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Vehicle Surveys & Vehicle Demand Model

Transportation Committee Workshop
Transportation Energy Forecasts and Analyses for the
2011 Integrated Energy Policy Report
Sacramento, California
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Presentation Objectives

- Add clarity to the discussions on why we periodically conduct the California Vehicle Survey by explaining **how**:
 - the survey fits into fuel demand forecast and analysis
 - it is different from other surveys
 - it is different from past surveys
 - it is related to our collaborations with other state and local agencies
- Seek your feedback on what you consider to be the important questions to ask.



Starting Point

What questions do we want to answer?

What policies do we want to evaluate?

The response to these questions guide our model and survey designs.

For instance: you may ask us **how much** natural gas will be used in the transportation sector in the next 20 years?

YvdW1

This will raise a **series of related questions** for which we will need to find an answer, **before** we can respond to your question, including:

What are **consumer preferences** for natural gas vehicle?

Slide 3

YvdW1

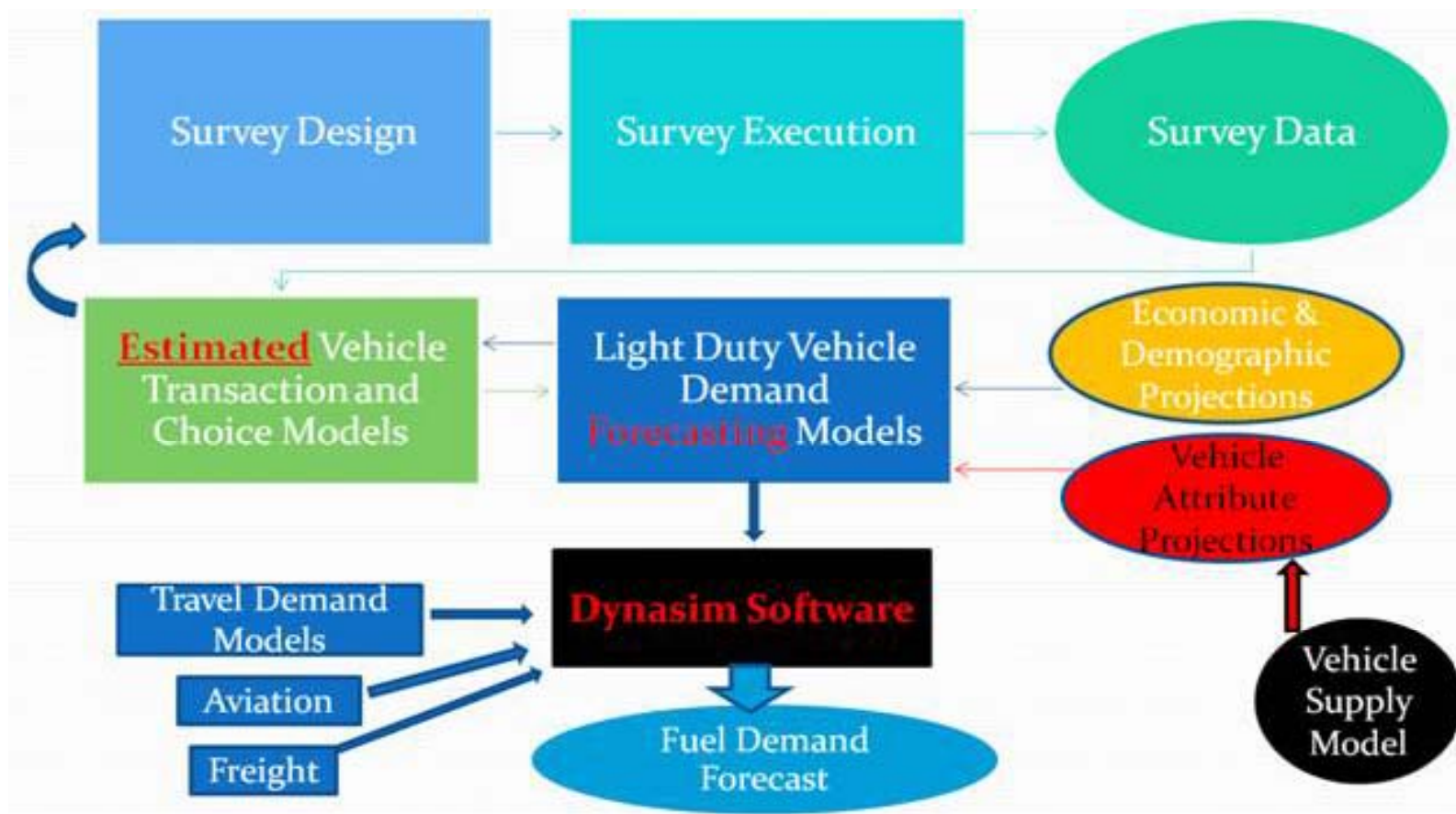
As I recall from our discussion this afternoon, something like this statement should be the point of departure for your talk. What is so special about this survey? What does it contribute to our work? Why is it worth paying for? And so forth.

