

AFDC UPDATE

News of the Alternative Fuels Data Center

AFDC Grows: Provides More Data, Increased Service to Users

As the amount of data collected on the federal alternative motor fuels fleet increases, the Alternative Fuels Data Center (AFDC) continues to improve its services by providing useful data to businesses, government, and individuals.

As part of its response to the Alternative Motor Fuels Act of 1988 (AMFA), the U.S. Department of Energy (DOE) created the AFDC in January 1991 to collect and provide information on the performance, durability, cost of operation, and environmental impact of alternative fuel vehicles (AFVs). The AFDC is



Expanded AFDC operations

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located at DOE's National Renewable Energy Laboratory (NREL).

The AFDC started two years ago with data collected from 81 light-duty vehicles purchased by the General Services Administration (GSA), 65 of which are fuel-flexible M85 (85% methanol, 15% gasoline) Chevrolet Lumina and Ford Tauruses; the remainder are gasoline-powered equivalents used for comparison.

"DOE needed a place to store non-biased results of testing generated by AMFA," said AFDC Manager Bob Wooley.

"We've come a long way since the data base first came on line," Wooley said, adding that the number and type of vehicles being tested keeps expanding.

Last year, GSA purchased 600 compressed natural gas (CNG)

General Motors (GM) Sierra pickup trucks; 75 Chrysler CNG vans; 24 E85 (85% ethanol, 15% gasoline) fuel-flexible Chevrolet Lumina; 2500 fuel-flexible M85 Dodge Spirits; and 20 fuel-flexible M85 Ford Econoline vans.

"Our main objectives are to collect operating data on selected vehicles purchased by GSA; compile accurate, quality information; and make the data available in a timely and user-friendly fashion," Wooley said.

Currently, out of the 3,287 AFVs in the federal fleet, the AFDC compiles and stores data on about 650 vehicles. "We look at driver reports, fuel usage, miles driven, how much oil was used, and what maintenance was done on each of

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AFDC Grows

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those cars," Wooley said. "About 400-500 of those vehicles also are being measured for emissions and fuel economy on a chassis dynamometer."

In addition to gathering information on light-duty vehicles, the AFDC also collects data on heavy-duty trucks and buses.

"The heavy-duty vehicle and transit bus programs, which are just getting started, encompass a wide variety of alternative fuels, including liquefied petroleum gas, neat methanol, E95, CNG, and liquefied natural gas," Wooley said.

Unlike the light-duty vehicle program, which collects data from government-purchased vehicles, the heavy-duty program involves industry/government cost-sharing projects.

The AFDC will soon make available heavy-duty AFV information from Federal Express; the New York Department of Sanitation; Archer Daniels Midland Company;

Hennepin County, MN; the state of Nebraska; Vons, a California grocery chain; and transit bus data collected by Battelle Columbus Laboratory.

"Through cooperative efforts, we selected organizations that represent unique OEM (original equipment manufacturer) technologies and geographic locations for transit buses, heavy-duty vehicles and some light-duty vehicles which will complement our needs," Wooley said.

For example, even though GSA has E85 vehicles in Chicago, IL and Washington, DC, the AFDC will work with the state of Colorado on its E85 program. "Their information could fit into our overall program because we need more information on E85 vehicles at high altitudes," Wooley said.

Independent agencies collecting vehicle data for the AFDC must follow detailed data collection plans developed at NREL. Because of quality assurance policies, it usually takes about six months from the time the AFDC receives vehicle data to the time it is made accessible to

the general public. Wooley said it is worth the wait to get accurate, unbiased, and understandable information through the data base.

Although the AFDC's primary goal is to collect information from alternative fuel demonstration programs, the data center also gathers supplemental alternative fuel information. For example, the AFDC continuously gathers information on the location of CNG, LPG, M85, and E85 refueling stations and keeps track of AFV availability through OEMs.

"We want to expand the information that is currently provided by the AFDC," said Wooley. A separate literature data base may soon be added; it would list publications and reports relating to alternative fuels. "This way we can cover other bases and supply more information on what's going on with private fleets." Wooley said the reports would be made available with a caveat that the AFDC did not actually do the research and testing. Wooley expects the literature data base to be on line by the end of the year. □

Are you an alternative-fuel provider, an alternative-fuel fleet manager or generally familiar with AFV refueling stations?

