

# **NIU/ANL Joint Fuel Cell Program**

## **Announces**

April 23-27, 2006



## **Demonstration and Seminar on Fuel Cells**

### **Fuel Cell Bus Demonstration**

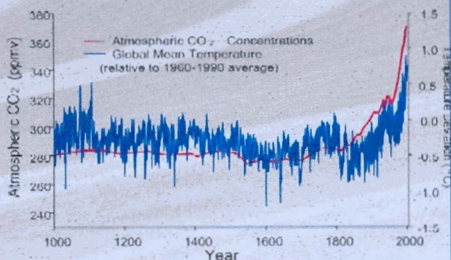
Jointly with

**Georgetown University Transit Bus Program**

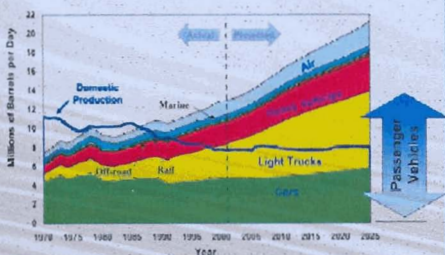


*In recognition of the Earth Day*

## Green House Effect is a major concern!



## Estimate of consumption and production of petroleum products in Us.



## Urgent Need (President's Proposal)

"Tonight I'm proposing \$1.2 billion in research funding so that America can lead the world in developing clean, hydrogen-powered automobiles... With a new national commitment, our scientists and engineers will overcome obstacles to taking these cars from laboratory to showroom, so that the first car driven by a child born today could be powered by hydrogen, and pollution-free."

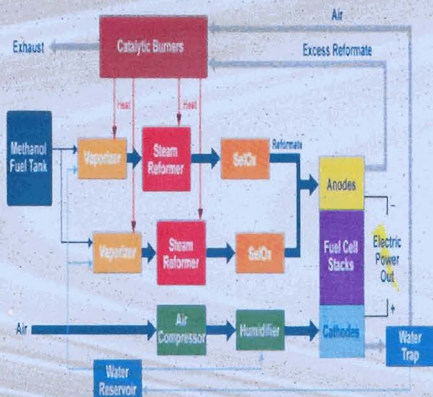
President Bush, State-of-the-Union Address, January 28, 2003



## Georgetown University Transit Bus

### Fuel Cell Power System

Ballard Power Systems provided the fuel cell system in the X-1 Fuel Cell Bus. It is the world's largest PEMFC power plant capable of operating on a liquid fuel. Reformate for the fuel cell is produced with twin fuel processing systems, based on technology used in DaimlerChrysler's NeCar III methanol fuel cell car.



#### Methanol Fuel Tank

The methanol tank holds approximately 150 gallons, giving the bus a range of up to 350 miles. The fuel tank can be completely filled with methanol in just minutes, with the same type of pump systems used at diesel filling stations.

#### Vaporizers

Methanol and water are pumped into the heated vaporizers, where they are mixed and vaporized. The output gas is a mixture of steam and methanol vapor.

#### Steam Reformers

The heated reformers catalytically react the steam/methanol mixture to produce reformate (hydrogen, carbon dioxide, and a trace of carbon monoxide).

#### SelOx Units

Since carbon monoxide is harmful to the catalyst in the fuel cell, the Selective Oxidation Units oxidize the CO produced in the reformers.

#### Fuel Cell Stacks

The fuel cell stacks receive the reformate along with compressed, humid air to create electrical current. The X-1 bus is equipped with 6 Ballard Mark 7 stacks, for a total net power of 100 kW.

#### Water Trap

Water is condensed from the cathode exhaust to be reused in the vaporizers and humidifier.

#### Catalytic Burners

During fuel cell operation, the burners react any excess hydrogen in the anode exhaust to keep the vaporizers and reformers hot.

#### Exhaust

The only emissions from the fuel cell system are air, carbon dioxide, and water. The exhaust water is condensed and mixed with methanol in the vaporizers to enhance hydrogen production in the steam reformers.

## April 23, 2006

12:30 - 2:00 p.m. Bus Demonstration and Tour at  
DeKalb County Court House  
133 West State, Sycamore, IL 60178

3:00 - 4:30 p.m. Bus Demonstration at  
Wal-Mart, 2300 Sycamore Rd.  
DeKalb, IL 60115

## April 24, 2006

### Mini-symposium

#### Alternative Fuel and Clean Environment

#### Holmes Student Center (Regency Room)

9:00 - 9:100 a.m. Welcome Speech Dean Vohra  
(NIU)

9:10 - 9:35 a.m. Energy & Environment Anima Bose  
(NIU)

9:35 - 10:00 a.m. Hydrogen Awareness David Lewis  
(ANL)

10:00 - 10:55 a.m. How Hydrogen Works Romesh Kumar  
(ANL)

10:55 - 11:20 a.m. Fuel Cell in Transportation J. Larkins  
(GUTBP)

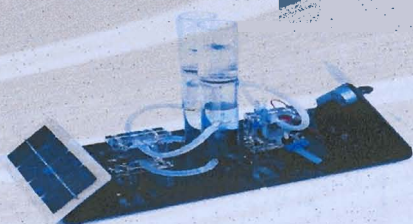
11:20 - 11:45 a.m. GU Transit Bus Program C. Pritzliff  
(GUTBP)

11:45 - 12:00 noon Q & A Speakers

2:00 - 4:00 p.m. Fuel Cell Bus Demonstration for Lecture  
Attendees

**April 25, 2006**

**CEET Building (Library**



10:00 a.m. - 12:00 p.m. Bus Demonstration and Tour  
(High School Teachers/  
Students)

12:00 p.m. - 2:00 p.m. Lunch Break

2:00 p.m. - 3:15 p.m. Bus Demonstration for NIU  
Students

3:30 - 4:30 p.m. Bus Demonstration for NIU  
Students associated with the  
Fuel Cells

**April 26, 2006**

9:00 a.m. - 12:00 p.m. Bus Demonstration at Argonne  
National Laboratory

12:00 p.m. - 2:00 p.m. Bus Driven to NIU-  
Naperville Campus

2:00 - 4:00 p.m. Bus Demonstration at NIU-  
Naperville Campus



College of Engineering and Engineering Technology  
590 Garden Rd.. DeKalb, IL 60115

For More Information, Call or

Bob Wilkerson, Student Service Coordinator

Phone: (815) 753-0651

Fax: (815) 753-1310

E-mail: [bwilk@ceet.niu.edu](mailto:bwilk@ceet.niu.edu)