State of California
AIR RESOURCES BOARD

The Dynamics of Plug-in Electric Vehicles in the Secondary Market and their Implications for Vehicle Demand, Durability, and Emissions

RESEARCH PROPOSAL

Resolution 14-25

September 18, 2014

Agenda Item No.: 14-7-1

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 2779-280, titled "The Dynamics of Plug-in Electric Vehicles in the Secondary Market and Their Implications for Vehicle Demand, Durability, and Emissions," (Research Proposal) has been submitted by the University of California, Davis for a total amount not to exceed $300,000;

WHEREAS, the Research Division staff has reviewed the Research Proposal and finds that in accordance with Health and Safety Code section 39701, research is needed to refine long-term projections of emissions benefits from plug-in electric vehicles in order to inform future decisions on the treatment of these vehicles by various ARB programs, such as incentives, durability requirements, or vehicle crediting; and

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

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 Research Division staff and approves the Research Proposal.

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 Proposal as further 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 14-25 as adopted by the Air Resources Board.

Tracy Jensen

Tracy Jensen, Clerk of the Board

ATTACHMENT A

"The Dynamics of Plug-in Electric Vehicles in the Secondary Market and Their Implications for Vehicle Demand, Durability, and Emissions"

Background

While manufacturer compliance with ARB's Zero Emission Vehicle (ZEV) program is based on new vehicles sales, the expected emission benefits will require that these vehicles, including plug-in electric vehicles (PEVs), remain in the fleet past the first owner. PEV sales over the past three years are approaching a total of 85,000 in California and many early consumers have been opting to lease rather than purchase these vehicles – either in response to competitive lease offers, uncertainty about current technology, and/or expectations for future developments – which will accelerate the development of a large secondary market of PEVs. This market began developing in late 2013, and initiating new research in these early stages will allow for comprehensive monitoring of its development process.

Objective

The objective of this project is to characterize the dynamics of PEVs in the secondary market to understand the longer term emission implications from an increasing market share.

Methods

Data sources will include comprehensive vehicle ownership/lessee databases, dealership inventory and sales data, commercially-sourced market and pricing data, and surveys of used PEV buyers. Data analysis will include evaluation of factors such as battery life, energy prices, infrastructure availability, attributes and prices of new vehicle offerings, and economic conditions on the demand and prices of used PEVs and on their usage.

This research project will employ an econometric model to examine the statewide market for used PEVs, including the factors that are related to price variation of used PEVs (e.g., HOV sticker, state and federal incentives, mileage, battery life, etc.), the demand for used PEVs (including regional variations within California and out-of-state, and the role of charging infrastructure), and the relationship between the primary and secondary PEV markets.

This project will also employ surveys to characterize used PEV buyers (socioeconomic and demographic characteristics, household fleets, etc.), their purchase motivations (value placed on vehicle attributes, incentives, charging access, etc.), and how they are using and charging their vehicles. The analysis will also evaluate whether the secondary market is expanding access to advanced clean cars, such as PEVs, to a wider array of consumers than the new PEV market. Additionally, the study will explore the variety of reasons that PEVs are entering the used market in order to gauge consumer acceptance of this class of technology.

Expected Results
This project will characterize the market for used plug-in electric vehicles in California and will analyze the factors that drive evolution of this market.

Significance to the Board
The results of this study will be useful to refine long-term projections of emissions benefits from PEVs, and to inform future decisions beginning in 2016, on the treatment of these vehicles by various ARB programs, such as incentives, durability requirements, or vehicle crediting.

Contractor:
University of California, Davis

Contract Period:
30 months

Principal Investigator (PI):
Thomas Turrentine, 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:
Dr. Turrentine is the director of the Plug-in Hybrid and Electric Vehicle Center at the University of California, Davis' Institute of Transportation Studies. He is listed as a co-Principal Investigator on the research project on new car buyers' valuation of zero-emission vehicles and is the Principal Investigator on the Advanced Plug-in Electric Vehicle Travel and Charging Behavior research project. Previously, he was the principal investigator on a consumer study of converted plug-in hybrid vehicles through a Mobile Source Control Division contract for $1,800,000 completed in 2010.

Prior Research Division Funding to the University of California, Davis:

Year	2013	2012	2011
Funding	$1,131,716	$4,949,363	$1,394,560

BUDGET SUMMARY

Contractor: University of California, Davis

The Dynamics of Plug-in Electric Vehicles in the Secondary Market and Their Implications for Vehicle Demand, Durability, and Emissions

DIRECT COSTS AND BENEFITS					
1.	Labor and Employee Fringe Benefits	$	247,889		
2.	Subcontractors	$	0		
3.	Equipment	$	0		
4.	Travel and Subsistence	$	504		
5.	Electronic Data Processing	$	0		
6.	Reproduction/Publication	$	2,500		
7.	Mail and Phone	$	2,420		
8.	Supplies	$	1,025		
9.	Analyses	$	0		
10.	Miscellaneous	$	20,005		
	Total Direct Costs			$	274,343
INDIRECT COSTS					
1.	Overhead	$	25,657		
2.	General and Administrative Expenses	$	0		
3.	Other Indirect Costs	$	0		
4.	Fee or Profit	$	0		
	Total Indirect Costs			$	25,657
TOTAL PROJECT COSTS				**$**	**300,000**