CLEAN FUELS FOR CLEAN AIR

Clean Cities ..... Honolulu

October 2002 Volume 8, Issue 1

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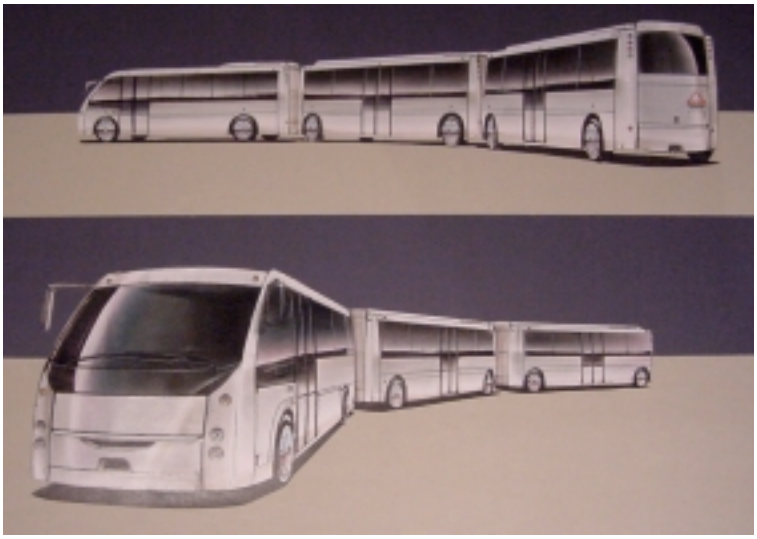

New Electric-Powered Wiki-Wiki Buses Ordered by Honolulu International Airport

The State of Hawaii Department of Transportation, Airports Division has ordered 10 new electric-powered trams to replace the aging diesel-powered Wiki-Wiki shuttle bus transport system at the Honolulu International Airport. The state-of-the-art trams, being built by Electric Vehicles International of Anderson, Indiana, are expected to be in service by the beginning of 2003.

The trams, which still need to pass a series of rigourous operational tests prior to delivery, are fully air-conditioned, ADA compliant, and most notably, incredibly quiet. The all-electric drive systems produce none of the diesel exhaust and pollutants associated with the current Wiki-Wiki bus system. They will also incorporate a "low floor" interior design to make passenger loading and unloading quick and easy.

Power for each tram is provided by onboard batteries that are recharged as needed. In addition, a small propane-powered generator is also located on each tram to power the air-conditioning system and provide a small "trickle" charge to the main batteries when cooling loads are low.

The trams are designed in two basic configurations. The tractor and double trailer configuration is designed to transport about 80 people to and from the gates to other parts of the main terminal. Another four trams, of a slightly different 20-person capacity design, will circulate

(see *Electric Tram* - Page 2)

(*Electric Tram* from Page 1)

throughout the airport property connecting the parking structure, the interisland and commuter terminals, and other areas such as the lei stands.

"We are anxious to conduct the testing of the new trams and get them into full operation," says Mark Snyder, General Manager of Global Electric Motorcars, LLC, the local dealer for EVI in the islands. "The airport has really needed an upgrade to the old Wiki-Wiki shuttle system. The new system will not only be modern and comfortable, but will be quiet and environmentally friendly as well. This really gives a great first impression of our islands to tourists and business people arriving into Honolulu."

Biodiesel Fuel Now Available on Oahu

Pacific Biodiesel, the only manufacturer of biodiesel fuel in the state, has opened a drive-up biodiesel fuel pump at its Oahu Biofuels Facility on Makepono Street in the Sand Island area of Honolulu. Any diesel vehicle operator can purchase biodiesel fuel from this location during their normal business hours of 7:00 AM to 3:00 PM , M-F.

If you have additional questions regarding fill-ups, please call Pacific Biodiesel at (808) 877-3144 (Maui) or (808) 224-3672 (Oahu).

Happy Motoring!.

Did You Know…? Facts About Ethanol Fuels

- Last year, 10% of all gasoline in the United States contained ethanol.
- Since 1981, over 152 billion gallons of ethanol blends have been used in the United States.
- Fuel with 10% ethanol, commonly referred to as gasohol or E10, has been certified by the Environmental Protection Agency to reduce carbon monoxide emissions by up to 30%. Tailpipe hydro-carbon emissions are also reduced.
- Ethanol is being used as an octane-enhancing component that is less toxic than commonly used enhancers such as benzene and toluene.
- Domestic ethanol production reduces demand for imported oil thereby increasing American energy self-sufficiency, diversification of the economy, and rural economic benefit.
- Ethanol is a viable alternative to MTBE, an imported oxygenate implicated in groundwater contamination problems throughout the U.S.
- Ethanol use is covered under warranty by every automaker that sells cars in the United States.

