both on the contractor side, and we also had some internal experts on the topic, and we have run these things by them, too.

COMMISSIONER SCOTT: Thank you. Are there --

MS. STRECKER: Are there any other questions in the audience? And there's no one on WebEx with questions --

COMMISSIONER SCOTT: Okay, let's go to our afternoon presentation.

MS. STRECKER: So we're going to start this afternoon with Laura Lawson and she's going to talk about our Light-Duty Vehicle Attributes -- excuse me, Laura Graber. She got married and I can't remember her new name.

MS. GRABER: Good afternoon. I'm Laura Graber with the Fuels and Transportation Division and I'm here to discuss our Light Duty vehicle attribute inputs that we will be using for our IEPR Forecast.

In order to forecast fuel consumption over the forecast period, we have to forecast vehicle stock. That is, what vehicles will people buy? In order to forecast which vehicles people will buy, we need to know what the attributes, attributes such as fuel economy, price, and acceleration, among many others, are in the vehicles available to consumers.

Currently, the Energy Commission does not forecast vehicle attributes, so we are going to obtain these forecasts via a contractor, Sierra Research.

Shown here is a list of vehicle attributes that will be forecasted and used as inputs in our personal and commercial vehicle choice models. Of particular importance in forecasting consumer choice and fuel consumption are vehicle price and fuel economy.

Listed here are the fuel types for which vehicle attribute forecast will be produced. New to this IEPR are the four fuel types at the bottom of this slide, Diesel Electric Hybrid, Hydrogen Vehicles, Compressed Natural Gas Hybrid, and Dual Fuel Vehicles.

The main factors that influence vehicle attribute forecasts are forecasts of conventional and alternative fuel prices, future policies and regulations, and forecasted economic data. For this IEPR, the high reference and low fuel price case and economic growth scenarios will be used in vehicle attribute forecasts in order to produce forecasts that align with these scenarios, and those scenarios that will be used for other forecasts in this IEPR. These attributes will in turn influence the personal and commercial vehicle choice models.

Historically, fuel economy has been heavily influenced by fuel prices and fuel economy regulations. As you can see on this graph here, fuel economy increased sharply after the fuel price spike of 1974; fuel economy increased further after 1978 when corporate average fuel economy standards were first implemented. From the mid-1980s to the mid-2000's, the combination of low fuel prices and a lack of additional fuel economy regulation led to relatively flat fuel economy levels.

After the mid-2000's, an increase in fuel prices led consumers to choose more fuel efficient vehicles. The Energy Independence and Security Act of the 2000's revised CAFE Standards also led to another climb in fuel economy beginning in model year 2011.

Additional fuel economy regulations covering model years 2012 to 2016 were proposed in 2009 and established by the Environmental Protection Agency and National Highway Traffic Safety Administration in 2010. The Fuel Economy Regulations proposed in 2011 and finalized in 2012, geared to increasing fuel economy to 54.5

miles per gallon by 2025, apply to model years 2017 to 2025 and therefore do not affect historical data.

The Energy Information Administration produces forecasts similar to ours, but on a national level. When our forecasts are complete, we will compare them to those of the NRG Information Administration, as well as other available forecasts. This EIA graph shows the fuel economy forecast in the reference case of the EIA's 2013 Annual Energy Outlook. The top line in blue is the CAFE Standard for new light duty vehicles. The middle line in green is the EIA's fuel economy forecast of new light duty vehicles each year, it is lower than the blue line because some automakers are expected to pay fines rather than comply with the Fuel Economy Standards. The red line at the bottom is the EIA's forecast fuel economy of all vehicles on the road in a given year, both new and used.

One important point to note about this forecast is that it does not incorporate any additional regulation-driven fuel economy increases after the year 2025, which is why it shows new vehicle fuel economy as being nearly flat after 2025.

As the fuel economy of new vehicles flattens in the latter part of this forecast, the gap between the fuel economy of new vehicles and all on-road vehicles narrows.

This graph shows the vehicle price forecast in the reference case of the EIA's 2013 annual energy outlook. This forecast shows an increase in vehicle price through 2025, followed by a relatively flat price forecast. These vehicle price increases reflect anticipated costs of fuel economy compliance.

Shown here is an EIA forecast of compact vehicle prices by fuel type. Note that in this forecast, the availability of alternative fuel vehicles increases and the costs decrease over time. In particular, this EIA forecast portrays 200-mile range electric vehicles, which are on the top line in light blue, as initially being of very low availability and high cost. To a lesser extent, it portrays 100-mile range electric vehicles shown above as the dark blue line as having this issue, as well.

This is the same graph as the last slide, but with the more expensive electric vehicles removed in order to allow us to close in on the difference in price between different fuel types. In particular, if you look at gasoline vehicle prices in red and light duty diesel vehicle prices in orange, this graph shows a gasoline and diesel price differential of about $2,000 in the year 2013. One comparing gasoline vehicle prices in red to gasoline hybrid vehicle prices in blue, the EIA forecasted a price differential of about $3,000.00 for 2013. Both of these price differentials narrow over time.

In order to meet proposed fuel economy standards, automakers must implement a variety of technologies to improve fuel economy. The EIA forecasted the market penetration of many potential technologies that can help meet fuel economy goals. Three technologies for which the EIA forecasted future market penetration rates are continuously variable transmission, vehicle mass reduction, and low friction lubricants.

According to the U.S. Department of Energy, CVT implementation would result in a six percent fuel efficiency improvement. Another vehicle technology that has been used and will likely continue to be used involves vehicle mass reduction. Fuel savings are proportional to the amount by which vehicle mass is reduced.

Finally, the EPA estimates that low friction lubricants improve fuel economy by one to three percent.

In order to produce forecasts that reflect California consumers rather than the nation as a whole, the inputs we use must reflect California's population, economy, and regulations. Inputs that will be used to represent California include our Fuel Price Scenarios. Due to a combination of blending regulations and taxes that differ from those of the nation as a whole, California fuel prices tend to be higher. The Vehicle Attributes Forecast will reflect this.

Additionally, we will use economic data specific to California, as California has an unemployment rate and median income that both differ from the nation as a whole, and these will be factored into the forecasts, as well.

Also, in addition to fuel economy regulations that all U.S. vehicles will be required to meet in the future, California vehicles will be required to meet LEV and ZEV

Regulations, as well as the Low Carbon Fuel Standards.

Thank you very much. Do you have any questions?

COMMISSIONER SCOTT: None from me.

MS. GRABER: Thank you very much. If there are no questions, at this time I would like to introduce Bob McBride.

MS. STRECKER: Were there any WebEx questions for Laura? Okay, so we had a couple of other questions that came in through WebEx that we're going to take at the podium right now. We've asked Gordon Schremp to come down in case we need him for any of the answers, so I'm just going to grab the questions and read them.

Okay, we have a question from Gina Grey and she's asking about our forecasting models and she says, "You do not show ARB as a possible source of model inputs. Have you used any data sources from ARB? If so, what were they specifically?" And we're going to ask Bob McBride to answer that question because he knows more about the ARB data sources than the rest of us.

MR. MCBRIDE: Thanks. I'd like to wait

until my first presentation is done and have Gina follow-up from there. I touch on the EMFAC model which is from ARB, but our knowledge of the ARB sources is increasing. We haven't used the EMFAC model, they publish data, we've used that, we're working with the people in that group to come at a best estimate of VMT and they, in fact, have a contract out. Unfortunately, the product of that won't be available until July. We may or may not be able to use it in this IEPR. But please follow-up after the presentation.

MR. EGGERS: We have two other questions from Gina Grey online. The first -- these two questions come from my presentation and I'm Ryan Eggers of the California Energy Commission. The first question is, "With significant increases in crude oil production currently and forecasted to occur from tight oil sources, and how fast that the U.S. is now the third largest crude oil producer in the world and projected to be number one in a few years, how do you anticipate these developments will impact all the traditional forecasting curves?"

Since we are using EIA projections, especially for price and crude oil U.S. demand

and world demand, as well as supply, in the case of the EIA projections, there is significant increases in tight oil supply being produced in both Texas and the mountain regions of the United States. That being said, these increases in crude oil production do not seem to be enough to sort of overwhelm the general U.S. demand here in the United States. Interestingly enough, tight oil sources here in California are not projected in any of those particular forecasts to increase here in California, and thus, especially here in the California market, we do see that the prices for crude oil still remain linked to the world price into the near future and into the 2050 sort of timeframe.

