

State of California
AIR RESOURCES BOARD

Resolution 06-57

December 7, 2006

Agenda Item No.: 06-11-2

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 49, entitled "Composite All-Electric 40-Foot Bus Using Lithium Batteries," has been submitted by ISE Corporation in response to the 2006 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 49, entitled "Composite All-Electric 40-Foot Bus Using Lithium Batteries," submitted by ISE Corporation, for a total amount not to exceed \$290,000.

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 49, entitled "Composite All-Electric 40-Foot Bus Using Lithium Batteries," submitted by ISE Corporation, for a total amount not to exceed \$290,000.

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 \$290,000.

I hereby certify that the above is a true and correct copy of Resolution 06-57, as adopted by the Air Resources Board.

Lori Andreoni, Clerk of the Board

ATTACHMENT A

Innovative Clean Air Technologies (ICAT) Grant Proposal: “Composite All-Electric 40-Foot Bus Using Lithium Batteries”

Background

ISE Corporation has developed an all-electric propulsion system using lithium batteries for use in a 40-foot transit bus. Lithium batteries offer energy densities of about 160 watt-hours/kg, two to three times the energy density of nickel-based battery chemistry. A three to five metric ton pack of lithium batteries could store 450-750 kWhr of electrical energy, which would support an operating range of 180 to 300 miles between charges.

Objective

The objective of the project would be to demonstrate in a transit bus made of composite material the longer range of a lithium battery propulsion system. An objective of the project would also be to demonstrate the ability of the lithium battery-powered bus to be recharged during brief stops, referred to as opportunity charging.

Methods

ISE will equip a 40-foot bus made of composite material operated by the Los Angeles County Metropolitan Transit District with a lithium battery-powered propulsion system. The bus will then be operated in service over a six month period to demonstrate the longer range, and potential for opportunity charging of the lithium battery propulsion system.

Expected Results

It is expected that the longer range and opportunity charging potential of the lithium battery propulsion system for composite transit bus applications will be demonstrated in this project.

Significance to the Board

The demonstration of the technology on a transit bus would advance the Board’s ZEV program.

Applicant: ISE Corporation

Project Period: April 2007 to October 2009

Principal Investigator: Tavin Tyler

ICAT Funding: \$290,000

Co-funding: \$1,995,009

Past Experience with This Principal Investigator:

The company has a received a previous ICAT grant. All work was completed satisfactorily in accordance with the provisions of the grant.

Prior ICAT Funding to 2006

Year	2005	2004	2003
Funding	0	0	0

BUDGET SUMMARY

ISE Corporation

“Composite All-Electric 40-Foot Bus Using Lithium Batteries”

Direct Costs and Benefits

	<u>ICAT</u>	<u>Total</u>
1. Labor	\$290,000	\$877,482
2. Employee Fringe Benefits	\$ 0	\$175,496
3. Subcontractors	\$ 0	\$ 0
4. Equipment	\$ 0	\$ 0
5. Travel and Subsistence	\$ 0	\$ 15,000
6. Materials and Supplies	\$ 0	\$609,921
7. Other Direct Costs	<u>\$ 0</u>	<u>\$ 0</u>
Total	\$290,000	\$1,677,899

Indirect Costs

1. Overhead	\$ 0	\$607,110
2. Other Indirect Costs	<u>\$ 0</u>	<u>\$ 0</u>
Total	<u>\$ 0</u>	<u>\$607,110</u>

Total Project Costs **\$290,000** **\$2,285,009**