You can emphasize this by re-ordering some slides, stopping on one slide for a while to make this point, or on each slide emphasize how it makes or contributes to what is important about this survey.

Ysbrand van der Werf, 9/8/2011



How Does It Work?





Other Surveys?

- Yes, there are other surveys that can inform the question you raised, but they cannot answer your question
- Some are opinion surveys, others rely on manufacturers perspectives, some are national surveys and not specific to California, some are out of date and do not reflect current consumer preferences ...
- When consumers are engaged in making choices they compare numbers. That is what our stated preferences survey enables them to do.



What is Most Important When Evaluating a New Car?

Row Bases: Factor Is Important Consideration

		Gender		Age			HHld Income		Region			
	TOTAL	Men	Women	18-34	35-54	55+	<\$50K	\$50K+	NEast	MWest	South	West
UNWEIGHTED BASE	1,713	878	835	249	554	884	618	753	300	381	630	402
<u>Top 3 Factors :</u>	%	%	%	%	%	%	%	%	%	%	%	%
Price	49	48	50	56	45	45	50	47	50	51	48	48
Safety	47	39	56	49	49	44	51	45	49	48	48	45
Fueleconomy	40	40	40	39	36	46	46	37	39	42	41	37
Quality	35	38	33	30	41	33	33	36	30	35	40	33
Performance	25	28	22	30	22	24	29	24	20	22	27	28
Value	24	26	21	19	29	23	21	27	21	24	24	26
Brand	16	17	15	15	15	17	14	18	14	17	16	17
Design or style	14	15	13	13	14	16	10	18	13	14	16	13
Environmentally friendly or green	12	11	12	11	12	12	11	11	11	10	10	17
Technology or innovation	8	10	5	6	9	7	7	7	9	8	5	11
Manufacturer incentives	6	6	6	6	5	6	6	6	10	3	7	5
Government incentives	2	1	2	3	1	2	2	2	2	2	1	2
Others	3	3	2	1	4	3	3	3	4	2	2	3
Don't know	2	1	2	2	0	3	1	1	3	2	1	1
NO ANSWER	1	1	2	1	1	1	1	1	1	2	1	2

Source: Green Cars, Consumer Report National Research Center, 2010 Survey



What Power Types Are Considered for New Vehicle

Base: Household Owns Car

	Gender		Age			HHld Income		Region				
	TOTAL	Men	Women	18-34	35-54	55+	<\$50K	\$50K+	NEast	MWest	South	West
UNWEIGHTED BASE	1,713	878	835	249	554	884	618	753	300	381	630	402
	%	%	%	%	%	%	%	%	%	%	%	%
Conventional gasoline	67	69	65	64	71	68	66	69	69	72	66	63
Hybrid or electric	39	37	40	41	42	33	37	42	35	35	37	47
Flex-fuel, runs on gasoline or ethanol fuel	35	38	32	41	33	33	40	32	34	36	38	31
Natural gas or propane	19	20	18	22	17	18	21	18	21	13	20	20
Hydrogen fuel cell	16	20	13	18	15	15	15	17	20	19	13	16
Diesel	14	21	9	18	15	11	13	17	13	13	14	17
Don't know	5	3	8	4	5	7	6	4	6	6	5	4

Source: Green Cars, Consumer Report National Research Center, 2010 Survey



We Need to Know

- Whether or not survey participants intend to buy a vehicle
- How they prefer one vehicle type to another
- Consumer preferences are revealed in the vehicles they have already purchased (revealed preferences)
- But, for the vehicle they plan to purchase, we have to rely on what they say (stated preferences)
- Do they actually do what they say? We are planning to test that.