The next question is, "If you go back to the first IEPR projections of high/low prices for conventional fuels for 2013, how accurate were your forecasts back then? Did significant price increases occur? And did the same increases occur in crude oil costs?"

For the cost of crude oil, there was on slide 14 from our February workshop that sort of addresses this particular issue, and if you look at both our 2009 and 2011 projections, for the most part our price band did sort of encapsulate different changes in crude oil price. That being said, in the case of the 2009 projection, we did seem to be on the low side as far as projecting crude oil prices, it does seem we overcompensated for that in our 2011 forecast where, once the difficulties in the Middle East and Libya were sort of overcome, our price band was sort of on the low side, or it was sort of on the high side, and so prices tended towards the low end of that particular price band. Our new 2013 price band is much much wider compared to those previous IEPR forecasts, and thus is more likely to encompass those large changes much more readily into the future. And right now it's starting sort of where in the middle of the two previous price bands were.

We apparently have another question from Tim Vonder from Sempra Utilities. It says, "(I) have shown the electricity DG price is considerably higher than gasoline in the case of the reference and the low price…," that is correct, "…but when he compares cost per mile driven, the cost for EV is considerably less than other types of vehicles. These savings are achieved through efficiency, he says. But what makes the EV more efficient than other vehicles? I believe he has characterized an EV as being very small in size, made of light-weight materials and, even though he didn't say, maybe EV drivers have different driving habits than non-EV drivers. So my question is, what are the characteristics of the car driven he is comparing the EVs to? Is it an apples to apples comparison, or an apples to oranges comparison? If this comparison is not apples to apples, then how would the comparison come out if they were an apples to apples set of characteristics? Maybe the cars driven that he is comparing are slightly different, maybe those other drivers prefer heavier, safer cars, or more comfortable larger cars. If there are cars and drivers he is comparing to, then this analysis does not make a fair comparison."

And Tim is bringing up a very good point. There are a lot of different types of vehicles out on the market and EVs tend to be in the compact range as far as the ones that are out on the market. Now, the cost per mile projections I was making, they were on an apples to apples basis because I was comparing compact EVs to other compact gasoline cars. Now, it is worth noting that, the bigger the vehicle gets, EV efficiency ratings tend to decline quite a bit and they become much more on par with their other fuel counterparts. I just used compact vehicles because that was one of the few sets of vehicle types that had efficiency ratings across the board. In some of the different sort of vehicle classes, I wouldn't have efficiency ratings for all those types of vehicles. But that being said, per our forecasting models, we do disaggregate these by classes and fuel types, and we only do the comparisons when we have seen fuel types within the same vehicle classification, and so the cost per mile calculations, while interesting, are not to be seen as final, they need to be taken as per class of vehicle at the end of the day.

I think that concludes our questions. Now we'll turn it over to Bob McBride.

COMMISSIONER SCOTT: And let me just say again, thank you, Ryan, and thank you to Aniss for coming back down to answer some questions. I appreciate it.

MR. EGGERS: You're welcome, Commissioner.

MR. MCBRIDE: Hello again. I'm Bob McBride, Transportation and Energy Office. In this part of the agenda, I will be talking about the data available to us on usage and vehicle attributes contributing to movement and fuel use by medium and heavy duty vehicles.

Medium and heavy duty vehicles are separated as three sectors in our analysis, first, goods carried on regional hauls under 200 miles happen on trucks weighing anything from 10,000 pounds in Class 3 to well over 30,000 pounds in Class 8. Goods on long haul routes, which we define as over 200 miles, happen by rail and also in Class 7 and 8 trucks over 26,000 pounds, or as intermodal freight. Services and local deliveries in a variety of industries are assigned to the remaining trucks over 10,000 pounds all the way from Class 3 to Class 8.

One of our assumptions that I wanted to point out, we assumed trucks of one type based in a California region move the same number of miles in a year, regardless of whether they're engaged in short hauls, local delivery, or in services. For example, consider Class 7 and 8 platform trucks based in Sacramento Region, we assumed those used in construction travel the same number of miles a year as those making deliveries in Placer County, or hauling to the Bay Area. That's a constraint of our model. Transit and intercity bus and rail movement is simulated in the urban and intercity models. We also account for paratransit school buses and charter buses.

The volume of commodities or goods moved by rail, truck, or intermodal long hauls, and moved by truck for regional hauls, is drawn from freight analysis framework prepared by the Federal Highway Administration for planning purposes.

Trucks and activity characteristics such as payload and the fraction of miles driven when the vehicle is loaded is drawn from the Vehicle Inventory and Use Survey, which was done by the Census Bureau. Data from larger transit agencies is required from U.S. Department of Transportation's National Transit Database. Data from smaller transit agencies comes from the Annual Transit Report by the State Controller's Office. Rail Freight characteristics are required from Surface Transportation Board, they publish a Rail Waybill dataset. In the Transportation and Energy Office, we also conduct a Transit Agency Survey to provide supplemental data.

So first about the Freight Analysis Framework. The flow of goods is forecast in the Freight Analysis Framework by the works done at Oak Ridge National Lab and reported for one scenario, one forecast scenario, it runs from 2011 to 2040. We measure this flow as ton miles, the movement of a ton of goods one mile. Regional, statewide, national and international movement is reported in FAF in tons and, for the first time, also in ton miles. Movement of 42 commodities between an origin and a destination is forecast. We aggregate this to origins and destinations in five zones in California and 15 interstate routes. The data is further divided by the mode of shipping, including truck, rail, and intermodal. Those are the modes we use.

For the next few slides, we separate the volume of goods to those moving within California, those moving from other states to California, and those moving from California to other states. Bear with me, there's a lot of information in these -- I fully expect questions.

Since we don't forecast air or water freight, we look only at the domestic legs of shipments; in other words, we track an export as far as it goes in the U.S. This slide shows trends in all modes of shipping, and this includes pipelines and water, as well as truck, rail and intermodal. From 1997 to 2011, the largest volume of freight moves from other states to California. Also, we can see in green an increase in the volume from California to the other states, over that period.

This and the next two slides include only truck, rail and intermodal freight, an overwhelming volume of freight is domestic, although since 1997 we can see an increasing share from both imports and for exports.

Domestic freight, shown in green, is the largest share coming to California, moving from California to other states, and also intrastate just within California. We received over twice the volume from other states than the volume we send. The largest portion of imports, shown in blue, comes into the U.S. by way of California, then moves to other states.

Again, this slide represents truck, rail and intermodal goods, and not pipeline or water. Also, relatively large volumes may be exported directly from individual regions in California, and yet not appear in this slide. For instance, rice moving within the Sacramento region before export does not appear since the domestic leg is within one California zone. Our forecasts do account for this freight movement within the regions, it just doesn't show on this graph.

This slide shows the direction of movement and the mode without regard to whether it's domestic, imported, or exported. Trucking shown in pink dominates all directions of freight movement. Rail volume, as shown in green, rail volume entering California looks roughly four times the volume leaving California for other states. In the right-most cluster, we see that a majority of freight entering California from other states moves by rail or intermodal freight, while in the center cluster, you see a majority of freight leaving California for other states moves by truck. Intermodal freight is expected to gather an increased share of goods movement over time. We are open to suggestions for improving our estimate of the fuel use due to what we're calling intermodal freight, but is actually reported in the Freight Analysis Framework as "multiple modes & mail."

These VIUS, Vehicle Inventory and Use Survey, for some key inputs that quantify the behavior of trucks, parsing of the truck population to regional or local freight as opposed to services relies on an analysis of VIUS and on the growth since 2002, since that's when that survey was drawn. Freight volumes are assigned to truck types using VIUS. These assignments vary in the VIUS data with the range of operations, so we make truck assignments for each range. The range is correlated to the distance between origin and destination for the commodities, that's VIUS.

We used data from the National Transit Database to quantify passenger, bus and rail use and also fuel economy inputs for those vehicles for our urban model. We used the Annual Transit Report from the Controller's Office to capture data from smaller transit agencies. Here at the Energy Commission, our Transit Agency Survey supplements these two sources, NTD and the

Controller's Report. We also pulled data from Bureau of Transportation Statistics mainly for intercity bus, rail and air.

For the forecast of fuel economy for medium duty and heavy duty freight trucks, we rely on the DOE Annual Energy Outlook. The AEO tables includes forecasts to 2040 and a growth factor for years after that, so that's what we're going to imply.

