

Biofuels UPDATE

Report on U.S. Department of Energy Biofuels Technology

Ethanol Takes Off

Recognizing that airports can help build an alternative fuel market, the U.S. Department of Energy (DOE) recently added a Clean Airports component to its successful Clean Cities program. The Clean Airports program will target small airports to serve as home bases for alternative aviation fuel activities, bringing pilots, fuel suppliers, and engine manufacturers together.

To enter the program, airport directors must demonstrate their commitment by appointing a coordinator, holding stakeholder meetings, developing a program plan, and having stakeholders sign a memorandum of understanding. The program plan must show how the airport will serve alternative fuel aircraft, use alternative fuels in ground transportation, and increase public awareness. Designation as a Clean Airport

Clean Cities Set the Pace

Since the Clean Cities program began in 1993, 48 areas have earned Clean Cities designation as part of DOE's voluntary program to increase the use of alternative fuels. By working on the local level, the program has been especially successful at building grassroots support for alternative fuels.

For more information, visit the Clean Cities Internet site at <http://www.cities.doe.gov> or call 800-423-1DOE.

Ethanol's Aviation History

- 1980 First flight on 180-proof ethanol.
- 1983 First coast-to-coast flight.
- 1989 First transatlantic flight.
- 1989 First FAA certification on a non-petroleum fuel for a series of engines on 200-proof ethanol (fuel-injected 260 horsepower).
- 1991 Second FAA certification of an engine series (a carbureted 105 horsepower).
- 1995 First flights on ethanol's ether derivative, ethyl tertiary butyl ether (ETBE). First public demonstration of ETBE at the Paris Airshow.
- 1996 First FAA certification of an aircraft to run on ethanol.



will recognize an airport's commitment to provide the support needed to meet the goals of the program.

On June 13, the Texas State Technical College Airport in Waco became the first Clean Airport in the nation. This airport is home to the work of Baylor University's Renewable Aviation Fuels Development Center (RAFDC), which is under the guidance of directors Max Shauck and Grazia Zanin.

The Morgantown Airport in West Virginia became the second designated Clean Airport on August 28. West Virginia University uses the airport as a base for its Cessna 150, which has logged more than 25 hours of flying time on ethanol.

The Clean Airports program culminates the work of several pilots and researchers who have demonstrated ethanol's potential to replace leaded av-gas (the fuel for general aviation aircraft) with a high-octane alternative (see Spring 1995 *Biofuels Update*, p. 1). Because leaded av-gas is more

expensive than gasoline, ethanol is already economically competitive.

Most milestones in ethanol's history with aviation have been accomplished during the past 15 years by Shauck and Zanin (see box). Their continued efforts led to the decision in the summer of 1996 by the Federal Aviation Administration (FAA) to grant final certification for a Cessna 152 to run on pure ethanol. The FAA's approval certifies both the engine and the airframe for ethanol use as long as prescribed modifications are made.

DOE has asked the RAFDC to manage the Clean Airports program and future designations. At least eight airports have expressed serious interest, and two have already met the criteria. "It is more than what we expected," said Zanin.

For more information, call Grazia Zanin, director of Baylor University's Renewable Aviation Fuels Development Center, at 817-755-3563, or visit the Clean Cities site on the Internet at <http://www.cities.doe.gov>.



Biomass Ethanol Improves Feedstock Economics

Most ethanol in the United States today is produced from corn. When corn prices reached \$4 per bushel last March (up from levels as low as \$2.60 in 1995), some small ethanol producers were forced to either close their doors or curtail production. Improving the technology that converts corn fiber to ethanol might increase yield and profit margins, but this also would likely reach a state of diminishing returns. To really take advantage of biomass-to-ethanol technology, we must apply it to other forms of

low-cost or no-cost biomass feedstocks.

The American Coalition for Ethanol (ACE) received a \$115,000 grant from the U.S. Department of Energy's National Renewable Energy Laboratory to conduct a 10-month study on the feasibility of a biomass-to-ethanol plant that utilizes feedstocks such as corn stover, wheat straw, and native prairie grasses. ACE is working with Anklam & Associates, Delta-T, and Broin Enterprises to examine the market, feedstock availability, and engineering

feasibility for economical biomass-to-ethanol production in North Dakota, South Dakota, and Minnesota. Trevor Guthmiller, ACE president, said, "One of the advantages of our study is that we are working with two companies that have built biomass ethanol plants . . . If anybody can design efficient plants, they can."

