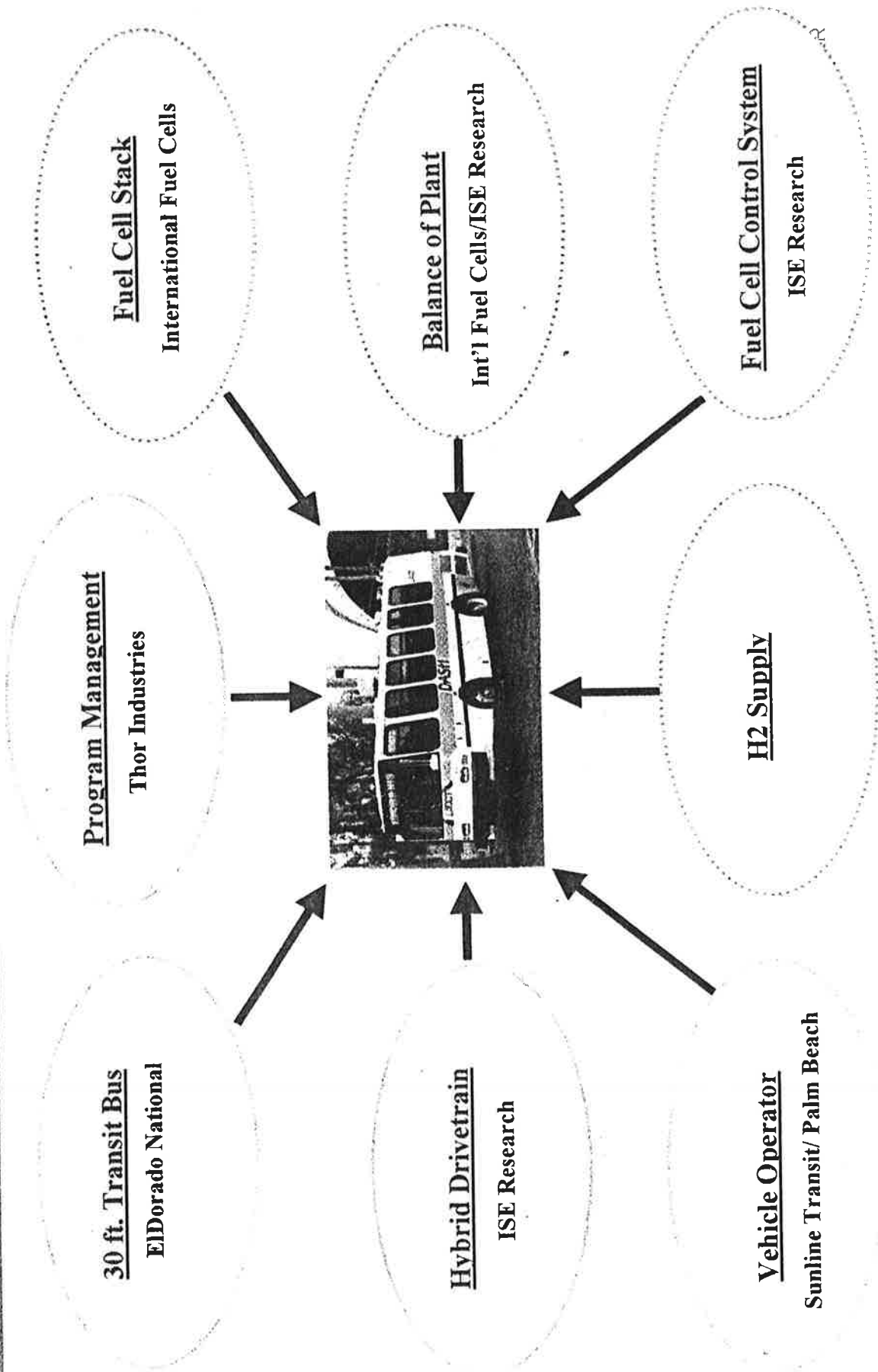


001376

FUEL CELL BUS PROGRAM ELEMENTS



David
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Citizen
Comment.