Stated Preferences Survey

- Creates hypothetical vehicles to represent the vehicles/attributes that do not currently have an established market, as well as the ones that do
- Describes a hypothetical vehicle type to the participants by its attributes including fuel type, fuel cost, vehicle price, range and others
- These attributes are numbers that matter to consumers
- The respondents are asked to choose from a set of 4 vehicles



Sample Choice Set

Vehicle Choice 3	Vehicle A	Vehicle B	Vehicle C	Vehicle D
Vehicle type	Midsize car	Subcompact car	Small cross-utility SUV	Midsize car
Fuel type	Gasoline	Full Electric	Hybrid-Electric (HEV)	Natural Gas (NGV)
Age of vehicle	New (2009)	New (2009)	New (2009)	New (2009)
Purchase price	\$25,600	\$24,800	\$21,900	\$39,000
Incentive	--	--	\$1,000 tax credit	--
MPG or equivalent	21 MPG	135 MPG	25 MPG	22 MPG
Fuel cost per year	\$2,000	\$350	\$1,680	\$1,310
Fuel availability		Plug-in only at home		1 in 50 stations
Refueling time		8 Hours		10 Minutes at station, 4 hours at home
Driving range		30 Miles		150 Miles
Maintenance cost per year	\$570	\$480	\$440	\$390
Acceleration (0-60 mpg)	6.2 seconds	5.2 seconds	11.1 seconds	6.2 seconds
Select One:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



We Cannot

- Accurately gauge consumers' preferences for a hypothetical vehicle or vehicle attribute if it has not been presented as a choice to respondents in the choice experiments
- Place a hypothetical vehicle in the choice experiments without having some realistic idea about the range of its attributes, including but not limited to price and MPG
- Include a vehicle in the estimated model if it has not been part of the stated preferences survey



Vehicle Surveys of Revealed and Stated Preferences

- Our vehicle survey is composed of both revealed and stated preferences surveys, for both household and the commercial sectors
- Conducted periodically, at the Energy Commission, to assess shifts in consumer preferences
- Energy Commission first integrated revealed and stated preferences surveys in mid 1990s, followed by later surveys in 2003, 2007, and 2009
- 2011 survey will differ from previous vehicle surveys at the Energy Commission, by integrating household vehicle survey with Caltrans household travel survey



2009 Vehicle Survey

- included more alternative fuels than previous surveys
- included CNG and electric vehicles (not in 2007 survey)
- did not include hydrogen vehicles in the vehicle choice sets.
- included more regional differentiation
- included cell phone-only households
- included model estimation for more refined market segments:
1,2 and 3+ vehicle households in contrast to 1 and 2+ households in 2007



2009 Survey Says:

All California consumers (households and commercial)

- Prefer gasoline vehicles to electric and CNG vehicles

Households with more than one vehicle

- Prefer PHEV, hybrid, FFV, and diesel to gasoline
- Respond positively to all incentives

Households with one vehicle

- Prefer hybrid to gasoline vehicles
- Respond positively to tax credit

All commercial sector fleet owners

- Respond only to the HOV lane incentive



Survey and Modeling Collaborations

- With Caltrans since 2008 on their Household Travel Survey (CHTS) project
- The CHTS RFP development process in 2009
- The CHTS steering committee and technical advisory committees since 2010, along with ARB, and multiple local agencies
- Contributed funds to equip travel survey participants driving alternative fuel vehicles with GPS and OBD
- Participated in the peer advisory board, involved in development of the Cal PECAS model, now known as Cal SIIM model, since 2008
- Served on the interagency team involved in updating RTP guidelines to meet SB375 requirements



As a Result...

- Collaboration and coordination with Caltrans, SCAG and others is built into the 2011 survey design
- 2011 vehicle survey will create an integrated travel and vehicle survey data base that can be used in developing integrated travel and vehicle choice models, after 2013
- Have started conversation with ARB, since last month on scope modifications of our future projects as well as the consumer choice projects listed on ARB's Strategic Research Plan, examine vehicle demand models at ARB and CEC, coordinate and coordinate integrated travel and vehicle choice model, and potentially on a commercial vehicle travel survey.
- A project due to begin for SCAG, using 2009 survey data to explore the relationship between land use and vehicle choice.



Collaboration

- Can lower the cost of completing a project, or meeting an objective, and/or improves the quality and/or quantity of the final product
- Improves data, method, and output consistency between different agencies
- Reduces overlaps, duplications, and redundancies
- Requires respectful dialogue with other agencies and their staff
- Involves not only the agencies involved in a project, but also the contractor(s) involved with different projects
- Therefore, it requires more time and a greater degree of coordination among all parties involved



Next....

Looking forward to 2013 and beyond

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