We show reference case in high and low oil price cases in the following slides, but we also show an AEO case for rapid improvement of fuel efficiency that's due to quicker adoption of engine and emission control technologies. The forecasts include diesel gasoline, natural gas, and propane fuels, so in pairs.

The next four slides show heavy duty freight trucks. The first show diesel here and natural gas for the four cases reference high/low, oil price, and rapid improvement. The rapid improvement case is about a half a mile gallon better than the reference case after 2020, so I'll talk a little bit. And you can also see in the natural gas case, the three oil price cases are the reference and the two oil price cases are closely clustered. The resulting fleet fuel economy for diesel and natural gas improves more gradually over the forecast. For both diesel and natural gas trucks, the rapid improvement case gradually rises again to about a half a mile a gallon over the reference case around 2035, so here's the rapid, so it tops out you can see for diesel somewhere around eight miles a gallon, and somewhere around 7.5 in the reference case. Note that Propane and gas don't change for heavy duty vehicles, there simply aren't very many and so technology is not aimed at them.

The following five slides show the medium duty freight trucks. The pattern here is similar, except that diesel and natural gas trucks improve until about 2020 and the gasoline trucks also improve until roughly 2030. I'll back up to diesel. For diesel, the high oil price in reference cases are similar, they overlap a lot. For gasoline, the reference in both oil price cases are pretty close, as well; in fact, they're all tightly bunched.

Two slides -- this shows the evolution of the medium duty fleet fuel economies for the reference case and one for rapid improvement case. The patterns look the same. We didn't include a slide for medium duty propane truck fuel economy which was an omission, but you can see here from both cases that the propane shows the greatest improvement in fuel economy over the period. So that's the purple line, right, it just keeps going which I found very interesting.

These two slides replicate what Ryan Eggers had on medium and heavy duty, except it's a clustered bar chart. Diesel fuels in most trucks, no surprise, fuels almost all Class 7 and 8 trucks. Somewhat more trucks in the 10,000 to 14,000 pound Class 3 are fueled by gasoline and diesel. About 13,000 natural gas trucks were registered in 2011. You can't really tell what classes they are, but they are mostly Class 8 and 6, and probably a lot of them are buses, although FedEx and UPS do have some natural gas trucks, step vans.

This shows the fuel economy of the other fuel vehicles, about 24 flex ethanol trucks, mostly Class 3, were registered in 2011. Propane and electric trucks were mostly Class 3 buses, as well. About 100 Hybrids, 100 in miscellaneous fuel categories were registered in 2011. And we don't see any registered PHEVs or hydrogen trucks, although we're told there are some in Yosemite, those have Federal plates, so we don't track them.

At this point, do we have any questions from the dais, and then from the room and Web?

COMMISSIONER SCOTT: I do have a question. On that last slide that you just did, you had a category for "other" and I was wondering what --

MR. MCBRIDE: What is other?

COMMISSIONER SCOTT: Yes.

MR. MCBRIDE: I'll have to look at that and answer it off line.

COMMISSIONER SCOTT: Okay, no problem.

MR. MCBRIDE: I'm not sure. I have the table.

COMMISSIONER SCOTT: No worries. The other question I had for you was the -- it's on slide 3 and you mentioned that the truck activity and characteristics will be based on a 2002 Vehicle Inventory and Use Survey? Is there a way to update that or get more current information?

MR. MCBRIDE: Yes. I don't want to say too much, we're in discussions with people at

Caltrans and the ARB to try and put together an update, but I can't say anything concrete about that. I do grow using other characteristics some of that data and we try to use as little of that 2002 data as possible, but it's essential to assigning the commodities to the truck types and to get truck payloads for specific commodities used on a specific truck type, it's really the thing. The Census discontinued the survey and anybody that does a freight forecast has been complaining since, we're really all in the same boat on VIUS.

COMMISSIONER SCOTT: Thank you.

MR. MCBRIDE: Yeah, thank you for pointing that out.

MR. BARTRIDGE: I just had a question about the rapid improvement fuel efficiency in some of your charts and what that contains, assumptions around investment or development?

MR. MCBRIDE: These are EIA cases. They didn't project a whole lot. There are details if we drill down further, and I would be happy to do that. But that's specifically what they said. Engine technology, more rapid, more optimistic adoption rates for engine technologies, for emissions technologies. I'll follow-up on that. Are there other questions? Okay, thank you.

Next, Jesse Gage will be talking about the Civil Aviation Forecasts.

MR. GAGE: Good afternoon. I'm Jesse Gage, also of the Fuels and Transportation Division. And I will be discussing the Civil Aviation portion of the 2013 Transportation Energy Demand Forecast.

The Aviation model concentrates primarily on jet fuel. Jet fuel demand is modeled using two wholly separate sub-modules, one for passenger fuel consumption and one for freight. Each sub-module is calculated for some 20 intrastate domestic and international regions. Aviation gasoline, which makes up a far smaller proportion of aviation fuel consumption, is modeled separately using a simple growth mechanic. Finally, it should be noted that this is strictly a civil aircraft model, specifically we do not forecast military jet fuel at this time.

Input data for the model consists of base year data, as well as exogenous forecasts. Base year data pertaining specifically to aviation is obtained from the Bureau of Transportation Statistics, which has data collection legislation in place similar to our own PIIRA covering flight information, financial reports, passenger and cargo volumes, and fleet make-up. This data extends as far back as 1990.

The exogenous forecasts are obtained from the Energy Information Administration via their Annual Energy Outlook. The Energy Outlook provides forecasts for a number of scenarios through 2040 for a similarly broad range of subjects, including ticket prices, aircraft efficiency projections, as well as fuel price. The EIA also provides a growth rate for their outputs, which we use to extrapolate from their forecast and period of 2040 to our own end period of 2050.

While not listed here, we also take our definitions of aircraft classifications from the energy outlook, namely their categorization of jet aircraft into narrow body, wide body, and so-called regional jets. The BTS, in contrast, classifies jets by the number of engines, which Energy Commission staff has found to be unsuitable for Energy Demand forecasting, as simply the number of engines on a jet says little about its characteristics. For example, a two-engine jet could refer to a small business jet such as a Cessna Citation, or a Boeing 787 Dreamliner. Clearly, these are two completely different animals from an energy standpoint, and lumping them together isn't too useful for our purposes.

Finally, the Aviation model uses the same demographic and social economic data as the other transportation forecast models such as Moody's and Global Insight.

A number of input variables such as fleet composition, that is the relative share of each type of jet, are common to both the passenger and freight sub-modules. The passenger side also considers ticket prices, regional household incomes, and the load factor, which is the percentage of seats on an aircraft which are occupied. One variable worth pointing out in particular is freight aircraft deficiency. While we have decent data for passenger aircraft deficiency, staff has been yet unable to find good specific data for the freight equivalent. I'll be talking more later about how we intend to work around this issue to develop an estimate.

If we look at fuel demand in California as a whole, we see that the aviation sector consumed about as many gallons of fuel as diesel and diesel alternatives in 2010. Note that jet fuel and diesel are fairly close in terms of energy density, making them also roughly equivalent on a GGE basis. Of this amount, commercial jet fuel takes the lion's share, military jet fuel makes up about 1/13th, and finally we have a very small portion of aviation gasoline or AV Gas, which is typically leaded 100 octane gasoline used by small helicopters and private planes.

COMMISSIONER SCOTT: Can I ask you a quick clarifying question there? On the diesel biodiesel, some of the inputs that we've looked at were just the on-road --

MR. GAGE: Yes.

COMMISSIONER SCOTT: -- sector, but I know obviously construction equipment, agricultural equipment, non-road sources use diesel as well. Are those in this pie chart you have here?

MR. GAGE: Yes. This is based off of Mr. Schremp's energy fuel balance, which encompasses on-road/off-road red dye, everything.

COMMISSIONER SCOTT: So this is everything that uses fuel on this chart?

MR. GAGE: Correct.

COMMISSIONER SCOTT: Got it. Thank you.

MR. GAGE: No problem. This chart demonstrates how the cost of jet fuel, as a proportion of the airline industry's total operating costs has changed over time. You can see that, as the price of fuel has risen over the past decade, so too has an increasing share of an airline's budget been earmarked for fuel expenditures. Also apparent is the price spike of 2008, illustrating the impacts shocks have on the industry.

Naturally, as this cost share increases, it becomes more important to airlines to mitigate this cost where possible. There are two ways to do this. One way is to reduce the amount spent per unit of fuel, the other way is to reduce the amount of fuel consumed per passenger mile, and there are a number of ways to do that, which we'll look at over the next few slides.

