

Alternative **FUELS**

Volume 3, Number 4



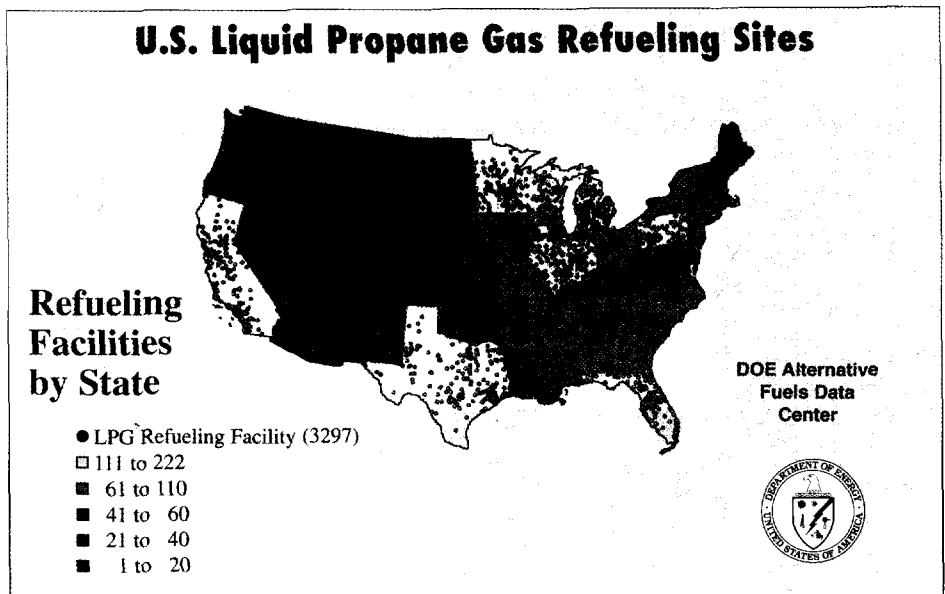
Propane—Popular Fuel Enhanced by New Engine Options

by Roger W. Turner, Senior Operating Officer, Alternative Transportation Fuels, Inc.

Propane's Advantages

A gaseous fuel closely related to natural gas, propane is a simple carbon-hydrogen molecule (C_3H_8) that mixes well with air and burns cleanly and efficiently. After gasoline and diesel, propane is the most widely used transportation fuel in North America, largely because of economic advantages in vehicles with high mileage and fuel consumption levels. Clean-burning propane engines also meet all applicable emissions requirements. Propane has other advantages, as outlined below, which will contribute to rapid growth in the increasingly cost-conscious trucking industry.

- **Infrastructure**—More than 3000 existing propane fueling sites nationwide can serve the trucking industry's needs (see map). Because of the modest cost of new installations, the infrastructure can expand rapidly to meet demand. Fueling propane vehicles is as easy and convenient as fueling conventional vehicles.
- **Vehicle Range**—Propane is stored as a high-energy liquid at ambient temperatures, and its driving range is only slightly less than that of traditional fuels.



Propane refueling sites across the country

- **Domestic Production**—North American propane derived from plentiful natural gas supplies can meet the demands of both existing transportation customers and new users.
- **Safety**—Propane has proven safe in numerous vehicle types and applications worldwide.

Propane's practicality, low cost, and reliable supply have made it the world's most widely used alternative transportation fuel, used in about 3.6 million vehicles worldwide (more than 700,000 in North America).

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Vehicle Availability

In the medium-duty arena, Ford Motor Company continues to offer its propane truck, which is available in various cab styles for municipal, utility, and commercial delivery service. The 7-L engine is fully warranted and meets all applicable federal and California emissions requirements. Certification tests show that the trucks produce 55% fewer hydrocarbons and 35% less oxides of nitrogen than their gasoline counterparts. Ford recently announced a significant increase in sales, projecting a 1995 potential for three times the number of units sold in 1993 and 1994. Increasingly, sales are to customers outside the propane industry, which has been the target market.

