

# Clean machines

The road to air quality  
improvement leads  
to alternative fuel  
vehicles.

By Tom LaRocque



Local government leaders may have breathed a sigh of relief more than a decade ago when they found out that the Energy Policy Act of 1992 (EPA) required only state and federal agencies to buy alternative fuel vehicles (AFVs). For several reasons, however, many cities and counties have since voluntarily purchased AFVs to improve their air quality and lessen the dependence on petroleum-based fuels.

Communities considering purchasing AFVs — which are powered by natural gas, ethanol, biodiesel, propane, electricity, hydrogen or a combination of gasoline and electricity — will be traveling through well-chartered territory. A wealth of case history, amassed by hundreds of fleets, exists. Transit agencies, school districts, airport-based fleets and solid waste disposal operators are major users of alternative fuels, and many have built exemplary alternative fueling programs.

For example, Greensboro, N.C., began using biodiesel in its diesel-powered vehicles in early 2002. The switch affected the city's medium- and heavy-duty trucks, waste haulers, fire trucks, ambulances and police vehicles. Fleet manager Gary Smith says the city has used more than 1 million gallons of B20 biodiesel, which is blend of 80 percent petroleum diesel and 20 percent biodiesel.

Greensboro's entire 751-vehicle fleet was converted in just a few weeks.

Biodiesel's big advantage, says Smith, is that it requires no vehicle retrofitting or modification, dispensing equipment or underground tanks. "We have four fueling sites," Smith says. "We'd convert one site and wait a week. If we had no problems, we moved on to the next one."

Fuel economy was unaffected by the move to biodiesel, Smith says. No new service or maintenance problems occurred until early 2004. In extremely cold weather, the fuel gelled in some vehicles, making them hard to start. "The tanks are underground where the temperature is constant at around 50 degrees, [so the gelling] problem is more likely to have affected fuel onboard the vehicles when parked overnight," he says. Nevertheless, the city's fuel supplier is adding a chemical to the fuel to address the problem.

### Early adopters

Hollywood, Fla., started converting its gasoline vehicles to use compressed natural gas (CNG) in the early 1990s, but the city eventually discontinued the process because its natural gas-fueled automobile choices increased, says Greg Turek, director of the city's Public Works Department. The city now operates 170 CNG-fueled vehicles, including 10 CNG-fueled Ford F-150 pickup trucks. Its police department owns 11 CNG vehicles, mostly Ford Crown Victoria sedans. Hollywood has received \$20,000 in vehicle purchase assistance from the U.S. Department of Energy's AFV Rebate Program — more than any municipality.

The Clean Cities Program of the U.S. Department of Energy was established in 1994 largely to help state and federal agencies meet the mandates of the Energy Policy Act of 1992. The program provides technical information about alternative fuels and vehicles, and it fosters relationships between government and industry. Its focus has expanded beyond alternative fuels to include hybrids, certain blended fuels, idle reduction for diesel trucks and informed consumer choice on fuel efficiency.

Through its Tiger Team Program, Clean Cities offers technical assistance to stakeholders in approximately 80 coalitions in urban areas across the country. For more information, visit [www.cities.doe.gov](http://www.cities.doe.gov) or call 1-800-CCITIES.

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Over the long run, Turek reports that the per mile gasoline cost is twice that of CNG fuel. "With gasoline prices going up, natural gas makes sense for us," he says. Operating its own fueling stations is essential for any large CNG fleet, Turek says. The city has its own fueling facility, with 10 slow-fill dispensers designed to fuel vehicles overnight.

Like Hollywood, Fla., the Kansas City (Mo.) Water Services Department started using alternative fuels in the early 1990s. Sam Swearngn, fleet manager of the department, says neither the agency nor the city were motivated to use AFVs

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The Washington, D.C., Metro Area Transit Authority operates 164 compressed natural gas buses.

# Fuel cells power five city-owned Los Angeles cars

Los Angeles boasts of one of the nation's most expansive alternative fueling programs. Included in its fleet of more than 1,200 AFVs are approximately 700 natural gas-fueled vehicles and 196 vehicles that are propane-powered. The city owns more than 300 electric-powered vehicles, including 294 full-function, highway-capable vehicles and 16 golf cart-like units. Some of its street sweepers, waste trucks and dump trucks also use alternative fuels. In addition, its transit agency is committed to buying only alternative fueled or hybrid-electric buses in the future.

Since late 2002, the city has leased five cars powered by hydrogen fuel cells. The clean, futuristic technology generates electricity through a chemical reaction between compressed hydrogen and oxygen in the air. A hydrogen fuel cell's only emissions are clean water vapor. In a special arrangement with Honda, the city secured five Honda FCXs, a fuel cell-powered vehicle that is EPA-certified for highway use but is not for sale commercially.

A temporary hydrogen fueling station — a trailer containing compressed hydrogen fuel cylinders — stands on city property near downtown, says Gretchen Hardison, director of air quality for the city's Environmental Affairs Department.

The Los Angeles Fire Department had to issue a permit for the fueling station, and all drivers of the hydrogen-fueled vehicles must be trained before they're allowed to use it. "It's been a learning experience for all of us," she says.

— Tom LaRocque



## Setting up the system

Creating an infrastructure to refuel AFVs can present its own set of problems, as the Washington (D.C.) Metro Area Transit Authority (WMATA) discovered. The agency, which operates 164 CNG buses, encountered some problems when it began to expand its CNG fueling system.

