State of California
AIR RESOURCES BOARD

Technical Analysis of Vehicle Load-Reduction Potential for Advanced Clean Cars

RESEARCH PROPOSAL

Resolution 13-11

March 21, 2013

Agenda Item No.: 13-3-2

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, a research proposal, number 2756-275, entitled "Technical Analysis of Vehicle Load-Reduction Potential for Advanced Clean Cars," has been submitted by Control-Tec, LLC;

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

> Proposal Number 2756-275, entitled "Technical Analysis of Vehicle Load-Reduction Potential for Advanced Clean Cars," submitted by Control-Tec, LLC, for a total amount not to exceed $166,892;

WHEREAS, Research Division staff has reviewed Proposal Number 2756-275 and finds that in accordance with Health and Safety Code section 39701, research is needed to understand how stringent greenhouse gas (GHG) emission standards may require vehicle manufacturers to increasingly utilize load-reduction strategies such as vehicle aerodynamic improvements, reduced tire rolling resistance, or mass optimization to facilitate compliance;

WHEREAS, the objective of this research project is to understand the extent to which current vehicles have already adopted these technologies, and their potential to reduce GHG emissions assuming that all model year 2025 vehicles adopt load-reduction technologies that have been demonstrated on today's vehicles. Research Division staff recommends this proposal for approval;

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 recommendations of the Research Screening Committee and Research Division staff and approves the following:

Proposal Number 2756-275 entitled "Technical Analysis of Vehicle Load-Reduction Potential for Advanced Clean Cars," submitted by Control-Tec, LLC not to exceed $166,892.

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 $166,892.

I hereby certify that the above is a true and correct copy of Resolution 13-11, as adopted by the Air Resources Board.

Tracy Jensen

Tracy Jensen, Clerk of the Board

ATTACHMENT A

"Technical Analysis of Vehicle Load-Reduction Potential for Advanced Clean Cars"

Background

Greater penetration of load-reduction technologies, such as improved aerodynamic designs, low rolling resistance tires, mass reduction, and reduced accessory loads, is one of many possible compliance strategies for auto manufacturers to meet the greenhouse gas (GHG) standards of the Advanced Clean Cars program. Reducing vehicle road load through these technologies contributes to GHG emission reductions by reducing the energy required to propel the vehicle. Additionally, load reduction strategies have the ability to produce ancillary cost benefits. For example, reducing vehicle road load may allow for a downsized powertrain while maintaining vehicle performance characteristics, which may in turn reduce emissions further; or for electric-drive vehicles, reduced vehicle load can result in lower energy storage requirements and vehicle costs, or extend vehicle range.

Objective

Stringent GHG emission standards may require vehicle manufacturers to increasingly utilize load-reduction strategies such as vehicle aerodynamic improvements, reduced tire rolling resistance, or mass optimization to facilitate compliance. The objective of this research project is to understand the extent to which current vehicles have already adopted these technologies, and their potential to reduce GHG emissions assuming that all model year 2025 vehicles adopt load-reduction technologies that have been demonstrated on today's vehicles.

Methods

The contractor will conduct a literature review of current and promising load-reduction technologies and strategies. They will then assemble a dataset containing detailed vehicle attributes for a full vehicle model year that will allow them to assess, calculate, or infer vehicle load of individual vehicle configurations. Using this dataset and statistical analysis, they will identify the vehicle configurations in the fleet that are using new, non-mass load-reduction technologies, materials, or designs and designating those that are best available or best-in-class. Additionally, they will produce a working definition for "mass efficiency" to develop appropriate metrics for this concept and identify the most mass efficient vehicles in the fleet.

Expected Results

The contractor will use their findings on best available and best-in-class technologies as well as mass efficiency to estimate the reduction in California's new vehicle fleet average tailpipe CO_2 emission rates assuming maximum utilization of load-reduction strategies and their secondary effects on powertrain sizing and energy storage. Basing this analysis on existing technologies found on vehicles in commercial production produces some level of assurance that these technologies can be adopted without compromising vehicle safety.

The deliverables of this project include a final report detailing all of the data, methods, and results from the research, as well as the final cross-referenced dataset and a listing of vehicle configurations with best available and/or best-in-class load reduction technologies, designs, or materials.

Significance to the Board
Continued evaluation of the potential benefits of load reduction strategies will help ARB to assess the technical feasibility and associated costs for advanced technology vehicles in future model years. These findings may inform the Technical Assessment Report that will be a component of the interagency midterm evaluation for the greenhouse gas standards.

Contractor: Control-Tec, LLC

Contract Period:
16 months

Principal Investigator:
Greg Pannone

Contract Amount:
$166,892

Basis for Indirect Cost Rate:
The State and Control-Tec, LLC have agreed to a twenty percent indirect cost rate.

Past Experience with the Principal Investigator/s:
ARB staff has worked with Control-Tec, LLC in the past with their devices for on-board diagnostic systems, but have no experience in a research capacity or with their data analytics division.

Prior Research Division Funding to Control-Tec, LLC:

Year	2012	2011	2010
Funding	$ 0	$ 0	$ 0

BUDGET SUMMARY

Control-Tec, LLC

"Technical Analysis of Vehicle Load-Reduction Potential for Advanced Clean Cars"

DIRECT COSTS AND BENEFITS				
1.	Labor and Employee Fringe Benefits	$	135,664	
2.	Subcontractors	$	0	
3.	Equipment	$	0	
4.	Travel and Subsistence	$	4,095	
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			$ 139,759
INDIRECT COSTS				
1.	Overhead	$	27,133	
2.	General and Administrative Expenses	$	0	
3.	Other Indirect Costs	$	0	
4.	Fee or Profit	$	0	
	Total Indirect Costs			$ 27,133
TOTAL PROJECT COSTS				**$ 166,892**