Want more info about ethanol-blended fuels? Go to the Alternative Fuels Data Center's website at www.afdc.doe.gov or to www.ethanol.org.

DOE Ethanol Fuel Workshop Being Conducted in Honolulu

The U.S. Department of Energy Office of Fuels Development will be conducting a workshop in Honolulu on November 14th to educate both the public and private sectors about ethanol use as a transportation fuel.

Focus of the one-day event will be to create an awareness of ethanol fuels and to ultimately pave the way to producing molasses and grain-based ethanol in Hawaii. Production of cellulose-based ethanol will also be discussed.

Ethanol Workshop Information:

Date: Thursday, November 14, 2002
Place: Ala Moana Hotel, 410 Atkinson Drive, Honolulu
Time: 8:00 AM to 4:30 PM
Cost: $20.00
Registration: Registration is being coordinated through BBI International. Call Anne Wester at (719) 942-4353 to obtain registration information. Complete registration information is also available at www.bbiethanol.com/doe.

Free Bonus Program for Automotive Service Technicians.

Free evening (6-8:30 PM) classes about ethanol fuels for automotive service technicians are being scheduled for Kahului and Kona on November 11; Hilo and Lihue on November 12; and Honolulu on November 13. Exact locations TBD. Classes will cover ethanol fuel specs, how fuel changes affect vehicle performance, fuel system material compatibility, and auto manu-acturer's warranties. For more information, call Maria at DBEDT ERT 587-3809 (Oahu).

The 9th National Clean Cities Conference and Exposition

Make note on your long range calendar that the 9th National Clean Cities Conference and Exposition will be held at the Wyndham Palm Springs Resort, Palm Springs, California on May 18-21, 2003. More information on the conference will be forthcoming as it becomes available. For timely updates, visit www.ccities.doe.gov.

City and County of Honolulu to Join Ranks of Municipalities Using Biodiesel

The City and County of Honolulu is joining the ranks of municipalities and government agencies nationwide that will begin using biodiesel fuel in a variety of their vehicles. The City is soliciting an RFQ in October 2002 to provide biodiesel fuel for the Facilities Maintenance Department. Initial delivery is expected by the beginning of November. According to Robert Primiano, Chief of Vehicle Maintenance, a number of diesel–powered vehicles within the City's fleet have already been targeted for biodiesel use once the fuel contract is in place.

Ford Decides To Stop Manufacture of TH!NK Cars

Ford Motor Co. recently announced it will discontinue production of the TH!NK Neighbor and TH!NK City all-electric vehicles due to poor customer demand. Ford also pointed to a lack of government support for zero-emission vehicles as another reason for their decision.

After purportedly investing over $100 million into the program, Ford concluded that all-electric vehicles do not appear to be the future for mass market transportation at this time.

Ford continues to actively pursue hybrid (combination electric and gas engine) vehicle and fuel cell vehicle initiatives at this time. A hybrid version of the Ford Escape, a small SUV, is scheduled for the marketplace sometime during the 2003 model year.

HEVDP Delivers All-Electric Shuttle Bus to Hickam AFB

The Hawaii Electric Vehicle Demonstration Project recently delivered an all-electric shuttle bus to Hickam AFB. The Air Force uses the bus to shuttle flight crews to and from the Hickam flightline to various areas on base as well as throughout Honolulu.

The bus, which is the largest all-electric passenger transport vehicle in regular operation in the state, has a capacity of about 30 passengers and is capable of being recharged at Hickam or at any one of the 13 Rapid Charge Stations located on Oahu.

Places To Find Us

Nov. 14 U.S. DOE Ethanol Fuel Workshop, 8:00 AM to 4:30 PM, Ala Moana Hotel. (see page 2)

Monthly Meetings held on the 4th Tuesday of each month at 1:30 PM. HEVDP Conference Room, 531 Cooke Street

To Learn More About Us

Please visit our website at:
www.state.hi.us/dbedt/ert/cc

How "Fuelsmart" Are You? (See Insert)

The Energy, Resources, and Technology Division of the Department of Business, Economic Development, and Tourism compiled this "Thirsty Cars Quiz" to help educate people about alternative fuels here in Hawaii and throughout the U.S. See how you rank…

Number Correct	"Fuelsmart" Ranking
Less than 5	Just love that OPEC crude!
6 to 10	See… Told you I read more than just the comics!
11 to 16	Not bad, eh!
More than 17	Maybe I should write the newsletter…

Honolulu Clean Cities is a non-profit organization sponsored by the U.S. Department of Energy for the purpose of promoting alternate transportation fuels for: clean air, energy independence, and local economic development.