DRAFT SCOPE OF WORK

Public Abstract: The Florida Hydrogen Fuel and Zero-Pollution Bus Initiative

This proposal is submitted by the Florida Energy Office on behalf of a Team led by Bruderly Engineering Associates, Inc. (BEA). In partnership with Palm Beach County Transit (PalmTran) and the Florida Department of Transportation, subcontractors include Stuart Energy USA, ISE Research, NRG Technologies, Inc., Concept Communiqués, Inc. Cross Creek Initiative, Inc. and ThunderPower JV. Active support for the project comes from the Clean Energy Research Institute at the University of Miami and the Gold Coast Clean Cities Program.

The BEA Team proposes a breakthrough project that supports the following USDoE program areas: transportation, fuel cell applications, deployment of innovative technology in schools, distributed power and fuel generation, and data acquisition. The BEA Team requests USDoE financial assistance to design, build, and operate an integrated bus transportation system and develop an East Coast research test site for zero- and near-zero pollution hydrogen fuels and engine technologies in Florida. The proposed technology development and testing program will support the first field deployment of many innovative technologies integrated into three prototype systems:

1. Prototype *Hydrogen Internal Combustion Engine (H2ICE) Hybrid-Electric Bus*.
2. 2nd generation *Hydrogen PEM Fuel Cell Engine (H2FC) Hybrid-Electric Bus*, and
3. Prototype *Hydrogen Fuel Mini-Station* -- the *Community Fuel Station (CFS)*.

First, the BEA Team proposes to build two hydrogen-fueled hybrid-electric community transit buses, different only in type of engine and power train adaptation, and install a Community Fuel Station, for Palm Beach County Transit (PalmTran) in South Florida.

Second, working in partnership with PalmTran and FDOT, the BEA Team proposes to field test, evaluate and document the performance of each hydrogen bus technology in revenue service over a period of two years; performance relative to each other and to similar diesel buses. Concurrently the BEA Team will also evaluate the performance of the Community Fuel Station.

The goals of the BEA project support EERE policy factors of addressing RD&D gaps, overcoming barriers to innovation, increasing energy efficiency, using alternative fuels, using clean energy, advancing the state of knowledge available in the literature, and enhancing integration of advanced technologies into systems:

- to develop a working partnership between a transit fleet operator, industry and government to create an East Coast research / test site for improving transit bus hydrogen internal combustion engine hybrid-electric (H2ICE) and hydrogen fuel cell engine (H2FCE) systems in Florida;
- to examine the feasibility of hydrogen internal combustion engine propulsion systems in hybrid-electric vehicles;
- to advance the technologies that generate hydrogen by installing, evaluating and operating the state-of-the-art Community Fuel Station based on electrolysis of water using grid electricity;
- applied research, development, technology validation and operational testing of two types of nearly identical hydrogen hybrid-electric community transit buses for the purpose of evaluating the relative performance of fuel cell and internal combustion engine propulsion systems.
- testing hydrogen fuel cell performance in community transit buses under various operating conditions.
- testing hydrogen internal combustion engine performance in community transit buses under various operating conditions,
- testing community transit bus performance using hydrogen fuel cells and, for direct comparison, hydrogen internal combustion engines with hybrid propulsion systems, motors, controllers, and sensors.