The AFDC is searching for additional alternative refueling stations that may not be listed currently in the data center. If you have additional refueling station information, please call Kevin O'Connor at (303) 231-7687 or write the National Renewable Energy Laboratory, Alternative Fuels Data Center, Building 15/1, 1617 Cole Blvd., Golden, CO 80401-3393. Fax information to (303) 231-7815. Useful information includes: site address, contact name, telephone number, and any known station capabilities, i.e., quick or slow fill, card accessible, hour restrictions. □

New AFDC Software Provides More Information at the Push of a Button

The Alternative Fuels Data Center (AFDC) recently released Version 1.1 of the AFDC/View program, which retrieves all the information available at the data center with the touch of a button (See Figure 1).

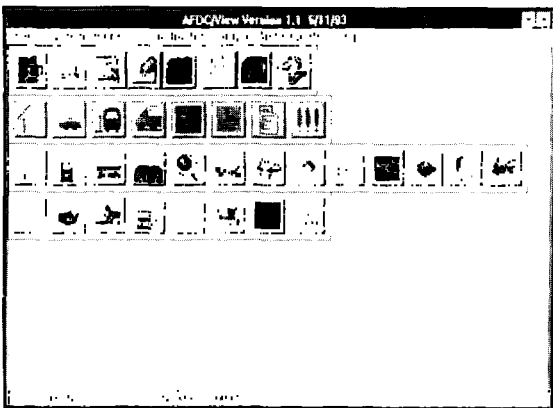


Figure 1

"It's broader in scope than past programs," said AFDC Manager Bob Wooley. "With this program, users can get more specific data with a greater variety of queries."

With the updated program, users can now access more than 50 new queries, including summaries and details of maintenance, oil, fuel usage, mileage, performance, and emissions data for M85 (85% methanol, 15% gasoline) demonstration sites. Vehicle specifications, site addresses, and detailed refueling site data also are available for most alternative fuels.

In addition, a greatly improved graphic option puts the information into bar, scatter or line charts. With AFDC/View the data are automatically downloaded to local

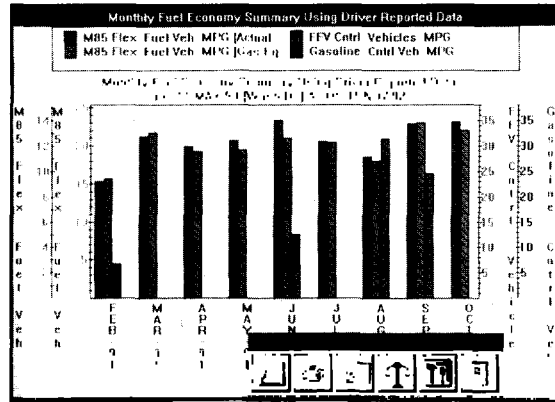


Figure 2

personal computers where they can be copied to the Windows clipboard and exported to other Windows applications, such as spreadsheets or word processors (See Figure 2).

A new "Stay-On-Line" feature also has been added to allow the user to retrieve multiple data sets in a single session.

Another time-saving feature is the "All" option, which permits users to receive summarized information instead of detailed site-specific data. For example, if a user wants fuel economy information on light-duty vehicles, the "All" option allows the user to receive the

summarized data without having to select each location individually.

Minimum computer requirements to run AFDC/View 1.1 follow:

- * 80386-class computer
- * Windows 3.1
- * DOS 3.3
- * 2 megabytes of memory
- * A mouse
- * A 1200-baud modem (2400-baud recommended).

To request an on-line approval access form and order the software, write to the National Alternative Fuels Hotline, P.O. Box 70879, Washington, DC 20024; or call (800)423-1DOE. Requests also may be faxed to (202) 554-5049. □

AFDC Also Upgrades Hardware

In addition to the new software, the AFDC also has upgraded to an improved hardware system.

The Sun Microsystems Sparcstation 10 replaces the Sun Microsystems Sparcstation 2. The new hardware is being expanded to 132 megabytes of memory. Plus, the new 6-gigabyte hard disk storage system has six times the capacity of the previous Sparcstation.

The Sun Microsystems Sparcstation 10 is hooked up to eight Universal Data Systems V. 3227 modems.

The 9600-baud "error correction" modems are capable of detecting errors in the data created from phone line noise and correcting the errors without having to retransmit the data. □

WVU Transportable Laboratory Collects Data, Trains Students in New Skills

Engineers have a difficult job as it is, but designing a federal test procedure emissions laboratory to fit on a truck bed was an onerous task. It took 22 West Virginia University (WVU) students and six faculty members 18 months to design the transportable heavy-duty emissions lab to accommodate less than half the space of a comparable stationary lab, to write compatible software, build the lab, and to make it operational, according to WVU Associate Professor Reda M. Bata.