General Motors Corporation also offers medium-duty propane TopKick and Kodiak trucks. The fully warranted 6 and 7L vehicles are upgraded for propane use at Monroe Truck Equipment in Janesville, Wisconsin, before delivery. The demand for these vehicles is also increasing. As with the Ford vehicle, purchasers are responding to federal income tax deductions for alternative fuel vehicle purchases. These deductions substantially reduce the incremental cost for the propane versions, meaning that users can recover the cost difference and accrue large operating cost savings during the life of the vehicle.

Cooperation Furthers Propane's Use

Thanks to cooperative programs funded by the propane industry, original equipment manufacturers, and government, two new heavy-duty engines will be available in 1995 and 1996. In one heavy-duty program, Caterpillar Corporation is modifying its 3306-series diesel engine for propane operation. Between 1990 and 1992, an early prototype engine was developed and installed for testing in actual use on a Ford LTS9000 truck chassis used by Superior Propane, Inc., for bulk delivery service. An additional prototype engine was

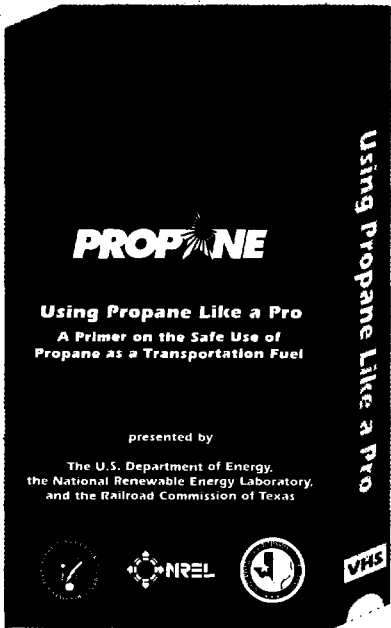
installed in a recycling vehicle by the town of Markham, Ontario as part of the Model Community Demonstration project.

The Caterpillar test engine demonstrated excellent reliability and operation. Second-generation prototypes incorporate component upgrades and recent advances in electric engine control technology. Emissions are expected to be significantly lower than the model's diesel counterpart, and the engine operates more quietly.

A second near-term project is now beginning with Detroit Diesel Corporation (DDC). This project, which involves a number of U.S. and Canadian organizations, seeks to capitalize on a new line of DDC engines designed to replace the widely used 6V92 diesel engine series. In 1995, field demonstrations of a spark-ignited propane version are planned at three locations: Halifax, Nova Scotia (two transit buses); Fredericton, New Brunswick (one transit bus); and Chicago (a refuse hauler). Units will also be tested in Orange County, California; Denver, Colorado; and Corpus Christi, Texas.

The propane Series 50 engine uses lean-burn technology to control oxides of nitrogen emissions and achieve power output roughly equivalent to that of its diesel counterpart. The engine is expected to meet U.S. and California low emissions standards for heavy-duty engines.

In light-duty trucks and vans, Chrysler Canada is developing full-size vans for limited introduction in Canada during the 1996 model year, with full production and possible U.S. introduction the following year. The Chrysler propane van is expected to meet California's stringent low emission vehicle standards while achieving excellent fuel economy. Ford Motor Company is also developing plans to introduce light-duty propane vans and pickup trucks through its Qualified Vehicle Modifier (QVM) program as early as the 1996 model year. Ford's QVM program is a partnership with authorized conversion dealers who upgrade the vehicles to gaseous fuels, both compressed natural gas (CNG) and propane.



The U.S. Department of Energy (DOE) recently released a video on propane safety. Entitled "Using Propane Like a Pro," the video was produced for DOE by the Railroad Commission of Texas through the National Renewable Energy Laboratory. The video runs 12 minutes and 30 seconds, and features Randy White, former Dallas Cowboy standout and National Football Hall-of-Famer. To obtain your FREE copy, call the National Alternative Fuels Hotline at 1-800-423-1DOE.