Perhaps the most obvious way of increasing airline efficiency is to increase the efficiency of individual aircraft, and in the past decade, at least, you can see the industry doing just that, increasing efficiency in response to rising fuel prices. Fuel efficiency for aircraft has risen about 40 percent since the turn of the century. Please note that this chart reflects efficiency of the fleet as a whole, not strictly new aircraft. As with the automotive fleet, older aircraft tend to be phased out over time in favor of newer, more efficiency aircraft.

Beyond these new designs, also factoring into fuel efficiency is a recent trend towards narrow body jets; however, the smaller, more compact jets also mean fewer available seats per plane, leading to another way of increasing fuel efficiency, simply packing planes with more people. Yeah, if you've been feeling a little more crowded on flights for the past few years, it's not just your cynicism, aircraft really are getting much more crowded. The passenger load factor has risen almost 20 percent since bottoming out in 1992; or, put another way, the number of empty seats on an aircraft has been cut in half over the past two decades. The EIA projects this to continue to increase, albeit at a much slower pace, plateauing at about 83 percent by 2040.

Taken together, these techniques have markedly increased the efficiency of aircraft, as measured in passenger miles per gallon of jet fuel. Efficiency by this metric has increased some 80 percent in the last generation from under 30 passenger miles per gallon in 1990 to about 50 today, and the EIA expects us to approach 60 passenger miles per gallon by 2040.

As mentioned before, there is an alternative to using efficiency to combat costs, namely reducing the price paid for fuel. Larger airliners are, of course, large buyers of jet fuel and thus are generally able to negotiate bulk contracts with producers. However, this can only take an airliner so far and further cost reductions may require some creative thinking. As a striking example, Delta Airlines turned some heads last year when they came up with a rather out-of-the-box solution to reducing costs, they bought a refinery. This is the first foray by any airline into the refining business. Delta bought this refinery located in Pennsylvania from Phillips 66 last year. The refinery processes nearly 190,000 barrels of crude per day and is configured to maximize jet fuel production to supply its operations primarily in the northeast.

While the refinery produces a variety of products, including gasoline and diesel, Delta barters these fuels with other producers such as BP and Phillips in order to receive more jet fuel. Interestingly, since the jet fuel doesn't have to be physically delivered to the refinery, Delta can, in a sense, use gasoline produced on the Eastern Seaboard to fuel jets at LAX. In the SEC filing which accompanied the announcement of this endeavor, Delta stated that the long term savings stemming from this purchase would be the equivalent to purchasing more than 60 new generation narrow bodied aircraft.

Up to know, we've been discussing efficiency from the perspective of passenger airlines, the factors on the freight side of the equation are analogous, but suffer from a paucity of data; specifically, staff has as yet been unable to derive precise figures for freight aircraft efficiency using either BTS data or other sources such as the EIA or even FAA, and staff would welcome input from parties which may have such information. That said, we have found that available data regarding the aircraft flown by carriers from each sector, as well as their purchasing habits, can provide some insight, and thus an estimate.

This slide shows the average age of an aircraft at the time of purchase for various major carriers. Note that this is not the current age of the aircraft, but the average age of the aircraft when a carrier bought it. So, for example, if a jet was manufactured in 1995, purchased in 2000, and still in service today, we would count it as five years for the purposes of this chart.

Freight airlines are in blue, passenger airlines are in red, and the story told here is rather obvious: passenger airlines prefer to buy their planes new, generally fresh off the factory line, while freight airlines such as UPS and FedEx take older aircraft, presumably from the passenger airlines, and convert them to air freighters.

As a case study, one can consider the McDonnell Douglas DC-10 last produced in 1989 and one of a dwindling breed of three engine jets. From this, you can see how, as the DC-10 was phased out of passenger service by 2007, its role shifted over to freight. While it should be noted that a boom in air freight going to eCommerce explains some of the early 2000's uptick shown here, BTS data shows that a good portion of the rise was also due to freight companies purchasing DC-10s.

As the years go on, however, even the freight sector has started looking beyond the DC-10 to more efficient aircraft. In fact, a FedEx press release from earlier this month stated their intention is to retire their fleet of 63 DC-10s over the next few years in favor of more modern aircraft such as the Boeing 767.

Putting this altogether suggests a path forward. Our plan is to assume that the fuel efficiency of freight aircraft is equivalent to those of passenger jets from some years in the future. So, for example, freight efficiency in 2015 could be presumed to be equal to that of passenger efficiency in, say, 2021 or 2022.

And that is all I have and I'd be happy to take your questions at this time. Commissioners?

COMMISSIONER SCOTT: No questions here.

MR. GAGE: Any questions from the

audience? Any questions online? Sounds like we're good. In that case, I would like to reintroduce Mr. McBride.

MR. MCBRIDE: Bob McBride. Now, in this part of the agenda, I'll be talking about data we have on Vehicle Movement, on-road as a whole.

We start using our Vehicle Demand Forecasts from Initial Values for Movement using 2011 as our base year, identifying and allocating movement in 2011 to the transportation sector's vehicle modes and vehicle classes; for example, urban travel is the sector, personal vehicles is the mode, and medium sized sedans are our vehicle class. Fuel consumption in this metaphor is the product of vehicle populations, the miles they travel, and their fuel economy.

Our 2011 estimate of fuel use by sector, mode and vehicle class depends on the way we define statewide vehicle movement. To project the fuel purchased and delivered in California, we'd estimate the vehicle movement using only that fuel, which would be a challenge. We might also estimate only the movement of vehicles registered in California. To estimate the energy consumed in California, we would use the movement of vehicles on California roads, three different VMT measures.

Several sources of data can contribute to our estimate of 2011 vehicle miles, their allocation to sectors, modes and vehicle classes. Highway Performance Monitoring System, HPMS, estimates statewide and county annual vehicle miles traveled. HPMS is prepared by Caltrans and sent to the Federal Highway Administration where it is used to allocate highway money.

Caltrans also publishes traffic counts, including traffic counts for trucks and all vehicles on the same points and state highways. The Air Resources Board estimates vehicle miles in their Emissions Factors Model several ways; smog check data from the Bureau of Automotive Repair is one of the ways they use, a relatively precise record of odometer readings at intervals that could be used to calculate VMT. You go to a smog check every two years, read the odometer, look at the date, calculate miles per day while all the way of VMT. But this is just for registered light vehicles.

Regarding Gina Grey's question, one reason we don't use the published EMFAC VMT directly is that they adjust this bar VMT to forecasts done by the Transportation Planning Agency so that they match up correctly when they use that, use EMFAC. Also, EMFAC's published data on the Web reflects those forecasts, and we would need to run the EMFAC model with our vehicle classes, and so on, in order to come up with an EMFAC Energy Commission VMT, and we're not doing that yet, we don't have the bandwidth at the moment. Although we can use the odometer reading data prepared by the EMFAC group in an unadjusted form to compare, unfortunately they've only done it through 2009, so we will compare our estimate to their 2009 light vehicle estimate. We have not done that yet.

Vehicle Inventory and Use Survey data on miles per vehicle can be calculated to estimate truck miles. In our office, we produced an estimate of statewide annual vehicle miles traveled using the fuel purchased and delivered statewide, the fuel economy of the fleet in each vehicle year by class and model year, and the population registered vehicles. Now, we feel that the data on the population registered vehicles and on the total fuel use are the strongest, so the two weak links here are the fuel economy and the VMT. I just wanted to point that out.

State, Federal and private organizations each use groupings and counts vehicles suited to their particular purposes, resulting in separate estimates of VMT. Fuels are used in different sectors, modes, vehicles classes, and gasoline is used primarily in light vehicles, but some in medium and heavy duty, while diesel is used by rails, some medium duty, and most heavy duty trucks, some buses, and some light vehicles.

Here, we show HPMS and Energy Commission estimates of annual VMT over time. The two are in the same ballpark, but the CEC estimate shows a more pronounced reduction of VMT in the recession. This reduction follows the influence of reduced fuel use statewide that we have on record, starting in 2008. If we put a point for EMFAC in 2007, it's a very good match for our estimate and we feel that's a very good year for EMFAC, they had incorporated some new methods, but the effects of the local forecasts not reflecting the recession did not kick in yet, so we feel we have good correspondence to EMFAC for that reason.