This newsletter is intended to provide information on alternative transportation fuels and alternative fuel vehicles to Honolulu Clean Cities stakeholders and others interested in this endeavor.

To find out more, please contact:

Robert Primiano
C&C Honolulu, Department of Facilities Management
1000 Uluohia Street
Kapolei, Hawaii 96707
(808) 527-6704
(808) 538-7899
rprimiano@co.honolulu.hi.us.

Clean Cities Honolulu
c/o Department of Facilities Maintenance
1000 Uluohia Street
Kapolei, HI 96707

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U.S. Department of Energy

Ethanol Workshop Series Registration Form

Sponsored by:

- US Dept of Energy, Office of Fuels Development
- Pacific Regional Biomass Energy Program
- City & County of Honolulu
- Hawaii Dept of Agriculture
- Hawaii Dept of Business, Economic Dev & Tourism
- Hawaii Dept of Health
- Hawaii Natural Energy Institute
- Honolulu Clean Cities

Biofuels For Sustainable Transportation

Hawaii

November 14, 2002, 8:00am – 4:30pm
Ala Moana Hotel, 410 Atkinson Drive, Honolulu, Hawaii 96814
Reservations (800) 367-6025 or neighboring islands (800) 446-8990, direct (808) 955-4811
(special workshop room rates from US $125 through November 1)

Name:_____ **Title:** _____

Affiliation:_____

Address:_____

City:_____ **State:**_____ **Zip:**_____ **Country:**_____

Phone:_____ **Fax:**_____

Email:_____ **Website:**_____

Registration Fee: $20

Payment Options (Registrants from outside the USA please select credit card option)**:**

☐ **Check:** Please make check or money order (US funds only) payable to: BBI International

☐ **Credit Card:** ☐ American Express ☐ Visa ☐ Mastercard ☐ Discover

CARD#_____ Exp. Date_____

Credit card holder name (please print) _____

Signature _____

Send payment with completed form(s) to:

BBI International
DOE Workshop Coordinators
P.O. Box 159
5015 County Road 12
Cotopaxi, CO 81223 USA

Tel: 719-942-4353
Fax: 719-942-4358

A confirmation notice will be sent to you once your registration has been processed. Please note, you are not guaranteed placement until your payment has been received.

Thank you!

For more information and program updates, please visit our website at www.bbiethanol.com
or contact Anne Wester at BBI International, 719-942-4353, fax 719-942-4358, anne@bbiethanol.com

THIRSTY CARS QUIZ

How "fuelsmart" are you? Take this timely quiz and find out!

As this goes to press, tensions are high in the Middle East and reporters are saying we're held hostage to high oil prices. Meanwhile, Congress is debating an energy bill that includes a "renewable fuels standard" to increase use of domestically - produced renewable fuels for trucks, buses and boats as well as for our thirsty cars. How "fuelsmart" are you? Take this timely quiz and find out! Answers are at the end.

1. The renewable fuels standard would increase production and use of:
   a. Solar, wind, and biomass
   b. Biodiesel and ethanol
   c. All of the above
   d. None of the above

2. Ethanol fuel can be used:
   a. In a 10% blend with gasoline
   b. In an 85% blend with gasoline, in fuel flexible vehicles
   c. As a hydrogen source (via a reformer) for fuel cell vehicles
   d. All of the above

3. If 0.1 gallon of ethanol (blending octane of 113) is blended with 0.9 gallon of 87 octane gasoline, the final octane of the fuel (E10) will be:
   a. 86
   b. 87
   c. 89.6
   d. 110.4

4. Which of the following is most commonly added to gasoline in the U.S.?
   a. Lead
   b. Oxygenate
   c. Detergent
   d. Emulsifier

5. What is phase separation?
   a. The term for the last phase of the moon
   b. A temporary separation of a husband and wife
   c. What results from adding 5 ml of water to 1 liter of E10
   d. A and C only

6. Ethanol-blended fuel is used in:
   a. AK, AZ, CA, CO, IL, NY, WA, WI, to improve air quality
   b. IA, ID, IL, NE, MN, WA, WI to support the local economy
   c. FL, OH, TX to increase octane
   d. All of the above

7. From what products (feedstocks) can ethanol be made?
   a. Grain
   b. Sugar
   c. Municipal solid waste
   d. All of the above

8. What does it cost to build an ethanol plant?
   a. A lot
   b. $1 to $2 per gallon of annual production
   c. $3 to $5 per gallon of annual production
   d. It depends on size, feedstock, etc.