WMATA's plans included upgrades to at least two of its eight large bus maintenance and refueling facilities. The agency contracted much of the work for the first facility with a company that specialized in fueling but not in construction or interior remodeling. "That was a mistake," says Jack Requa, WMATA's chief operating officer for bus services. The contractor subcontracted the construction work, which included installing methane detectors, explosion-proof lighting and specialized air handling equipment. However, because the subcontractor reported directly to contractor, the agency found it difficult to communicate with the subcontractor. Consequently, WMATA will issue separate contracts for construction and fueling installation in its next renovation project, Requa says.

WMATA received help estimating the cost of the equipment and facility upgrades from the Tiger Team section of the Clean Cities Program, which is funded by the Washington, D.C.-based U.S. Department of Energy. Initially, WMATA sought advice for its estimates from other transit properties with CNG experience. However, at one point, WMATA's cost expectations became too high because it used information from an agency that was plagued with cost overruns and unusual local construction requirements.

## Working with objections

One out of every two taxis and shuttles must be an AFV at the Oakland (Calif.) International Airport, according to an ordinance passed two years ago by its governing body, the Oakland Port Authority. The requirement affects companies with at least two shuttles or four taxis. Because hybrids do not qualify, and ethanol and propane are not available, AFV means CNG by default.

Renee Dowlin, the airport's environmental planner, was the primary advo-

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by mandates but rather out of concern about groundwater contamination from MTBE, a gasoline additive that has since been banned in many states.

The city initially decided to use CNG, which dissipates into the air when it escapes and is no threat to groundwater. The water department gradually built up its AFV fleet and today owns approximately 135 light-duty CNG vehicles. Swearngn notes that vans, such as the Ford E-350, are least compromised by CNG fueling because the original equipment fuel tank does not impinge on cargo space. The department also uses many CNG-fueled pickups and passenger cars and fuels more than 300 diesel-powered vehicles with B20 biodiesel.

"People ask me, 'How much money are you going to save with CNG?'" Swearngn says. "I say it won't be any cheaper. If it was, there would be a CNG station on every corner." On a fuel-cost-per-mile basis, he says CNG has been slightly less than gasoline. Swearngn also admits he did not anticipate the added cost of

inspecting every fueling compressor twice weekly as a safety precaution.

During Swearngn's tenure with the city, its Water Services Department has secured a considerable amount of funding from the federal government — more than \$3 million — for AFV purchases. Most of the federal money has come through the Congestion Mitigation and Air Quality (CMAQ) program of the Washington, D.C.-based U.S. Department of Transportation. CMAQ funds are administered locally through planning organizations such as Kansas City's Mid-America Regional Council.

"Get in there and fight for those funds," he advises, because other agencies representing local transit and traffic-control are competing for the same dollars. "The transportation guys in particular tend to think of CMAQ as being rightfully their money, because it comes down from the DOT," he says. Swearngn says agencies should familiarize themselves with the office administering CMAQ funds and visit that office, especially during meetings when funds are allocated.

cate of the ordinance. She says taxi and shuttle operators were concerned about the cost of the AFVs and the reduction of luggage capacity because of the trunk-mounted fuel tanks. However, only cars equipped with auxiliary CNG fuel tanks suffered greatly reduced trunk capacity, and extra fuel generally is not needed because CNG pumps are close to all airport vehicle fleets. True, CNG vehicles generally cost more than gasoline-fueled counterparts, but a purchase incentive from the Oakland Air District erased the incremental costs. In the past, taxi operators typically acquired used vehicles and "drove them into the ground," Dowlin says, adding that the ordinance may have forced many carriers to buy new vehicles, but the result is fewer, but more stable, fleets.

Dowlin advises others interested in implementing AFV requirements to "be persistent and research what's out there," and to be aware there are false claims about vehicle limitations. She also suggests looking for funding incentives for AFVs and clean air efforts from federal, state and local governments.

#### Find a champion

Hartford, Conn., placed 20 natural gas-fueled Honda Civic GX sedans on the street in 2002, following extensive research into alternative fueling by Owen Humphries, a city contract administrator. While fleet management is not part of his job description, Humphries was motivated by a desire to see cleaner air in the city of 120,000 residents.

"When the state legislature is in session, we might have another 70,000 people driving in and out of the city," says Humphries. Hartford, which is the state capital, lies at the crossroads of two major interstate highways. A nearby landfill, where many diesel trucks idle for long periods, further aggravates the air pollution problem.

The state gave Hartford \$106,000 to help buy its AFVs, and the city received a federal tax break of \$2,000 per vehicle. With the two incentives, "we ended up paying nothing for the first year of use," says Humphries. "Purchase incentives are out there."

Fuel costs have been "spiky," he says. Unlike gasoline and diesel fuel, which are purchased by the city through large, fixed-price contracts, natural gas is purchased at a Texaco station near

the city center. By purchasing 20 CNG vehicles, he says, Hartford hopes to help jump-start an AFV market throughout the city.

Humphries advises other cities considering AFVs not to "make decisions based on fuel prices alone." Along with environmental issues, public health and politics, consider net vehicle acquisition costs by factoring in the purchase incentives available. Finally, he suggests finding a champion to back the program — someone like Hartford's mayor, who helped secure the AFVs.

While there is no uniform formula to creating a successful AFV program, at least a few paths have been beaten by local government pioneers. However, by using the common elements of their experiences, such as finding local support and funding, cities and counties can be on the road to a cleaner and healthier environment. ACE

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