US DoE State RD&D

DE-PS-36-016030010

add: Comm. de Reg. & Transp.
Palm Beach County
Alachua County
UF - FSE - CFT

H₂ Fueling Board

(3) Combined Heat and Power (CHP) and Distributed Power

Projects should focus on applied research and field testing addressing distributed power and combined heat and power technologies, including but is not limited to:

- Transmission constraints, interconnect barriers, and strategic placement of distributed power technologies, consistent and streamlined siting and permitting regulations, and an equipment pre-certification program to avoid long and costly permitting delays.
- New commercial and industrial development and urban infill redevelopment for distributed generation utilizing several DOE developed technologies (e.g., fuel cells, microturbines, industrial turbines, photovoltaics, wind, solar geothermal and energy storage) and demand-side management measures to examine systemic operational parameters and capabilities.
- Advanced distributed power and combined heat and power technologies at state and federal facilities.
- Hybrid applications (e.g., hybrid wind/fuel cell/microturbine applications) for institutional and commercial application.

(4) Transportation

Projects should focus on applied research with laboratory validation and field operational tests designed to maximize the benefits of clean and efficient vehicle technologies, including but not limited to:

- Testing alternative fuels, (consisting of, but not limited to, ethanol, methanol, hydrogen

Initiative on Cooperative Programs with States for RD&D
DE-PS36-01GO90010

and/or electricity) performance in on-road vehicles under normal and/or extreme operating conditions.

- Research on operating a refueling infrastructure for alternative fuel vehicles.
- Transportation systems, such as fuel cells, hybrid propulsion systems, motors, controllers, and sensors.

Funding of approximately \$6 million will be available for 6 to 10 awards under this solicitation in fiscal year 2001. Projects may be proposed with performance periods of one to a maximum of three years. The estimated amount of DOE funding for individual awards is expected to range from \$300,000 per year to a maximum of \$1,000,000 for a three year project (not including applicant cost share). Please refer to Section II. GENERAL INFORMATION, G. Cost Sharing for further information.



Florida Department of Transportation

JEB BUSH
GOVERNOR

605 Suwannee Street
Tallahassee, Florida 32399-0450

THOMAS F. BARRY, JR.
SECRETARY

May 10, 2001

David E. Bruderly, PE
Bruderly Engineering Associates, Inc.
920 SW 57th Drive
Gainesville, Florida 32607-3838

Re: Solicitation No.: DE-PS36-01GO90010
Initiative on Cooperative Programs with States for Research,
Development, and Demonstration

Dear Mr. Bruderly,

The Florida Department of Transportation, Transit Office, will be pleased to participate in the Florida Hydrogen Vehicle Field Test Team for the Field Testing Hydrogen Vehicles & Fuel Infrastructure proposal to the U.S. Department of Energy. We will provide technical assistance and management support to the project team. Our staff time and any travel costs we incur relating to advisory board participation may be considered as in-kind contribution toward total project costs.

Please contact me at (850) 414-4522 if you need addition information.

Sincerely,

Edward R. Coven
State Transit Manager

/erc



U. S. Green Building Student Chapter
M.E. Rinker School of Building Construction
University of Florida
Gainesville, Florida

May 8, 2001

David E. Bruderly, President
Bruderly Engineering Associates, Inc.
920 SW 57th Drive
Gainesville, Florida 32607-3838

RE: DE PS36-01GO90010

Dear Mr. Bruderly:

The USGBC Student Chapter, sponsored by Dr. Charles Kibert, Director of the M. E. Rinker School of Building Construction at the University of Florida, is greatly interested in supporting Bruderly Engineering Associates, Inc. in the Hydrogen Fuel Initiative effort for the state of Florida.

Our student chapter's goal is to promote green building practices, technologies, policies and standards for the built environment on campus and in the Gainesville community. As an organization composed of members from a variety of departments, including the College of Design, Construction and Planning, we are interested in providing student support for the acquisition of hydrogen-powered fuel cell and engine hybrid-electric buses and the community hydrogen fuel station. Due to the large size of our student population and the great demand placed on bus transportation, the availability of hydrogen fueled buses will not only improve our campus, but will lead the way for other communities to reduce their impact on Florida's environmental health.