We used our own estimate of 2011 VMT as our base year value. We also account for the truck miles driven on California roads by vehicles registered out of state, estimated for the EMFAC model, based on data from IFTA, the International Fuel Tax Agreement; in other words, for tax purposes they have to account for miles they drive through each state, even though they may fuel out of state, so we can back that out or add it in as we need.

The EMFAC web based status shown here breaks down medium and heavy duty VMT. The red line shows the daily travel of these out-of-state trucks that I was talking about. The black line shows daily travel of trucks, both registered in California and that only move within California. The yellow shows the intrastate movement by California registered trucks that also may travel out of state, but we're not concerned with their out of state travel.

We also make a bottom up estimate of daily movement for vehicle, which in the end is reconciled to the annual statewide VMT. We present some data in the following slides from the 2008 and 2009 National Household Travel Survey. I do plan to make use of data from the 2012-2013 California Household Travel Survey, it's only becoming final this month, so these slides reflect the national a few years ago. I also make use of the Census Journey to Work from 2006 to 2010, Five-Year American Community Survey.

The Household Travel Surveys gather social and economic characteristics and travel data from households and the individuals in them. Daily VMT for personal light vehicles is calculated from trip rates, from trip distance and vehicle occupancy, which is how many people are in the car. The recent California Household Travel Survey gathered data, as Aniss Bahreinian showed about 42,000 households with over 100,000 individuals in them, so a very simple formula: multiply trips per person by miles per trip, divide that quantity by the number of occupants in the vehicle.

So first from the National Survey, we can observe rising trips per person until about 1995, returning to about the '91 level in this century, markers on these slides indicate the years the survey was conducted, it's not exactly the same interval of years. Roughly the same fashion, daily miles per person peaks in 1995, so trips per person peaking in 95 miles per person also.

The black line here shows the average vehicle occupancy for all purposes aggregated, the lowest number of people in a vehicle occurring in 1995. Trips to work shown in green shows lower occupancy and social and recreational trips are higher.

We also gather data on the trends in traffic congestion in the urbanized areas. The travel time index shown here is the actual time a trip requires divided by the time the same trip would take in an off-peak hour if there were no traffic. The Los Angeles area is shown in purple, to a lesser extent San Francisco Bay Area -- no, that's not in purple, it's in green, L.A. is in green, Bay Area is in yellow. Honestly, it was once purple and red. They show more delay due to traffic congestion than the other areas in the state, which isn't a surprise.

The final steps: to allocate the on-road VMT to transportation sectors, modes and vehicle classes of doing this is to reconcile the annual statewide VMT to the daily VMT for individual vehicles. The least reliable components of the daily VMT calculation may be adjusted so the total is consistent -- total daily is consistent with the total annual, and that would mean fuel economy and VMT.

That's my presentation. Do you have any questions? Any questions on the Web or in the room? No, we're good. Okay, thank you very much. Next, we'll have Gordon Schremp talk about the fuel supply.

MR. SCHREMP: Good afternoon, Commissioners, Advisors, Audience, people online. My name is Gordon Schremp, I'm Senior Fuels Specialist at the California Energy Commission, I work in the Transportation Energy Office, and I'll be covering some of the Supply/Demand balance, I guess data sources, methodology we go through to figure these out, and sort of what we use this information for -- multiple purposes. And I'll also give you a little bit of background and context of where our fuels come from and where they go because it has implications for infrastructure, not only in California, but also for exporting fuels to neighboring states.

So here are some of the items I'll be covering today, finishing up with an example of jet fuel balances that we've done just to give you a flavor of how we break out the information and kind of what that looks like.

So you've been hearing a lot about models today. We don't use a model for this work. Basically, this is an accounting exercise using various data resources and using some of our knowledge of the state's petroleum supplies and system, and deductive reasoning in some cases if we're running out of what we refer to as quality information, and I'll cover a little bit about that.

So basically it's the plumbing, in and out, imports, exports, production, we're looking at inventory change, as well, for a complete accounting of supply equating to consumption or demand. So we use this for all sorts of purposes. Maybe the better use is to identify shifts in where fuels are coming from and where they're going, and how those changes can be important elements to assessing sort of the burden on infrastructure, if you will.

So one good example is California going

from basically a net importer for things like gasoline to a net exporter, so that has implications for marine infrastructure capability and also looking at things like pipeline and marine terminal capacity when you saw growing demand, significant growing demand in, say, Nevada. Pipeline capacity was starting to become constrained, so there was some expansion into Nevada, but then there was the great recession, a decline in demand in neighboring states, and so that took a lot of I guess some of the pressure off the pipelines to build new capacity and at this point there doesn't seem to be any over, say, the next 10 to 15 years. And of course, we use this information in the Integrated Energy Policy Report, as well as a variety of other applications and respond to questions.

So in theory, the supply, demand or consumption should balance out, it doesn't always. In some cases we'll have demand estimates, good targets already to shoot for, and two categories that jump to mind are gasoline demand or consumption in California, we think we have pretty good demand numbers, Board of Equalization data, taxable sales, and Board of

Equalization Data -- public data and not public data -- to figure out what diesel demand is. To Commissioner Scott's question on does that chart show just one type of end use? No, it shows all forms of diesel demand, both on and off-road and stationary source. So we will see when we do some of these Supply/Demand balances maybe some of the numbers aren't lining up, but there's usually a reason for that; it can be an error, but there's usually a reason, some other end use or it's going some other place outside of California that we're not accounting for. So that has to do with accuracy and a level of uncertainty in the data.

So we start, of course, with what we think is high quality information, done a lot of QC on this data, both our own data or some other data we're purchasing, and then we work our way down to fill in the blanks, as I refer to it.

So just to step back briefly and look at what are California transportation fuels, and someone said 2011 was the base year -- they never told me that, I thought it was 2009 -- no, I'm just kidding, I'm showing 2009 as an example, these are kind of old, because I want to show a consistent year for both what we actually used to produce at the refineries, and did a demand balance that we're happy with at this point. The intent is to have all of these balances updated through 2012 as part of this IEPR cycle, so we'll have that completed shortly. So this is just for illustrative purposes to give you an example of what goes on in California before I give you an example of the Supply/Demand balance.

So this figure is in millions of gallons, you see thousands of barrels per day. So the lion's share clearly from this is gasoline absent the Ethanol, about 65 percent. And you see diesel and jet fuels kind of close to 15-18 percent, and some alternative fuels are down there in sort of the marine color, and those, when you break out that quantity, the lion's share is Ethanol, fuel Ethanol used in gasoline, some E-85, and at this point in time in 2009, more recently, but not a tremendous amount more, and as has been discussed by previous presenters, there's an upper limit of Ethanol use in gasoline in California, it's 10 percent.

One of the major changes that would have to be completed before Ethanol could be used in gas would be modifications to the California Air Resources Board Reformate Gasoline Regulations, those are essentially developed looking at relationships between qualities in gasoline, fuel properties, and what comes out the tailpipe, and emissions in certified California vehicles. So large datasets went into developing these relationships, and then development of complex mathematical equations to best fit fuel properties to what is in theory coming out of the tailpipes to create the predictive model for reformate gasoline in California.

COMMISSIONER MCALLISTER: A quick question, so are there any other oxygenates in common use at this point, other than Ethanol?

MR. SCHREMP: Good question. MTBE was initially phased out, or was first phased out in California, a type of oxygenate and ether that has oxygen as molecule; ETBE, it's just like MTBE, but not created with methanol, but created with ethanol, that had some sporadic use, a much more desirable blending component from a refiner's perspective, much higher octane, lower rebate per pressure, but it had a particular problem, it was even worse than that of MTBE.

MTBE was phased out in California because of not direct health concerns, but secondary water quality standards which are aesthetic -- taste, odor, color. And so MTBE could be detected by people and Great White Sharks in quantities of parts per billion, literally, in water taste tests. ETBE you could detect in even smaller quantities. So it had an aesthetic water quality concern, potential contamination of aquifers, which led ultimately to the phase out of MTBE and ETBE in California, and in the U.S. So now MTBE is still produced in some facilities in the United States, exported outside of the United States to use in some other countries, Octane or an oxygenate, so, yes, it's still used, but not in California and not in the United States, and it's only MTBE that I'm aware of at this time.

COMMISSIONER MCALLISTER: So Ethanol really has the vast majority of the oxygenate --

MR. SCHREMP: That's correct.

COMMISSIONER MCALLISTER: -- in California? Okay. And then, I mean, I guess I would just point out, like holy moly, the biodiesel and the alternative fuels are an extremely small piece here and we're obviously doing a lot of things to try to scale them up, and we need to just point out the need to keep doing that. I mean, it's self-evident, but we've got a long way to go here.