The information ACE produces could translate well to all aspects of the industry, according to Guthmiller. "Corn-based ethanol producers could improve efficiencies as well," he said.

Administration Requests More Funding, Public Expresses Support for Renewables

In a followup to a similar poll last year, American voters expressed continued support for funding federal research on renewable energy sources. The study, commissioned by the Sustainable Energy Budget Coalition, was conducted last December by the Maryland-based Republican polling firm Research/Strategy/Management, Inc. "This poll represents a 'New Year's Resolution' by voters for a national energy fitness plan that will power America into the next millennium," said Scott Denman of the Safe Energy Communication Council.

Of those polled, 75% said the United States should do something to reduce dependence on foreign oil, and more than 70% said they believed global climate change is at least a serious problem. These responses help explain why continued funding for the U.S. Department of Energy's renewable energy research was given the highest priority by the respondents.

"Given the public's concerns with continued dependence on oil imports and the threat of global climate change, coupled with its hostility toward continued support of nuclear power and fossil fuels, energy efficiency and renewable energy technologies emerge as the only viable energy options for the future," said Carol Werner of the Environmental and Energy Study Institute.

This year the Administration's proposed budget for the 1997 fiscal year requests a 34% increase for DOE's transportation biofuels research program. This would increase funding for biochemical conversion research and feedstock development by more than \$13 million. The biochemical conversion program brings together engineering and investment partners to share the cost of developing and demonstrating cellulosic biomass-to-ethanol technology. The feedstock development program supports research in short-rotation

woody crops, and herbaceous energy crops, including genetic development of switchgrass.

Many groups stepped forward this Spring to voice their support for increased funding to the House Appropriations Subcommittee on Energy and Water Development. "The payoff from biomass energy development will be so large that your current investment will seem a bargain," said Reid Detchon, executive director of the Biomass Energy Alliance. "It will seem minuscule compared to the benefits that will be gained. We have an enormous untapped domestic renewable energy resource in biomass and manpower in the great agricultural regions of this country to produce it."

☛ *For a copy of America Speaks Out on Energy: A Survey of Public Attitudes on Sustainable Energy Research, call the Sustainable Energy Budget Coalition at 301-270-2258.*

Biofuels News Bites

- Last March the U.S. Environmental Protection Agency (EPA) approved 10% volume (3.4% weight) ethanol blends in gasoline during the summer months to meet oxygenated fuel requirements. EPA raised the cap after research found little environmental reason for the earlier 7.7% volume (2.7% weight) limit.

"The rule provides gasoline marketers the ability to take full advantage of ethanol's octane, oxygen, and toxic displacement benefits," said Eric Vaughn, president of the Renewable Fuels Association. "Consumers will benefit by having access to high-quality, high-performance ethanol-enhanced reformulated gasolines at the lowest cost. The environment will benefit because the higher blend level will provide greater reductions in carbon monoxide, exhaust volatile organic compounds, and toxics, such as benzene. And farmers will benefit from an increased value-added market for domestically produced corn," he said.
 - By July 1996, more than 90 members of Congress had joined the House Renewable Energy Caucus to support research and development of renewable energy sources. The first activities of the Caucus included a presentation on renewable energy research by Charles Gay, director of the National Renewable Energy Laboratory, and a Renewable Energy Expo held on the Hill and open to the public. For more information, call Craig Cox in the office of Representative Daniel Schaefer (R-CO) at 202-225-7882.
 - The new Farm Bill signed last spring by President Clinton will phase out farm subsidies but continue the conservation reserve program with no provision for energy crops (see Summer 1994 *Biofuels Update* p. 1).

However, a market-based farm policy could still create opportunities for biomass ethanol. "A smart ethanol plant operator would go out to farmers now to lock in acreage for higher ethanol yield crops," said David Rinebolt, a consultant to the National Bioenergy Industries Association. "Continued payment in the early years helps make that concept work. We just need a bunch of forward-thinking farmers and to get the word out."
 - The U.S. Department of Energy has released a final rule that mandates states and certain fuel providers to start acquiring alternative fuel vehicles (AFVs) for their fleets in the 1997 model year that starts September 1, 1996. The requirement is part of the 1992 Energy Policy Act, which was passed to reduce the nation's oil dependency.

