State of California
AIR RESOURCES BOARD

RESEARCH PROPOSAL

Resolution 12-17

March 22, 2012

Agenda Item No.: 12-2-1

WHEREAS, the Air Resources Board (ARB) has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code sections 39700 through 39705;

WHEREAS, a research proposal, number 2739-273, entitled "Modeling Household Vehicle and Transportation Choice and Usage," has been submitted by the University of California, Davis;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

> Proposal Number 2739-273 entitled "Modeling Household Vehicle and Transportation Choice and Usage," submitted by the University of California, Davis, for a total amount not to exceed $300,000.

NOW, THEREFORE, BE IT RESOLVED that the Air Resources Board, pursuant to the authority granted by Health and Safety Code section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

> Proposal Number 2739-273 entitled "Modeling Household Vehicle and Transportation Choice and Usage," submitted by the University of California, Davis, for a total amount not to exceed $300,000.

BE IT FURTHER RESOLVED that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein, and as described in Attachment A, in an amount not to exceed $300,000.

I hereby certify that the above is a true and correct copy of Resolution 12-17, as adopted by the Air Resources Board.

Mary Alice Morency, Clerk of the Board

ATTACHMENT A

"Modeling Household Vehicle and Transportation Choice and Usage"

Background
ARB has previously sponsored research related to forecasting new vehicle purchases, but the current model (CARBITS) has focused exclusively on the vehicle purchase decision without regard to expected vehicle usage or market factors (beyond fuel prices), and doesn't account for consumer acceptance of advanced vehicles. ARB requires additional research to better understand: (i) households that choose to have low or zero vehicle miles traveled (VMT); (ii) consumer acceptance of emerging low-emission vehicles; and (iii) considerations that affect vehicle purchase choice, such as anticipated or actual vehicle use and market factors (beyond fuel price).

Objective
The proposed project's objectives are (1) to identify the geographic and demographic characteristics of low-VMT and low-vehicle ownership households, including a deeper understanding of the factors that influence their transportation footprint; and (2) to develop a model of household vehicle and transportation choice and usage that will allow more rigorous evaluation of policies intended to reduce transportation emissions.

Methods
The researchers will analyze vehicle ownership (VO) and vehicle-miles traveled (VMT) in existing datasets. They will use the National Household Travel Survey (NHTS) data to classify households as zero-, low-, medium-, or high-VO and -VMT (relative to "typical" households of the same size), and will develop models that predict VO category as a function of household income and mobility limitations. They will use attitudinal data to investigate the extent to which including attitudes can improve the VO model's predictive ability. They will classify zero- and low-vehicle-owning households based on the likely reason for their status, and they will explore the role of geographic factors in a household's VO and VMT status.

The researchers will develop an empirically based model of household vehicle choice and usage. First, they will obtain, clean and merge the datasets, then consolidate vehicles into household-level vehicles, calculate summary statistics and analyze fleet composition. They will examine the relationships among: VMT, gasoline price and fuel economy; household income and response to gasoline price and fuel economy; population density and other locational characteristics and gasoline price/fuel economy; and will explore the diffusion of low-emissions vehicles, including where they are and attributes of households holding them, to see whether the data will permit including them in the model. The team will then determine vehicle classifications for choice mode and scenarios for counterfactuals/projections (both in collaboration with ARB), determine the framework for (and then code) the model, and ultimately run the model on a subsample of data and then on the full dataset. Finally, they will perform suitable robustness checks, calculate summary statistics (elasticities, survival curves), and calculate vehicle fleet projections under counterfactual scenarios.

Expected Results
The researchers will provide a report that classifies zero- and low-vehicle-owning households based on the likely reason for their status, including the role of geographic factors. The research team will also develop an empirically based discrete choice model of household vehicle choice and usage which will factor in VMT, gasoline price, fuel economy, household income, household response to gasoline price/fuel economy, and population density and other locational characteristics, and the diffusion of low-emissions vehicles. The final report will include full documentation of the model.

Significance to the Board
This research will inform the development of sustainable communities strategies under Senate Bill 375, support Advanced Clean Cars by modeling how anticipated vehicle usage (and acceptance of new vehicle technologies) affects vehicle purchase decisions, and improve ARB's forecasting of the light-duty vehicle fleet and associated emissions.

Contractor:
University of California, Davis

Contract Period:
36 months

Principal Investigators (PIs):
David S. Rapson, Ph.D.
Patricia L. Mokhtarian, Ph.D.

Contract Amount:
$300,000

Basis for Indirect Cost Rate:
The State and the UC system have agreed to a ten percent indirect cost rate.

Past Experience with this Principal Investigator:
The research team members are all well-qualified to perform the work, and have published extensively on closely-related topics. Co-PI Patricia Mokhtarian is a key researcher on an ongoing ARB project that will quantify the effect of local government actions on vehicle miles traveled.

Prior Research Division Funding to University of California, Davis:

Year	2011	2010	2009
Funding	$1,394,560	$508,267	$1,588,387

BUDGET SUMMARY

Contractor: University of California, Davis

"Modeling Household Vehicle and Transportation Choice and Usage"

DIRECT COSTS AND BENEFITS			
1.	Labor and Employee Fringe Benefits	$ 171,359	
2.	Subcontractors	$ 38,199	
3.	Equipment	$ 0	
4.	Travel and Subsistence	$ 1,937	
5.	Electronic Data Processing	$ 0	
6.	Reproduction/Publication	$ 0	
7.	Mail and Phone	$ 0	
8.	Supplies	$ 1,000	
9.	Analyses	$ 0	
10.	Miscellaneous	$ 67,576[1]	
	Total Direct Costs		$280,071
INDIRECT COSTS			
1.	Overhead	$ 19,929	
2.	General and Administrative Expenses	$ 0	
3.	Other Indirect Costs	$ 0	
4.	Fee or Profit	$ 0	
	Total Indirect Costs		$ 19,929
TOTAL PROJECT COSTS			**$300,000**

[1] Miscellaneous expenses are exclusively for graduate student tuition costs. Graduate student fees are calculated according to the tuition and fee schedule for residents of California, minus a 25 percent buy-down for students hired under extramural grants, funded by the UC Davis Office of Graduate Studies. Academic year 11/12 resident fees are currently $15,271.44/year. For academic year 12/13 and beyond an annual increase of 10 percent is added.

Attachment 1

SUBCONTRACTORS' BUDGET SUMMARY

Subcontractor: Yale University

Description of subcontractor's responsibility: Dr. Kenneth Gillingham is needed for this project to bring expertise in econometrically modeling vehicle choice and driving behavior in California. He will be involved in the development of the model, choice of variables, interpretation of the results, and writing of the paper. Dr. Gillingham was chosen for this role for his unique experience in developing a somewhat similar model using California data from the smog check program.

DIRECT COSTS AND BENEFITS				
1.	Labor and Employee Fringe Benefits	$	34,214	
2.	Subcontractors	$	0	
3.	Equipment	$	0	
4.	Travel and Subsistence	$	512	
5.	Electronic Data Processing	$	0	
6.	Reproduction/Publication	$	0	
7.	Mail and Phone	$	0	
8.	Supplies	$	0	
9.	Analyses	$	0	
10.	Miscellaneous	$	0	
	Total Direct Costs			$34,726
INDIRECT COSTS				
1.	Overhead	$	3,473	
2.	General and Administrative Expenses	$	0	
3.	Other Indirect Costs	$	0	
4.	Fee or Profit	$	0	
	Total Indirect Costs			$3,473
TOTAL PROJECT COSTS				**$38,199**