MR. SCHREMP: Yes. And what is not on here because these are sort of liquid fuels, if you will, or gaseous natural gas, certainly in electricity as you have seen projections, current EV vehicles, projected EV vehicle growth, Plug-in Hybrid Electric Vehicles, so that's another form of fuel in the transportation sector is just electricity, and you can also display that, if you will, in terms of gasoline displacement, and we've done that before and we'll likely do the same for this IEPR cycle, as well, I just don't show it in this chart.

COMMISSIONER MCALLISTER: Great, thanks.

MR. SCHREMP: So these data sources, we primarily rely on our data collection apparatuses that's been in place since the beginning of the Energy Commission, updated once in the history of the Commission to greatly expand our data collection in a couple of important areas, one was to redesign our data collection forms that were modeled after the Federal forms, to capture

California and neighboring state specificity for fuels. What I mean by that is, for example, the Federal Government will have reformate gasoline as a line item and that can be Federal reformate gasoline for use in the northeast, Texas; California is California reformate gasoline, it meets that standard for the Fed, so they're fine; Arizona clean burning gasoline is sort of in between, but it can be reformate gasoline, so we changed our forms to capture that type of specificity, to break out the reformate gasoline so we could better and more accurately track what's being produced, imported, and exported. The import-export element prior to, say, 2006 was not really good, we had some data from EIA, but it's at a higher level, only sort of a foreign import, so we designed import-export forms to capture domestic movements, Washington to California, California to Oregon, by marine vessel, rail imports, more important for, say, ethanol from the Midwest, more important recently for crude oil from Bakken and West Texas coming to California refineries, so we now have a pretty good means of tracking. And sometimes some people fall through the cracks because they're new, a bank, a trading company who is bringing imports into California for the first time, they just don't know we exist and didn't know they had to report. So after the fact, we find some of this out.

So proprietary information is another very important element, which I'm sure you folks will see some of our subscription requests that are more than, say, $100 a month, a lot more, and we're buying data, we're basically looking at information you couldn't otherwise collect, or it would be an extensive effort by many many additional staff to go and get the data, so that's what these organizations do, and then you purchase the data. So it's very important to be able to function to track this information, supply-demand balance in just basically our day in, day out work. I'll note that the cTrack information, you go, "Why would you want to track marine vessels?" And that comes in handy to find out where the vessel has been because we'll see imports in some of these data information resources, they don't say where it originated, so we don't know if it's a foreign point of origin, or a neighboring state, so cTrack allows us to ferret that information out. So a lot of this marine import/export that Kim on our staff does, it's almost like detective work.

So open source information, this is good for other people to be able to look at this, as well, but a couple of caveats here. The Board of Equalization Data, taxable sales, etc., it's very good for gasoline, and they will post diesel sales, you can go online, see the monthly, and I know the media will talk a lot about diesel demand is up, diesel amount is down based on those publically available figures; however, that's not all the diesel that's being used. Dyed diesel is an exempt distribution of diesel as far as the Board of Equalization is concerned, it's a non-event, they don't care, it's not a taxable consequence event. So they do care in case people are cheating and not reporting the appropriate amount of taxable sales, so they started tracking dyed diesel volumes only for that purpose in 2004. So we have been getting that information from them, and that allows us to do an appropriate sort of total fuel, diesel fuel use in California calculation. And those numbers look pretty good when we do supply/demand balances. So we think that's a good demand bogey or consumption bogey to shoot for.

EIA has good information on imports, only foreign, you know, company-level foreign imports and foreign exports. Army Corps of Engineers' state-to-state, that's what we look at, but a severe lag time, and the DESC data, Military, that's how we do the Military balances and State Lands Commission more recently, data they track, and why is the State Lands Commission looking at marine imports and exports? Well, actually they want to look at petroleum volume by marine terminal because they're the folks that develop standards for Marine Oil Terminal Engineering Maintenance Standards, or MOTEMS, to make sure our marine terminals can withstand earthquakes and tsunamis, and not break apart and have releases of petroleum products. So they want to know which terminals are receiving the most petroleum products, both in and out. So that's a very good dataset that is not available online, but if you were to ask them, they would provide it to you. So it's open source in that sense.

So you probably didn't think you'd see a spaghetti -- a western reference today, but here you are, because we like to characterize our data resources, put them into three groups, we like our PIIRA data very well, we especially like the Kinder Morgan weekly petroleum product pipeline deliveries to neighboring state destinations -- Reno, Las Vegas, Phoenix, Arizona, and we also get the pipeline movements from Western Texas into Arizona, I'll show a map of that, and our BOE data, so there will be very high confidence in that information. Others that are good to use, they have some issues, some limitations, but once again, Kim is doing her collective detective work and taking all of this together to develop a final dataset that we are very pleased with, and we think it's as most accurate as it can be.

And then others have some varying issues, some of them serious, prime supplier numbers published by EIA, people quote that as demand in various states, and it certainly is not, it's significantly off when we look at Nevada and Arizona, so we don't use that, but I just put that up there to illustrate a point, sort of beware of what you're looking at, or understand as best you can.

Petroleum Administration for Defense

Districts, or PADD, is a breakdown of the U.S. into five geographic regions, and EIA is very good at reporting movements between regions, but clearly those are not movements between states. So for example, we will look at U.S. Gulf Coast PADD district to the West Coast PADD district, but where did it go? Oregon up to Washington, Southern California, Northern California? We don't know. So that's sort of a mystery and so we looked at this, it has some utility but not a lot, and I think the Army Corps of Engineers, you know, we're trying to get 2011 data now, so it's a little bit of a lag there here in 2013.

So what do these flows look like? We certainly have three main areas of production and the largest surely is Los Angeles and Northern California Bay Area Refineries, about 20 at this point, some of the refineries sort of work together, an asphalt plant and a refinery paired together. We've had a couple idle facilities at this point in California, so 13 facilities are producing what we call California fuels, California reformate gasoline, California diesel fuel, and other refineries will produce asphalt and some export, and lubricants, and things like that. But they're primarily located where they have access either to the water so they can get their crude oil from global sources, and get their products on the water to other areas of the state, as well as export, or they're located in Bakersfield where -- that's where the oil was and has been for well over 100 years, and that's why there are refineries still in Bakersfield.

So I think you saw a 2010 version of this, and this is a little bit finer detail, this is what's coming out of the refineries. And the point of this is that these refineries operating in California produce fuels primarily for this market and these specifications, but they also produce fuels for export -- neighboring states, and you see a thin green RBOB .9 percent line, that's basically Arizona gasoline, conventional gasoline going to Las Vegas, Nevada, and EPA diesel going to the neighboring markets, that's Federal ultra low sulfur diesel, and the other category is a fairly large percentage of total output from the California refineries for the crude oil and the unfinished oils they process, and here is an example of sort of a breakdown of those materials, including a solid petroleum coke that a lot of it is Cal signed and exported to foreign markets. So once they've produced the fuels, it needs to get to the end users, and they certainly use marine vessels, which are in blue, and they use petroleum pipelines, these are not crude oil pipelines, there are more of them, and they would connect Bakersfield all the way up to the Bay Area, and Bakersfield all the way down to Southern California. Petroleum pipelines do not connect Northern to Southern California, so you can't move refined products to Southern California in petroleum product pipelines, so you use marine vessels, and they're basically a net flow north to south. We produce more at the refineries in the Bay Area than we need in Northern California, and so Southern California not as much, so it's a natural flow down there.

And this illustrates sort of the multi-state demand, supply/demand you see here, Arizona supplied from two directions, Nevada, Las Vegas now being supplied from two different locations. That's sort of a brand new pipeline segment, that is the UNEV, Utah Nevada Pipeline from the Salt Lake City Refineries, and so that's a new sort of entrance late last year, bringing supply into

North Las Vegas. So additional supply for Las Vegas is good, a little of additional redundancy, but there's a finite limit. I know Commissioner McAllister has talked about relative supply and pinch points and limiting factors, as well. The refineries in Utah are not large, and they don't have necessarily a surplus of fuel, but they do have basically a surplus of gasoline when? During the winter months when demand is down, and the specification goes from summer to winter, and they can produce more gasoline. So they can move more gasoline into Las Vegas, however, that doesn't really help maybe us out, take the pressure off the California refineries, because that is a low demand for us, too. So there's some mismatches there, but it still makes economic sense for the project to be built and it's additional supply for Las Vegas, which can be helpful when there's a pipeline problem coming from Los Angeles.