The laboratory, which is collecting data for the Alternative Fuels Data Center (see related story, page 1), consists of two tractor-trailers — one that houses a very compact 8 x 31-foot chassis dynamometer with a weight acceptable for road travel (under 55,000 lb), and another that contains a data acquisition and control system and gas analyzers. The mobile laboratory also includes an environmental chamber for particulate filter condition and a sensitive microbalance for particulate matter weighing.

Because of the reduced dimensions and cost limitations necessary to fit the parameters of the project, the student-faculty design and construction

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AFDC to Provide State AFV Purchasing Plans

Data on state alternative fuel vehicle (AFV) purchasing plans, recently published in the U.S. Department of Energy's (DOE) "Alternative Fuel Vehicles for the State Fleets: Results of the 5-Year Planning Process," will soon be made available through the National Renewable Energy Laboratory's Alternative Fuels Data Center (AFDC).

The state AFV purchasing plans will be used in conjunction with the previously published federal plan to encourage original equipment manufacturers (OEMs) to produce a variety and reduce the incremental cost of AFVs. These plans encourage fuel suppliers to expand the alternative fuel infrastructure and fuel availability.

The plans assisted DOE in identifying states' market potential for and concerns with AFV development. For fiscal year 1993, 8,271 AFVs were requested in 31 states, including the District of Columbia. Compressed natural gas was requested more than any other alternative fuel (See Figure 3).

However, several states identified limited OEM AFV production levels as a barrier to achieving these purchasing goals. In addition, limited infrastructure and short dedicated-AFV driving ranges could pose a significant problem to AFV acceptance. Yet the greatest concern was the added cost of AFVs at a time when budgets are already stretched. As one Iowa representative said, "If these OEMs (vehicles) were made available at no incremental cost, we would probably increase our AFV purchases."

For those interested in obtaining AFDC on line access forms or receiving copies of the plans, contact the National Alternative Fuels Hotline at (800) 423-1DOE or (202) 554-5047. □

States' Total AFV Requests

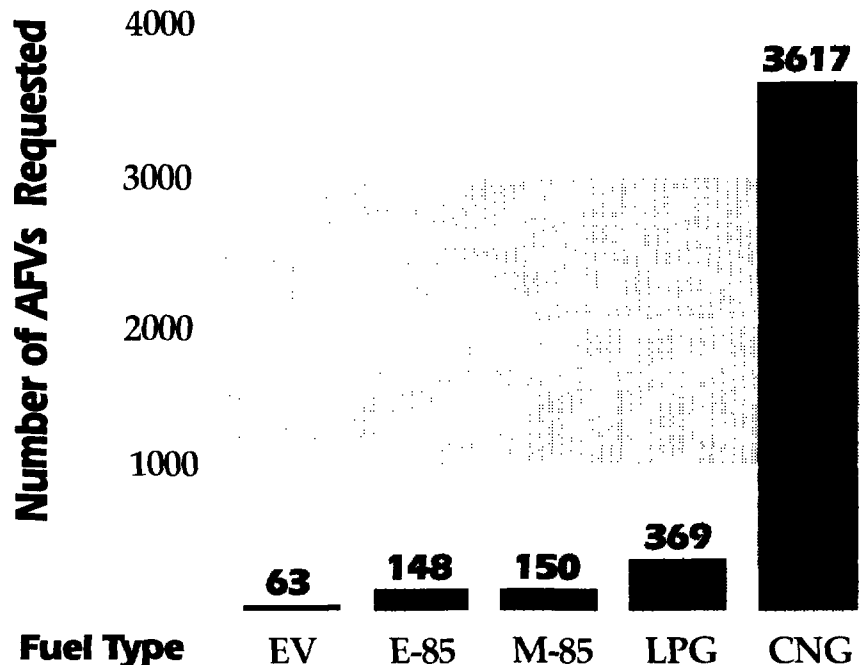


Figure 3

AFDC to Have Heavy Duty Emissions Data Available

The U.S. Department of Energy's (DOE) Alternative Fuels Data Center (AFDC) will soon contain heavy-duty emissions data derived from testing performed by the Transportable Heavy-Duty Vehicle Emissions Testing Laboratory. (See related story below; and *AFDC Update*, March 1993, page 1).

The AFDC will include information on 104 heavy-duty vehicles (88 buses, 12 trucks, and 4 tractors) using different alternative fuels at the fleet site of operation. Vehicle, engine, and fuel types are summarized in Table 1. Nine states were visited and tests were conducted at 15 different sites.