9. Ethanol contains 76,000 Btu per gallon (lower heating value). How much energy does it take to make a gallon of ethanol from molasses?
   a. 45,000 Btu
   b. 20,000 Btu
   c. 120,000 Btu
   d. 76,000 Btu

10. In Hawaii, gasoline blended with up to 10% ethanol:
    a. Is exempt from the 4% State tax on retail sales
    b. Is subject to a reduced rate of Federal highway tax
    c. Is subject to the same fuel specs as non-ethanol-blended gasoline
    d. All of the above

11. Fuel flexible "E85" (85% ethanol, 15% gasoline) vehicles can use any combination of gasoline and E85. Today, there are more than 2.3 million flexible fuel vehicles on the nation's highways. Approximately how many of those vehicles are on the roads in Hawaii?
    a. 7
    b. 70
    c. 700
    d. 7,000

12. Fuel cell vehicles are being developed by:
    a. Audi, BMW, Mazda, Mercedes, Opel, Volkswagen, Volvo
    b. Daimler-Chrysler, Ford, and General Motors
    c. Honda, Hyundai, Mazda, Nissan, and Toyota
    d. All of the above

13. Fuels commonly discussed for use in fuel cell vehicles include:
    a. Gaseous fuels and mixtures: hydrogen, methane, hythane
    b. Liquid fuels: Gasoline, ethanol, methanol, gasohol, diesel
    c. Solid fuels: Coal, coke, shale
    d. A and B only

14. Existing gas stations and infrastructure could most easily be modified to accommodate:
    a. Combinations of gasoline and hydrogen
    b. Combinations of natural gas and hydrogen
    c. Combinations of gasoline and ethanol
    d. Pure methanol

15. Researchers at the Hawaii Fuel Cell Test Facility will:
    a. test proton exchange membrane fuel cells for various applications
    b. develop solid oxide fuel cells and other related technology
    c. test fuel cell and component performance and reliability
    d. all of the above

16. The Hawaii Fuel Cell Test Facility is a partnership of:
    a. JROTC, DBEDT, HEVDP, USDA
    b. EPA, IRS, HECO, UTC, SOEST
    c. HNEI, ONR, HECO, UTC, SE
    d. all of the above

17. This activity builds on HNEI's expertise in the production and storage of:
    a. Oxygen
    b. Hydrogen
    c. Carbon dioxide
    d. Nitrous oxide

18. A project to construct a photovoltaic-powered hydrogen production facility has been proposed by:
    a. HECO, USN, and HNEI
    b. CIA, FBI, and INS
    c. DOT, PVC, and GOP
    d. all of the above

19. The Gateway Project at the Natural Energy Lab on the Big Island is:
    a. A manufacturing plant making gates and fencing out of lava rock
    b. A company that specializes in spelling out large greetings on lava using white stones
    c. Intended to be a site for distributed energy resource development & information
    d. A project to build a floating gate to produce energy from the waves

20. Tomorrow's thirsty cars:
    a. Won't use fuels produced from a variety of renewable energy sources
    b. Won't require any new or modified infrastructure
    c. May be based on technologies developed, tested, or perfected here in Hawaii
    d. Will never run out of fuel when the operator neglects to fill up

Answers to Cars Quiz:

1:b.
2:d.
3:c. Ethanol raises the octane of gasoline by 2.5 to 3 points. The effect can be estimated by using the blending octane value as follows: (0.1*113)+(0.9*87).
4:c. The use of lead was discontinued in 1986. All gasoline must by law have detergent additives; only some gasoline (where cleaner fuels are required for air quality) must have oxygen.
5:c. A common concern in the handling of ethanol-gasoline blends has to do with water contamination. When more than .5% water is added to a 10% blend, it will attach itself to the ethanol and cause it to "fall out" of solution with gasoline. This issue is avoided by removing water at the bottom of storage tanks before introducing ethanol-gasoline blends into the distribution system and by using a "hydrosorb" filter on service station dispenser pumps. In blends of diesel with ethanol, an emulsifier is used (another way to avoid phase separation).
6:d. Ethanol is also used in several states not listed. For Hawaii, reasons would be support of the local economy and increased energy security. Reduced air pollution would be a secondary effect but probably not the driver.
7:d. Currently about 95% of U.S. ethanol is made from corn and nearly 100% of Brazil's ethanol is made from sugar cane. It is expected that in a few years ethanol will also be made from cellulosic material (paper, yard and wood waste, and energy crops). Work in this area is being supported by the US Departments of Energy and Agriculture. Some of the research is being done here at the University of Hawaii.
8:d. Construction cost per gallon capacity for a 15 million gallon-per-year facility is about $1.50. Facilities using cellulosic feedstocks have significantly higher capital costs but lower feedstock costs.
9:b. The energy ratio of molasses to ethanol is 76,000 Btu out / 20,000 Btu in, or about 3.8:1. The energy ratio of sugarcane to ethanol has always been much better than it was for corn (according to a July 2002 USDA report, for every fossil Btu used to grow and process corn to ethanol 1.34 Btu of fuel is produced; energy ratio of 1.34:1). For cellulosic feedstocks, the energy ratio is even better: 5:1.
10:d. E10 is exempt from the State 4% tax until 12/31/06. E10 is also exempt from 5.3¢ of Federal tax; the Federal ethanol program reduces the cost of Federal farm support programs. All fuels for use in automotive spark ignition engines must comply with American Society of Testing and Materials specification D-4814.
11:d. Many of the owners of Flexible Fuel Vehicles don't even realize their Ford Taurus, Ranger or Explorer; Chrysler minivan, Sebring, or Stratus; GM S-10, Sonoma, Avalanche, SUV, Silverado or Sierra pickup; Isuzu Hombre; Mazda truck; or Mercury Sable or Mountaineer can use E85. Have you checked **your** owner's manual lately? E85 fueling stations are available in CO, IA, ID, IL, IN, KS, KY, MD, MI, MN, MO, MT, NE, NM, ND, OH, SC, SD, UT, VA, WI and WY.
12:d We were getting tired of "all of the above" being the correct answer, so tried to have one of the choices be a list of automakers NOT coming out with fuel cell vehicles and concept cars. The only ones we could come up with were Isuzu and Daihatsu but they are partially owned by GM and Toyota, respectively, which are aggressively pursuing fuel cell development, so it didn't even seem safe to say they weren't. Oh, well!
13:d. Although hydrogen is the substance actually used by the fuel cell, a variety of gaseous and liquid fuels can provide the hydrogen to the fuel cell via a "reformer." Never heard of "hythane?" That's because it's not a chemical, its a mixture: hydrogen and methane.
14:c. Most of the fuel distribution infrastructure is designed to handle liquid fuels. Although methanol is also possible, it's more toxic and can't support as wide a variety: traditional, fuel flexible, and fuel cell vehicles.
15:d. Yup, all of the above again.
16:c. The Hawaii facility is a partnership of the Hawaii Natural Energy Institute (HNEI), Office of Naval Research, Hawaiian Electric Company, UTC Fuel Cells, and Stuart Energy. HECO is providing the site; UTC, one of the world's largest manufacturers of fuel cells, is supplying test equipment and fuel cells; Stuart Energy is providing an electrolyzer that will produce hydrogen. The center will be fully operational in 2003.
17:b. Over the course of the next several years, HNEI will have opportunities to participate in several hydrogen-related demonstration projects, with heavy involvement by industrial and government partners.
18:a. An endeavor of HECO, HNEI, and the U.S. Navy calls for the construction of a photovoltaic electricity-generating facility on Oahu, with a hydrogen production component.
19:c. The projects are funded by the U.S. Department of Energy with support from the State of Hawaii's Department of Business, Economic Development and Tourism (DBEDT), HNEI and private sector partners. Another project, the Hydrogen Power Park, will introduce a hydrogen infrastructure in the islands. HNEI will install a hydrogen production and storage system in the initial phase; the second stage will add a fuel cell, and later stages may link renewable energy technology to power the hydrogen production.
20: Crystal ball says **c**. If this was a vote, rather than a quiz, I'd choose b, c, and d.

From the October issue of the *Wiliki*, newsletter of the Hawaii Council of Engineering Societies. Comments may be directed to Maria Tome, mtome@dbedt.hawaii.gov, 587-3809.