COMMISSIONER MCALLISTER: So just to sort of be clear, so there are several Bay Area, North Bay Area has a bunch of refineries up there, so they could be producing refined product, putting it on a boat, sending it down to Southern

California, and then that would go in a terminal, and then potentially could get pumped over to Vegas or Phoenix?

MR. SCHREMP: Yes, that does happen. That's correct.

COMMISSIONER MCALLISTER: Interesting.

MR. SCHREMP: This is just sort of, if you will, a zoom-in on that southwest Kinder Morgan system, and it just goes to show you there's multiple lines, just three of them now that go into Las Vegas, one that is a dedicated jet fuel delivery system, and two product pipeline into Las Vegas, too, because of their demand increase. And it's a very efficient least cost transportation means, and history has shown us very few spills per barrel of movement in these petroleum product pipelines. They are rare, but they have happened, but it's usually a pretty good means of moving materials safely.

So why do we care? Why would we look at that? And who cares about the neighboring states? Well, because the system is interconnected, it has impact when we look forward, you know, as you all heard this morning and early this afternoon, we're looking forward through, you know, what is demand looking like for light duty, medium duty, heavy duty? What's it looking like for gas and diesel, jet fuel? And so we have to also look at these neighboring states. Why? The California refiners are providing fuel to them, so how their demand goes, either up or down, does affect sort of the demand, if you will, in the California refinery output.

So some additional changes to these boxes, the labeling, where it says "Fuel Import Requirements," well, you could actually say "Fuel Import/Export Requirements." And instead of "Refinery Process Capacity Projections," you could actually look at that and say a potential for a Contraction of Refinery Capacity in California. That would mean a shutdown of some refining capacity because you don't need as much. And what's driving that? Well, one thing that's driving it is gasoline demand declining seven of the last eight years in California, and forecast to continue to decline, whereas at the same time diesel and jet fuel is forecast to go the opposite direction. So what happens? The refineries in California, basically gasoline producing machines, as you saw on the earlier pie chart, they now -- well, if you want me to make more diesel, and if I process more crude oil to do that, now I'm making more gasoline that I don't even want of what I'm producing. So that's what we look at as an imbalance. In their product slate, you can do some things to adjust for that. Clearly if you're importing gasoline components, which we used to back in the '90s, a significant quantity, 10 percent of our supply, that has significantly declined. And we've seen a reversal in marine exports of gasoline, some domestic movements to Oregon, West Coast, but we've seen exports to other U.S. states on occasion when the economics makes sense, but foreign gasoline exports to foreign markets. This is not an isolated event for California. In 2012, the United States refiners set a record for the greatest quantity of refined products exported outside the U.S. in any year the EIA has been collecting data. So it made sense for them to run at higher rates, ship to foreign locations, Central America, South America, Europe, and make a profit, and that's why they ran and some of them had the advantage of distressed crude oil in the middle of the United States, Gulf Coast refiners, so it made sense. Likely in 2013, the same thing.

So the California refiners are not so different. If it made economic sense to produce more than just the local markets and the pipeline exports, they did so. So we know foreign exports were up. So looking at the infrastructure now, you have to say, well, gosh, now I don't have to build for an ever increasing marine import need, now that sort of went away, but now you're looking at some export opportunities. And so plumbing in the marine terminals and the load factors are shifting over time because of these changing trends.

So we look at how those things changed in California. If demand is going up, we look at the refinery capacity, and increased use of renewables, we expect to see that under the Low Carbon Fuel Standard. In the near to midterm, you're going to see the need for a drop in fuels, renewable gasoline, renewable diesel fuel, interchangeable with those two fuels made from crude oil, they displace that, so how does that get into the system? And how does that affect the infrastructure? And what do you need?

And then in the neighboring states, demand is going up, or a new pipeline delivering to Las Vegas takes pressure off the California refiners, these are all important issues to look at the infrastructure needs, or not.

And so here are some of the key questions, I won't read them, but it's not just volume, it's the flavor or type of fuel you're bringing in may have special handling, or storage characteristics, but don't go into the normal system, if you will. I think biodiesel is a good example of that, you don't really put biodiesel with your diesel, and put it in the pipeline and ship it in pipelines that carry jet fuel also because there is some trail back issues with the additives that could affect the jet fuel, and so pipeline companies, whether that's Kinder Morgan, Colonial, they do not ship biodiesel in their pipeline system, so it has to be delivered to the terminals, and it's the same for Ethanol, deliver it to the terminals and dedicate storage, and then blend it at that location when they load the tanker trucks.

So as we move to greater use of biodiesel, which we believe we have to do under the Low Carbon Fuel Standard, you will need to see more biodiesel infrastructure at these 50 distribution terminals in California. And so that's an important element of expanded biodiesel use. And Commissioner McAllister, you asked about, you know, a small amount of alternatives now, but we do expect growth, and this is certainly one of the growth areas.

COMMISSIONER MCALLISTER: Yeah, that's kind of what I wanted to get at, I mean, the absolute quantity is one piece of data, but really what we're interested in is the longitudinal development, right? And sort of what happens and how it scales. And, you know, I think I have a lot of confidence that we're moving in the right direction. I did actually have another question, I'll wait until the end, but just about the natural gas side of the equation, but I'll let you finish and then we'll go to questions.

MR. SCHREMP: Okay. And in speaking of natural gas, I do have renewable natural gas, that's injection into the existing pipeline, or the renewable natural gas at the source used locally, and that's certainly another form of renewable fuels we expect to see more of driven by the Low Carbon Fuel Standard because of its low carbon footprint.

So I'll finish up with a few slides on an example of what we mean by Supply/Demand Balance. So I think -- I hope you were paying attention to all the acronyms I was using earlier because here they are. And I think on the California Demand box at the bottom, you see none. Well, that means we don't have a source of jet fuel demand. One could go look at Board of Equalization again, good for gasoline, pretty good for diesel, and they'll show maybe, I don't know, 50 million gallons of jet fuel sales -- I thought there was like three billion gallons, yeah, there are, but that's the private jet aircraft using jet A fuel at airports. So there's a small amount of it and it is tracked by the Board of Equalization. But as an earlier speaker this morning said, when you fuel Southwest Airlines on the tarmac, you stand there and you see the fuel truck pull up, that's in wing fueling, not taxed, not tracked by the Board of Equalization. So the line starts to -- we don't have a good demand target to look at, so

I think jet fuel supply/demand balance is the trickiest when we do --

COMMISSIONER MCALLISTER: So who would have that data? Is that a Federal activity? I mean, presumably Southwest signs for the contracts, gets deliveries, the fuel gets in the ground tank on the tarmac somehow. Who does track that?

MR. SCHREMP: Well, certainly the airlines do, and probably down to every quart of jet fuel use, as was pointed out it's a very big operating cost/expense, so they would know. And so if there was -- you know, we don't have a requirement for the end users to report that to us. If we did, then we could actually have a demand bogey to look at. So it's not required. The use is not required to be reported to us. I know that in the Bureau of Transportation statistics, I see national fuel use, jet fuel use, and they're getting that data reported to them by the airlines, and I believe they're also getting them to report the data in terms of domestic use, so planes leaving on a domestic segment, or leaving after fueling to a foreign segment, and so they'll break out the total fuel use in a particular calendar year. Now, clearly they have the data by individual airport, yet no reporting requirement to us, and none to the Federal or counterpart of the Energy Information Administration. So the data is probably there, but no current mechanism to go get it by state.

COMMISSIONER MCALLISTER: Interesting.

MR. SCHREMP: So these boxes are just an isometric of blue water borne exports, domestic foreign sources, and imports in yellow, and on the right-hand side the exports via pipeline. So here's sort of how the numbers shake out as an example from 2009, and you see sort of an equivalent volume going to Nevada and Arizona in the pipeline, these are in thousands of barrels per day, and you've had gallons, and so this is good, this is another form of measurement. And an interesting takeaway is clearly the California refineries produce way more than we need, 193,000 barrels a day demand, the 236,000 barrels a day of production. And so, yes, it's going in the pipelines, these are contractual obligations. And then we see movement both in and out, over the water, and this is very common, and you'll see north-south, south-north, movements. And

I'll show you that in this slide here.