One transient driving cycle, the Central Business District, was used to simulate the travel pattern in urban areas. This single cycle was

Engine Type	No. of Vehicles	Fuel Type	No. of Vehicles
DDC6V-92	54	Jet A, CD*, Diesel #1	32
GMC	6	Diesel #2	29
Cummins L-10	27	CNG	19
Caterpillar	9	Methanol	7
MAN D256 MLUM	3	LPG, JP4	4
Hercules G3400	2	CD/CNG, Jet A/CNG	5
Ford 460 EFI	1	E95	3
ACE	1	Gasoline	1
Chevrolet	1	CNG, Gas	1

Table 1

*Clean Diesel

used to test all the vehicles to establish a common ground for comparison between different vehicles, fuels, and sites of operation. It consists of 14 segments: each has a 40-second duration time (10 seconds for acceleration, 18.5 seconds for constant speed at 20

mph, 4.5 seconds for deceleration, and 7 seconds idling) for a total of 560 seconds.

The laboratory tests mass transit and school buses and other heavy-duty vehicles under the Urban Bus Program of the Alternative Motor Fuels Act of 1988. □

Heavy-Duty AFV Performance Data Collected for Second Year

The U.S. Department of Energy (DOE) has announced the availability of up to \$700,000 through its Heavy-Duty State/Municipal Vehicle Alternative Fuel Demonstration Program. Performance data from these alternative fuel vehicles (AFVs) will be collected by the National Renewable Energy Laboratory

(NREL) and added to the Alternative Fuels Data Center (AFDC).

The funding, expected to translate into about 10 financial assistance awards, will support state and municipal fleet managers in acquiring heavy-duty AFVs. DOE has distributed solicitations (# DE-PS41-93R110543) to all state energy offices, requesting applications from parties interested in participating in the program. Award recipients will be required to submit weekly vehicle logs to NREL for five years beginning on the date the vehicle begins operation. Data on mileage, maintenance, reliability, and exhaust emissions will be compiled and catalogued in the AFDC.

Last year, awards were granted to 10 states and the District of

Columbia; the awards were used to defer incremental cost on about 45 alternative fuel school buses. These data are being collected from last year's participants, and are currently being added to the data center.

Parties interested in participating in the program should contact their state energy office for a copy of the solicitation. Applications must be submitted to the state energy offices and postmarked by June 30, 1993. Each state energy office will then submit one application to a DOE Regional Support Office for screening. Selected applications will be reviewed by DOE's Office of Technical Assistance and Office of Alternative Fuels. Awards will be issued by September 30, 1993. □

Hotline Responds to Callers' Questions on Tax Deductions, and Other Issues



The Department of Energy's (DOE's) National Alternative Fuels Hotline has responded to several thousand callers on alternative fuels issues including the National Energy Policy Act of 1992 (EPACT), vehicle conversions, and fleet requirements under the Clean Air Act Amendments of 1990 (CAAA). Below are answers to some of the often-asked questions the hotline receives:

Q. How can I find out how to take tax deductions or credits for clean fuel vehicles under EPACT?

A. Taxpayers may request Publication 553, "Highlights of 1992 Tax Changes" from the Internal Revenue Service (IRS). On pages five, six, and 12-14, Publication 553 provides general information on the credit for qualified electric vehicles under section 30 of the Internal

Revenue Code and the deduction for qualified clean-fuel vehicle property and refueling property under section 179A of the Code.

To order a free copy of Publication 553, call the IRS toll-free telephone number at (800) TAX-FORM [(800)-829-3676], or write to your nearest IRS Forms Distribution Center listed on your income tax packages. In addition, taxpayers who have more specific questions on sections 30 and 179A of the code may call (202) 622-3110 (not a toll-free call) or write to: Internal Revenue Service, CC:DOM:P&SI:Br6, 1111 Constitution Avenue, N.W., Washington, DC 20224.

Q. What clean fuel vehicle regulations are relevant to fleets?

A. Many fleets in large metropolitan areas will have to comply with either or both the EPACT and the CAAA.

Under the CAAA, beginning in 1998, fleets in 22 of the worst-

polluted metropolitan areas with 10 or more vehicles that can be centrally fueled are required to phase-in new vehicle purchases that operate on "clean fuels." Under this regulation, reformulated gasoline (RFG) and clean diesel qualify as clean fuels. There is also a provision for a "credit trading" program under the CAAA, which allows certain fleet owners who comply with the regulations early to accumulate credits that can be banked, traded, or sold.

Under EPACT, fleets with 20 or more vehicles (if fleet owner has more than 50 vehicles in metropolitan areas) capable of being centrally fueled in more than 100 metropolitan areas are required to begin purchasing clean fuel vehicles starting in different years, depending on the type of fleet: federal (1993); state (1995); municipal (1999); private (1999); and alternative fuel provider (1996). RFG and clean diesel, however, are not included in the definition of alternative fuels under EPACT. A fleet credit trading program will also be developed under the new law.