In the Future

Propane offers the trucking industry the potential of fuel cost savings, enhanced engine durability and reduced maintenance costs, and environmental benefits. Favorable vehicle range and the existence of an adequate refueling network are additional advantages. Many companies that operate truck fleets are already familiar with propane as a fuel for forklifts and warehouse heating. Fueling with propane will become even more convenient in the near future as marketers introduce new retail outlets along interstate highways that provide value-added services such as credit cards, card-lock networks, and detailed fleet management information. With these expected "extras," propane can be an alternative fuel that makes compelling sense in the rapidly changing business and regulatory environment.

Roger W. Turner, senior operating officer of Alternative Transportation Fuels, Inc., is responsible for developing a North America infrastructure of alternative fueling stations and related services under the Altera brand. He serves on President Clinton's Federal Fleet Conversion Task Force and is a founding member and director of the Propane Vehicle Council.

National Renewable Energy Laboratory to Sponsor Development Project for Heavy-Duty Alternative Fuel Vehicles

The National Renewable Energy Laboratory will sponsor a project to develop and demonstrate advanced fuel system technology. The project will provide a means of furthering the development and viability of alternative fuels as the energy source for heavy-duty vehicles. The laboratory plans to issue a letter of interest to firms with background and experience in alternative fuel combus-

tion, emission technology, storage, and formulation. Fuels to be considered include natural gas, propane, methanol, and ethanol.

Federal Agency Sets Highway Standards for Compressed Natural Gas Tanks

The National Highway Traffic Safety Administration has announced a new standard for the durability, strength, and performance of CNG cylinders. The standards became effective in the spring of 1995. The new federal motor vehicle safety criterion, Standard #304, specifies performance requirements. These include a pressure test to establish cylinder durability, a burst test to evaluate the container's initial strength, and a bonfire test to evaluate the container's pressure-relief characteristics. The agency said the rule aims to reduce deaths and injuries from fires that can result from CNG leaks.

New Alternative Fuels Emissions-Testing Facility Opens

A state-of-the-art alternative fuels testing facility and laboratory opened October 21, 1994, at the University of Wisconsin-Milwaukee. The new facility is one of only a few nationwide that can conduct the stringent Federal Test Procedure (FTP) emissions test the U.S. Environmental Protection agency specifies. Detailed analysis of vehicle exhaust components will be performed using an advanced instrumentation system developed by Nicolet Instruments, Inc., of Madison, Wisconsin. The 48-inch roll dynamometer can simulate heavy-duty urban drive cycles. The 8000 square-foot facility contains three large test bays and a centrally located control room.

First M85 Outlet Opens in Edmonton, Alberta

The first M85 refueling station in Edmonton, Alberta, opened in September 1994, marking the westward expansion of Canada's methanol trade. The facility is in a Parliament Petro-Canada service station and is available to the public. The Canadian Oxygenated Fuels Association is attempting to have a network of M85 refueling facilities available throughout Canada. Canada's methanol industry accounts for more than 10% of the world's production and has the potential to guarantee a long-term supply at competitive prices.

Pennsylvania Offers Alternative Fuels Grants to Fleets

The Pennsylvania Alternative Fuels Task Force has announced that money is available to fleets under the Alternative Fuels Incentive Grant. About \$3.5 million is available annually, for a total of \$21 million for the duration of the grant. As much as 60% of eligible costs will be covered, including installation of fueling equipment and facilities. Level of funding available for each grant will decline biannually by 10% until a 20% level is reached. Eligible fuels include CNG, propane, ethanol, methanol, electricity, liquefied natural gas, and hythane (a product composed of 15% hydrogen and 85% methane). Funding for an individual grant is limited to a maximum of 10% of the total available funds and up to 15% to any county in the state.

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The aim of **Alternative Fuels in Trucking** is to inform fleet owners and operators, equipment suppliers, government officials, and other interested parties about important developments in the use of alternative fuels in heavy-duty trucks. Suggestions and comments are welcome and may be directed to the National Alternative Fuels Hotline at 1-800-423-1DOE. Views expressed by guest authors are their own, and not those of ATAF, DOE, or NREL.

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