So we break the data out and we do a Northern/Southern California Regional breakdown, we do the break point at the Tehachapi, so the Bakersfield Refineries are in Northern California, so Northern California is kind of large. And then you'll see some ability to look at those north-south, south-north and, yes, there's that north-south flow, if you will, the negative -16,000 barrels a day, that's leaving, going to Southern California -- normal for gasoline, diesel, jet fuel, we produce more than we need. And something else of interest, you look on the far right-hand column, the Arizona column, two-thirds of the way down you see us getting supply from both Southern California via pipeline and West Texas -- not very much from West Texas for jet fuel, but that's markedly different for gasoline. You see the lion's share for gasoline going to Arizona now coming from Texas, rather than California, and that's been a shift over the years.

These are just some of the footnotes that are on the previous slide, so you can actually read them a little bit easier, just some detail.

And you cannot do a commercial jet fuel balance without doing the Military jet fuel balance first, and the reason you do this one first is because that little pink box, the 11.5 thousand barrels a day of domestic imports, you see in parentheses "Place Holder," well, we're basically figuring out what those demand targets are based on the DESC contracted volumes, and then we're filling in what we're missing. And why we're doing that over the water in marine import is because imports of jet fuel are not consistently, or even well delineated between military jet fuel and commercial jet fuel. You'll see "jet," you'll say "JT" sometimes so you don't see the specificity because they don't need to do that for Department of Commerce filings, they don't need that level of detail. We require that in our forms, but not all people do that consistently, or we don't catch everybody for the military jet fuel. So this is part of the detective work that I do to figure out the military portion, and once we fill and get a balance on this, then I can do the rest of the commercial.

COMMISSIONER MCALLISTER: But the reason

that uncertainty exists is because these are like third parties that are bringing that fuel in and either selling it to the military, or somebody else? And they don't distinguish? Or what's the kind of structural process there?

MR. SCHREMP: I think it has to do with different reporting forms and formats and requirements. So if -- and this is not necessarily for -- foreign imports and exports have some pretty good specificity in the PIER's data that we buy, pretty good specificity in EIA's data, except for jet fuel. It will say "jet fuel," but it won't say it's military.

COMMISSIONER MCALLISTER: Oh --

MR. SCHREMP: But military jet fuel coming from foreign sources would be highly unusual.

COMMISSIONER MCALLISTER: Oh, right, okay.

MR. SCHREMP: That's why this is a domestic import over the water from Washington State Refineries. What happens is military jet fuel contracts are let formally on a Federal fiscal year, October 1 through September 30 basis, and people bid on them -- refiners. So you get different successful refinery bids, and they're supplying various portions of all these different destinations, of which are something like this -- these are just the Southern California military destinations. The jet propellant or JP designation, JP=5, is sort of a naval jet fuel with a higher flash point, 141 degrees Fahrenheit, so they don't want a fire on the aircraft carrier. And then JP-8 is non-Naval jet fuel. And so different destinations, multiple jet fuels at same destinations, you see these volumes, and delivery methods. So knowing how it's getting there, we're already tracking some of these, and if it's by truck, it's coming from somewhere else. So I have to do a separate balance of all of these destinations, get this to balance of where it's first coming to, and then figuring out how it got into the State of California or it's produced here. So we do this first, so I think military jet fuel, even though it's a very small component of total transportation energy use, you know, here are all the problems or some issues with the jet fuel balance, the bottom line here is we are likely undercounting jet fuel. So if we miss a cargo, a delivery, it didn't get added here, and it didn't end up being the "demand or consumption." So anything else I could find, we just sort of increase that number. But having said that, we do look at the data, we do look at sort of the changes nationally in jet fuel demand from that BTS data, and I think this information does track well historically, so I think we're doing a pretty good job capturing it, but I would certainly feel better if we had some sort of demand bogey from some sort of sales or some of the data as you mentioned, Commissioner McAllister, from some other Federal source for California airport activities to say, "Ah, okay, yeah, good, now I know what I'm shooting for." But we just don't have that.

COMMISSIONER MCALLISTER: It kind of makes sense, right, that you've got a market and the military is one buyer, and you kind of have -- yeah, if it's not being labeled explicitly, then you have a problem if you want to separate that out for your forecast.

MR. SCHREMP: Right, right.

COMMISSIONER MCALLISTER: So thanks for the detail.

MR. SCHREMP: And this is my final slide, so I would be happy to answer any other questions from the dais, or the audience, or online.

COMMISSIONER MCALLISTER: I just had one question about the natural gas, the slide where you sort of broke down the alternative fuels and the lion's share was Ethanol, and the next biggest slice was natural gas. And I wanted to just see -- so you were talking about liquid fuels, and I wanted to just see, is that 120.1 -- is that including all natural gas? Or is it just -- does it get compressed, for example?

MR. SCHREMP: This is compressed natural gas and it is converted to a gas and gallon equivalent for illustrative purposes, for this pie chart. So, yeah, so it's a gaseous fuel that we do include in the liquid line, so, yeah, that's that piece in 2009. And we know that's actually gone up.

COMMISSIONER MCALLISTER: Yeah. In 2009, in terms of this, it seems like a while ago, right? I mean, given all the stuff that we've done in the meantime at the Commission and across the state to kind of promote alternative fuels, you know, to move the needle, it would be good to see how these evolve going forward as the data comes in.

MR. SCHREMP: Okay. Any questions from any folks in the audience here? Not seeing any. None online? Okay, thank you.

MS. STRECKER: Okay, thank you. This concludes our presentations. I thank everybody for their participation today, it's been a long day for some of us, it's always stressful getting ready for workshops.

I wanted to remind you all that we're accepting comments to our Docket through July 12th. You can go online and find the Workshop Notice for the details on how to submit your comments. And Lynette has a slide for us. If you have any questions about anything today, please feel free to contact me. My contact information is up there, my email address, and thank you all. Commissioners, do you have any closing comments?

COMMISSIONER MCALLISTER: I think there's -- is there a spot for public comment? Or did you guys already do that?

MS. STRECKER: There is a spot for public comment, but we don't have any.

COMMISSIONER MCALLISTER: C'mon, raise your hands out there in the audience. Yeah, I mean, I was bummed to have to step out of the room for some of the good stuff, it was all good. But I enjoyed what I saw and clearly there's a lot of heavy lifting going on with the data issues, I think I underappreciated how difficult it is to get a handle on this market and really the nuance of it going forward. So I really appreciate the heavy lifting by staff on this. You know, as the Chair said at the kickoff, transportation is a key part of our emissions profile in the state and we're in California, we like our cars, we like our vehicles, we've got an extensive large state with a lot of population that does a lot of moving around, and a lot of goods movement from here and all over the country. So this really matters. And, you know, I'm the Lead on Energy Efficiency, and if I do my job, you know, well, to get more energy efficiency, then transportation is going to be an even bigger slice of the whole puzzle. So we've really got to have it all, we've got to get all of the sectors to move in the same direction with respect to efficiency and carbon emissions to get to the overall goals that we have in the state. And so none of it is less important or more important than the other, it's all important, so this is really a key sector and I think particularly with respect to vehicle travel, miles traveled, I mean, having lived in San Diego for a good long while and worked with SANDAG there, and worked with some of the other stakeholders, you know, I think the big question is how do you get people to modify behavior and sort of make choices that are less carbon intensive and if we're successful at that, if the RTOs and the Regional Planning and local governments and the various stakeholders there are successful at that local level, then eventually we're going to see this panning out in our forecasts, so I really do think that the up and down the chain interaction to keep a pulse on what's really going on out there in the various regions of the state is really important and I'm glad to see staff doing quite a bit of that. So with that, I will pass to the Lead Commissioner on Transportation and see if Commissioner Scott has any closing comments.

COMMISSIONER SCOTT: Sure. I would just add to what Commissioner McAllister said about the importance of this sector for our greenhouse gas goals but also for our air quality goals across the state, and that's another important piece there. I think I don't need to tell folks around the room this, but you know, the assumptions here are everything and it makes a difference in terms of what we're analyzing and how it turns out, and I just want to thank the staff for their thoroughness today in walking us through and sort of explaining what assumptions there are, what years the data are from, where there may be some weaknesses, and just really giving us a good thorough and detailed presentation about those assumptions that were made. And I think that's all that I'll say. Thank you. And thanks to our participants.

MS. STRECKER: Thank you.

COMMISSIONER MCALLISTER: So I think we are adjourned. Is that right? All right. Thanks, Lynette, and team, and Gene, thanks for shepherding us through the day.

(Thereupon, the Workshop was adjourned at 3:15 p.m.)

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