In some cases fleets may have to comply with both laws. For summaries of EPACT, an outline of fleet provisions, and a summary of the CAAA Clean Fleet Program and contact names and numbers, call the National Alternative Fuels Hotline at (800) 423-1DOE [(800) 423-1363], or (202) 554-5047. □

WVU Transportable Laboratory *(continued from page 4)*

team had to employ innovative ideas to save space and costs. For example, the "selectable disc" flywheel system that simulates the inertia of a vehicle during acceleration and deceleration, had to be designed by the student-faculty team to fit to reduced space and U.S. Environmental Protection Agency (EPA) requirements. It was then specially built by a local mine equipment manufacturer. The design team also found a way to incorporate lower-cost parts into a power train system that transfers power from the vehicle to the flywheel and the eddy current dynamometers.

The computer and data acquisition control system also were completely designed by the student-faculty team. In addition, six students and technicians involved in multiple roles — from

truck driver to lab analyst—operate the laboratory on a day-to-day basis as it travels the country testing transit buses, school buses, and trucks (last year it tested more than 100 vehicles). To train the students and technicians to use the equipment, they were taken to the U.S. Environmental Protection Agency's mobile source emissions laboratory in Ann Arbor, MI. They were also required to study technical manuals to understand operation of all the equipment.

Of course, nothing prepares someone as well as practical, real-life experience. "All of this hands-on experience for the students creates a new breed of engineer with skills that are in demand by industry," said Dr. Bata, who also is quick to mention that his graduating students have almost all landed jobs.

One unexpected part of the students' and technical crews' training was learning patience. Bata relates a story of the lab team being held up for two full days in Tacoma, WA because of the weather. Emissions testing requires weather and pollution levels (background) to be at a certain level to obtain accurate readings. In this case, heavy airport traffic and a lack of wind contributed to high air pollution readings in the area. The technical crew had to wait two full days for sufficient wind to dissipate the air pollution enough to begin testing.

This year, more students will have a chance to participate—because of the demand for its services, the university is in the process of building a second transportable laboratory. □

If you are interested in becoming an Alternative Fuels Data Center user, please detach, fill out this form and return to:

AFCD, NREL: 1617 Cole Blvd., Golden, CO 80401-3393; Fax: 303-231-7815

Name _____ Date _____

Company _____

Address _____

City _____ State _____ Zip _____

In order to use AFDC View for Windows, your PC must meet the following minimum specs: 90286 Processor (80386 recommended), DOS 3.3, Windows 3.1, 2 MB RAM (4 recommended), Mouse, 1200 baud modem (2400-baud recommended).

Would you like your software on a: 3-1/2" and/or 5-1/4" disk?

Meetings and Conferences

June 23-25: 9th Annual IBIS Fuel Ethanol Workshop, Charleston, SC. For information, call Larry Peckous at (800) 438-1361 (Ext. 384), or write to: IBIS, P.O. Box 241068, Charlotte, NC 28224.

June 27-29: 2nd Annual National Alternative Fuels Conference, Pfister Hotel, Milwaukee, WI. For information, call Leslie Adler at (800) USA-FUEL or 202-554-0614, or write to: Information Resources, Inc., 499 South Capitol Street, Suite 406, Washington, DC 20003.

August 30-Sept. 2: 1st Biomass Conference of the Americas, Radisson Hotel, Burlington, VT.

For information, call Jessica White at (303) 231-1158, or write to: NREL, 1617 Cole Boulevard, Golden, CO 80401.

September 12-15: 11th Annual Natural Gas Vehicles Conference, Radisson Hotel, Denver, CO. For information call Dan Brown at (703) 841-8600 (Ext. 443), or write to: American Gas Association, 1515 Wilson Boulevard, Arlington, VA 22209.

September 26-29: SAE 1993 Fall Technical Conference on Alternative Fuel Engine Performance & Emissions, Lakeview Resort Area, Morgantown, WV. For more information, call Reda Bata at (304) 293-3111, or write to: West

Virginia University, Mechanical & Aerospace Engineering Department, Morgantown, WV 26506-6101.

October 22-23: Solar & Electric Vehicle Symposium Car & Trade Show, World Trade Center, Boston, MA. For information, call Nancy Hazard at (413) 774-6051, or write to: NESEA, 23 Ames Street, Greenfield, MA 01301.

November 7-10: International Symposium on Alcohol Fuels (ISAF), The Broadmoor Hotel, Colorado Springs, CO. For more information, call Jessica White, Conference Coordinator, at (303) 231-1158, or write to: NREL, 1617 Cole Boulevard, Golden, CO 80401-3393.

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