State of California
AIR RESOURCES BOARD

Modeling Household Vehicle and Transportation Choice and Usage

RESEARCH PROPOSAL

Resolution 15-12

May 21, 2015

Agenda Item No.: 15-4-1

WHEREAS, the Air Resources Board (ARB or Board) 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, the Research Division staff has reviewed Contract Number 11-322, titled "Modeling Household Vehicle and Transportation Choice and Usage," and recommended a contract augmentation for approval to the University of California, Davis, for a total amount not to exceed $45,000;

WHEREAS, the Research Division finds that in accordance with Health and Safety Code section 39701, the results of the study will provide a more sophisticated understanding of the evolution and emissions of the light-duty fleet, which will improve ARB's vehicle emissions inventory, and will be valuable to ARB's Advanced Clean Cars and Sustainable Communities programs; and

WHEREAS, in accordance with Health and Safety Code section 39705, the Research Screening Committee has reviewed and recommends funding the Augmentation.

NOW, THEREFORE BE IT RESOLVED that the Air Resources Board, pursuant to the authority granted by Health and Safety Code section 39700 through 39705, hereby accepts the recommendations of the Research Screening Committee and staff and approves the Augmentation.

BE IT FURTHER RESOLVED that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the Augmentation proposed herein, and as described in Attachment A, in an amount not to exceed $45,000.

I hereby certify that the above is a true and correct copy of Resolution 15-12 as adopted by the Air Resources Board.

Tracy Jensen

Tracy Jensen, Clerk of the Board

ATTACHMENT A

"Modeling Household Vehicle and Transportation Choice and Usage"

Background
This project was approved by the Board in April 2012 to advance ARB's ability to forecast new vehicle purchases, and to provide insight into the factors that enable some households to voluntarily maintain low emission transportation footprints (i.e., low or zero vehicle miles traveled [VMT] or vehicle ownership). The primary task for the Co-Principal Investigator (PI), David Rapson, is to develop, test, and run a vehicle choice and usage model that is more sophisticated than previous models and accounts for drivers' anticipated usage of the vehicle in their purchase decision, as well as a more comprehensive set of market factors (i.e., beyond just fuel prices). The development of this model relies on a variety of datasets, the most important of which is the California Department of Motor Vehicle (DMV) data.

Between the time this contract was approved by the Board in 2012, and the kickoff meeting in October 2012, ARB's policy on sharing confidential DMV data with contractors changed. The original work plan for this contract anticipated that ARB would provide the DMV dataset directly to the contractors, but the new policy no longer allowed this. In order to provide the DMV data to the contractors, ARB and the contractors developed a complex process of anonymizing the DMV data while also preserving personal and household identifiers. The resulting process has been significantly more complicated and has required much more time from senior research personnel (Co-PI David Rapson and Subcontractor Kenneth Gillingham) than was originally anticipated. As a result, the work plan requires substantial revisions and an augmentation of $45,000 to ensure that personnel support is adequate to complete all of the key tasks that were outlined in the original contract.

Objective
The 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 proposed augmentation will allow the research team to complete the design, coding, and testing of the vehicle choice and usage model, run the counterfactual simulations, and develop forecasts of the future vehicle fleet. This model of household vehicle choice and usage 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. 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 structural model, and ultimately run the model on a subsample of the data and then on the full

dataset. Finally, the research team will perform suitable robustness checks, calculate summary statistics (elasticities, survival curves), and calculate vehicle fleet projections under counterfactual scenarios.

Expected Results
The research team will 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
The results of this research will provide a more sophisticated understanding of the evolution and emissions of the light-duty fleet, which will improve ARB's vehicle emissions inventory, and will be valuable to ARB's Advanced Clean Cars and Sustainable Communities programs.

Contractor:
University of California, Davis

Contract Period:
48 months

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

Contract Augmentation Amount:
$45,000

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

Past Experience with the PIs:
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. Co-PI David Rapson has worked diligently to maintain progress toward the development of the vehicle choice and usage model in spite of the lack of the anonymized DMV dataset.

Prior Research Division Funding to the University of California, Davis

Year	2014	2013	2012
Funding	$ 2,249,136	$ 1,131,716	$ 4,949,363

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	$ 24,031		
2.	Subcontractors	$ 0		
3.	Equipment	$ 0		
4.	Travel and Subsistence	$ 136		
5.	Electronic Data Processing	$ 0		
6.	Reproduction/Publication	$ 0		
7.	Mail and Phone	$ 0		
8.	Supplies	$ 0		
9.	Analyses	$ 0		
10.	Miscellaneous	$ 18,305[1]		
	Total Direct Costs		$	42,472
INDIRECT COSTS				
1.	Overhead	$ 2,528		
2.	General and Administrative Expenses	$ 0		
3.	Other Indirect Costs	$ 0		
4.	Fee or Profit	$ 0		
	Total Indirect Costs		$	2,528
TOTAL PROJECT COSTS			**$**	**45,000**

[1] Miscellaneous expenses include $18,195 for graduate student in-state tuition. The primary purpose of the budget augmentation is to fund research assistance for the final year of the project. The graduate student researcher (GSR) will assist with final data merging and cleaning, programming, analysis, and presentation of the results for the final report.