

State of California
AIR RESOURCES BOARD

Resolution 01-46

October 25, 2001

Agenda Item No.: 01-8-2

WHEREAS, the Air Resources 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 proposal, number 01-52, entitled "Hydrogen Bus Technology Validation Program", has been submitted by the University of California, Davis--Institute for Transportation Studies in response to the 2001 Innovative Clean Air Technologies (ICAT) Program solicitation;

WHEREAS, the proposal has been independently reviewed for technical and business merit by highly qualified individuals; and

WHEREAS, the Research Division staff and the Executive Officer and Deputy Executive Officers have reviewed and recommend for funding:

Proposal Number 01-52, entitled "Hydrogen Bus Technology Validation Program", submitted by the University of California, Davis--Institute for Transportation Studies, for a total amount not to exceed \$124,949.

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

Proposal Number 01-52, entitled "Hydrogen Bus Technology Validation Program", submitted by the University of California, Davis--Institute for Transportation Studies, for a total amount not to exceed \$124,949.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and agreements for the efforts proposed herein, and as described in Attachment A, in an amount not to exceed \$124,949.

I hereby certify that the above is a true and correct copy of Resolution 01-46, as adopted by the Air Resources Board.

Marie Kavan, Clerk of the Board

ATTACHMENT A

Innovative Clean Air Technologies (ICAT) Grant Proposal: “Hydrogen Bus Technology Validation Program”

Background

UC Davis-ITS, with assistance from NRG Technologies (holder of patents for the technology of the ICAT proposal) is conducting a validation program for hydrogen-fueled bus technologies. The program is funded in part by the U.S. Department of Transportation. One of the technologies is “HCNG”, a 30/70 mixture of hydrogen and natural gas. That mixture allows a suitably modified engine to run at air/fuel mixtures much leaner than what is possible with natural gas. The lean mixture leads to very low NO_x emissions. A prototype HCNG bus is on hand and will be operated in transit service to provide data for designing an advanced prototype whose construction and deployment in transit service would be partially funded by ICAT.

Objective

The objectives are to achieve the 2007 NO_x standard of 0.2 gram/brake hp-hour, (g/hp-hr), to compare operational performance of the HCNG transit buses with the performance of CNG buses, and to predict, via models developed from project’s data, HCNG performance in service other than the transit operation of the project.

Methods

UC Davis-ITS will collect emission and performance data from an existing prototype of the HCNG bus to complete the design of components for the second bus whose demonstration will be funded by the ICAT project. The second bus will be placed in transit service in Yolo County in parallel with ordinary CNG buses. Performance and emissions will be monitored. Data from the operations will be input to models to estimate operating costs in comparison to CNG buses in general transit service.

Expected Results

A successful project should give transit operators the information needed to allow them to choose HCNG as the technology for buses ordered for 2007.

Significance to the Board

A successful project would be the first demonstration of the ability to achieve the 0.2 g/hp-hr NO_x standard for 2007. Commercial use of HCNG would encourage the development of a hydrogen fueling “infrastructure”.

Applicant: UC Davis, Institute for Transportation Studies **Project Period:** 12 months

Principal Investigator: Dr. Marshall Miller

ICAT Funding: \$124,949

Cofunding: \$126,074
UCD-ITS \$100,051
NRG Technologies \$26,023

Past Experience with This Principal Investigator: None.

Although staff does not have any prior experience with the PI, the extent of review of ICAT proposals provides a sufficient level of confidence for staff to recommend the proposal for an ICAT award. The ICAT evaluation process includes reviews by five external technical and four external business advisors, as well as internal reviewers from Mobile Source Control and Operations Divisions, Stationary Source Division, Research Division, and the Executive Office.

Prior ICAT Funding to the University of California, Davis, Institute for Transportation Studies:

Year	2000	1999	1998
Funding	0	0	0

BUDGET SUMMARY

UC Davis, Institute for Transportation Studies
Hydrogen Bus Technology Validation Program

<u>Direct Costs and Benefits</u>	<u>ICAT</u>	<u>Total</u>
1. Labor	\$ 29,149	\$ 87,457
2. Employee Fringe Benefits	\$ 8,162	\$ 24,488
3. Subcontractors	\$ 81,666	\$121,023
4. Equipment	\$ 0	\$ 0
5. Travel and Subsistence	\$ 410	\$ 3,393
6. Materials and Supplies	\$ 956	\$ 2,869
7. Other Direct Costs	\$ 0	\$ 0
Total	\$120,343	\$239,230
 <u>Indirect Costs</u>		
1. Overhead	\$ 4,606	\$ 11,793
2. Other Indirect Costs	\$ 0	\$ 0
Total	\$ 4,606	\$ 11,793
Total Project Costs	<u>\$124,949</u>	<u>\$251,023</u>