The law also required the federal fleet to acquire AFVs starting in 1993. As part of its effort to meet the 1996 model year requirement, the General Services Administration anticipated ordering 1,352 vehicles that will run on 85% ethanol.
 - This spring Puerto Rico's Governor Pedro Rossello became the 21st member of the Governor's Ethanol Coalition (see Summer 1995 *Biofuels Update* p. 1).
 - At press time, at least two states had passed legislation that affects ethanol or biodiesel markets. Indiana Governor Evan Bayh signed House Bill 1302, which provides a 10% state income tax deduction for improvements to ethanol or soydiesel production facilities. Idaho Governor Phil Batt signed House Bill 514, which removed the state's ethanol production income tax credit.
 - The Biomass Energy Alliance's homepage on the internet now receives more than 14,000 visitors each month. The word is spreading that this is the place to go for updates on federal biomass policy. Check it out: <http://www.biomass.org>.
 - For information on biofuels technology on the Internet, visit the National Renewable Energy Laboratory's Biofuels Information Center at <http://www.afdc.doe.gov/biofuel/biofuels.html>.
 - General Motors has pushed back its plans for producing all its four-cylinder S Series pickup trucks capable of running on up to 85% ethanol (see Winter 1996 issue of *Biofuels Update*). For those who wish to purchase a flexible-fuel ethanol vehicle, Ford will continue its ethanol option for its 1997 model year Taurus models.
- ☛ For more information on any of these topics, call the National Alternative Fuels Hotline at 800-423-1DOE.

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Special Report

U.S. Department of Energy Seeks Input on Local/Private Fleets

The U.S. Department of Energy (DOE) is providing a unique opportunity for the public to influence future federal alternative fuel policy. On August 7, 1996, DOE published an advance notice of proposed rulemaking (ANOPR) to solicit comments on the best ways to meet the petroleum displacement goals of the Energy Policy Act (EPACT) of 1992. As part of the public comment process, DOE is requesting input on incentives and ways to assess the effects of fuel displacement on reducing oil imports, improving the economy, and reducing greenhouse gas emissions, among other things. Comments must be received by November 5, 1996.

Under EPACT, private and local fleets could be required to make alternative fuel vehicles 20% of their light-duty vehicle purchases in the 2002 model

year and as high as 70% in 2005 and beyond. Instead of this mandate, the Secretary of Energy could use the public's comments to recommend to Congress other incentives or requirements for fuel suppliers, vehicle manufacturers, and consumers to increase the use of alternative fuels.

EPACT's goal is to replace (on an energy equivalent basis) at least 10% of petroleum motor fuels by the year 2000, and 30% by 2010. "A virtual one-to-one relationship exists between additional gasoline consumption and America's increased use of imported oil," DOE stated in the ANOPR. "The U.S. consumes 4 million barrels per day more for transportation purposes alone than it produces; that gap is projected to rise to 9 million barrels per day by the year 2010."

Current EPACT alternative fuel requirements limit the potential for some fuel applications, but results of this comment period could open the door to a more diverse fuel market. For example, only neat biodiesel complies with the current federal, state, and fuel provider fleet mandate. But for economic and technical reasons, many truck and bus fleets are limited to blends of 20% biodiesel and 80% diesel. Allowing blends in future programs would meet the needs of many truck and bus fleets, and offer substantial petroleum displacement benefits. Another example of potential increased alternative fuel use involves credits that can be earned with heavy-duty vehicles. These credits can only be earned after light-duty vehicle requirements are met. Heavy-duty vehicles are high-mileage vehicles, so allowing them to earn credits automatically would offer substantial petroleum displacement benefits.

"We have options on this one," said DOE program manager Kenneth Katz. "We really didn't have options on the first one [state and fuel provider fleet rule]."

☛ For more information, call the National Alternative Fuels Hotline at 800-423-1DOE.

Ethanol Ford Taurus Option Now Costs Less Than Gasoline Model

Fleet managers can now save \$345 when buying an ethanol vehicle instead of a gasoline model. Ford Motor company recently announced it is investing in the future of alternative fuel vehicles (AFVs) by reducing the prices on its 1997 flexible-fuel Taurus models. This is the first time an AFV has been offered at a cost below the comparable gasoline model.

Installing special fuel tanks, fuel lines, engine components, and special calibration costs Ford more than \$1,165 for the flexible-fuel Tauruses, which can run on gasoline and blends of up to 85% alcohol (either ethanol or methanol). The alcohol Tauruses have larger fuel tanks to compensate for the lower energy content of alcohol when compared to gasoline.

☛ For more information, call Ford's alternative fuels hotline at 800-ALT-FUEL or your local Ford dealer.