Sincerely,

Ana Lavagnino
President
USGBC Student Chapter



16 May 2001

Mr. David Bruderly
Bruderly Engineering Associates
920 SW 57th Drive
Gainesville, FL 32607

Dear Mr. Bruderly:

On behalf of ISE Research Corporation (ISER) and the ThunderPower joint venture, I am pleased to offer our continued support for the Florida Hydrogen Vehicle and Infrastructure Field Test Program. More than a year ago, Thor Industries Inc. and ISER joined with other firms committed to development of a commercially attractive fuel cell bus. ThunderPower LLC, started with a commitment of over \$1 million in private funds. Subsequently there has been commitment of \$430,000 through the Sacramento Electric Transportation and \$330,300 through CALSTART/WestStart. In the past week the South Coast Air Quality Management District authorized its Chairman to contract with ISER in an amount not to exceed \$350,000 in support of the development and demonstration of a prototype fuel cell bus.

Partners in this program include, in addition to ISER:

Thor Industries, the largest manufacturer of mid-sized buses, including subsidiary manufacturers El Dorado and Champion Bus. Thor is the majority member of ThunderPower LLC.

International Fuel Cells, an established fuel cell manufacturer and the provider of the fuel cells for the American space vehicles, including the Space Shuttle, as well as a commercial line of 250 kW stationary fuel cells. IFC has recently developed a high-efficiency automotive PEM fuel cell used by one of the major automotive manufacturers, as well as the PEM fuel cell designed for the ThunderPower bus application.

SunLine Transit Agency, has operated a fleet of natural gas fueled buses for 7 years. SunLine has developed a comprehensive hydrogen fueling facility at its Thousand Palms, CA facility, is serving as a test site for the Xcellsis fuel cell bus, and is proceeding to convert its buses to operate with hythane, a mixture of hydrogen and natural gas which allows cleaner operation. SunLine transit will host the ThunderPower bus for the first portion of its demonstration phase.

We believe your program, involving the deployment and demonstration of two hydrogen fueled buses in Florida, offers an excellent opportunity to leverage our development of the hybrid hydrogen bus into a broader demonstration jointly based on the two coasts. In particular, it will offer operators the unique opportunity to compare side by side similar buses with similar hybrid electric drive trains with distinct charging

systems, the familiar and low cost internal combustion engine with carbon-free hydrogen fuel, and the quieter recently developed fuel cell engine.

By leveraging off ThunderPower developments we can supply the two Florida buses, plus technical support for data collection/analysis and vehicle maintenance, for a cost approximately \$700,000 lower than what the Florida program would cost as a standalone project. At least \$400,000 of our funding should qualify as cost share for the purpose of securing federal funds to help defray the incremental cost of the Florida initiative. Finally, the innovative ThunderPower approach will result in hydrogen fueled buses priced substantially lower than fuel cell buses under development by other firms, accelerating commercial implementation of these clean technologies.

We look forward to participating in the Florida initiative in partnership with your firm and with Florida energy and transit agencies.

Sincerely,

A handwritten signature in black ink, appearing to read "Michael C. Simon". The signature is written in a cursive style with a prominent initial "M".

Michael C. Simon
Chairman of the Board

**SOLICITATION FOR SUBMISSION OF FINANCIAL
ASSISTANCE APPLICATIONS**

**OFFICE OF ENERGY EFFICIENCY AND RENEWABLE
ENERGY**

SOLICITATION NUMBER DE-PS36-01GO90010



**INITIATIVE ON COOPERATIVE PROGRAMS WITH
STATES FOR RESEARCH, DEVELOPMENT AND
DEMONSTRATION**

Issuing Office: U.S. Department of Energy
Golden Field Office
1617 Cole Boulevard
Golden, CO 80401-3393

Date Issued: March 27, 2001

Closing Date: June 1, 2001

Point of Contact: Jim Damm
Facsimile: (303) 275-4744
Electronic Mail: gostate@nrel.gov

All information regarding this solicitation is available on the Department of Energy Golden Field Office World Wide Web site at: <http://www.golden.doe.gov/bussinessopportunities.html> by clicking on "Solicitations"