

According to the American Public Transit Association's *Transit Vehicle Data Book, 1999*, propane vehicles account for approximately 300 of the overall U.S. transit vehicle population. In dark contrast, compressed natural gas (CNG) buses account for at least 2,400 of that population. Other alternative fuels are represented in the mix, but natural gas stands above its non-traditional competition, which may cause the propane vehicle industry to wonder what it is missing.

As urban air pollution awareness turns its accusing finger at diesel-belching buses, alternative fuel vehicles (AFVs) are being asked to fill the role as a cleaner counterpart. But for propane the questions remain: Where is propane in the transit fuel mix and how can the propane vehicle industry emerge from its protective shell?

Alex Spataru, president of the ADEPT Group, a consulting firm in Los Angeles, says current trends in transit veer in the direction of smaller shuttles that are more accessible to riders and may even be dispatched like taxis. In addition, the transit sector is opening itself to new areas of technology. With advancements in transportation communications, such as global positioning satellites, the rider may no longer need bus stops. Spataru says that an increasing number of advanced transit organizations use tracking systems to monitor inventory and better meet demand.

# WAITING FOR THE BUS

TRANSIT DISTRICTS CITE LACK OF ENGINE AVAILABILITY AND INDUSTRY COMMITMENT FOR DELAYS

by Joy M. Keller

“Shuttle operations are definitely a thing of the future, especially with America getting older,” says Spataru. “People are going to need to go places and commercial centers will begin providing some of the stimuli for this.”

With the new surge of interest advanced transportation, alternative fuels are bound to come into play.

Jerry Trotter, manager of bus programs for the Washington, D.C.-based trade organization American Public Transit Association (APTA), says he too sees larger transit authorities incorporating smaller, 25- to 30-foot buses because such vehicles are considered more neighborhood friendly than their larger predecessors. “People don’t want big buses running around in their neighborhood, so transit carriers are using feeder buses — also known as circulators — to pick up riders and transport them to the larger commuter buses or rail systems.”

This transition to smaller vehicles leaves the door wide-open door for propane, the main reason being that propane engines are available in these size classes. However, a major rift in engine options tears into propane’s chances of being used in larger transit buses.

### **Angst over the engine**

Probably the most cumbersome obstacle facing propane’s broader acceptance in transit circles is a lack of engine options. The only existing OEM heavy-duty propane engine, a Cummins 5.9L, fits well in several applications but not in all transit buses. The typical size for a transit bus, according to Trotter, is a 40-foot model, which in many cases requires more power than the 5.9L can supply.

Not too long ago, propane had a chance to nudge its way into this vehicle class. Detroit Diesel Corp. (DDC) was a lead partner in a project to develop a market-ready propane-powered version of its Series 50 heavy-duty engine. But early last year the company backed out of the deal, claiming the potential customer base was too weak to justify production costs. Even though other project participants were positive, the company’s sales goals could be met, a year-and-a-half later no one has stepped in to take DDC’s place.

Vinod Duggal, director of advanced engineering for alternative fuels at Cummins Engine Co., says sales volume isn’t adequate to contemplate development of heavier propane-powered engine options.

In the early ’90s the engine manufacturer tested a 10-liter propane engine on buses in Orange County, but that fleet decided to change fuels. “The ebb and flow of fuel choice is difficult to determine ahead of time,” says Duggal.

Duggal defends the his company’s willingness to support the propane vehicle industry, saying, “We had a tentative plan last year to develop another propane engine for the transit bus mar-

*People don’t want big buses running around in their neighborhood, so transit carriers are using feeder buses — also known as circulators — to pick up riders and transport them to the larger commuter buses or rail systems.*

— Jerry Trotter  
APTA

ket, but there wasn’t enough volume base to justify potential business costs for that project.” Citing the fact that from an engine manufacturer’s perspective the transit industry is itself small, Cummins could only hope to sell an estimated 120 heavy-duty propane units under a best-case scenario. That number, notes Duggal, is not enough incentive to develop a new engine.

Such a statement isn’t likely to surprise Spataru.

“In the heavy-duty engine sector, I really don’t predict that any manufacturer will take the lead,” he says. “It’s hard to attract large engine manufacturers to do anything in that domain. They typically follow demand. They are order-takers and are one step further removed from the end users than vehicle OEMs (original equipment manufacturers).”

Agreeing with others in the transit sector, Trotter says the lack of engine options is the biggest drawback for propane’s chances in the sector.

On the brighter end of the spectrum, he recalls a time when propane enjoyed a streak of interest in the ’70s when several transit systems around the country were running propane as their primary fuel. Unfortunately, the lone engine was only used in transit applications and the manufacturer said it couldn’t continue production. Consequently, the hope of that era faded.

### **Hopeful horizons for propane**

The engine availability issue aside, propane still is being used by U.S. transit agencies in cities like San Antonio, Texas, where VIA Metropolitan Transit has an active and growing fleet of propane buses and trolley cars.

Since much of the legislation guiding transit fuel operations is regional or state-specific, propane is bound to enjoy some success in the transit sector, Spataru says, if policies that encourage its use are addressed by the propane industry at the community level.

Spataru, who has a vested interest in seeing propane succeed in this application, says participants in the propane vehicle industry must take action now. First, he says, the industry needs to deal with an aversion the overall population has to propane. “Propane has gotten a bad rap in terms of safety and some may be scared off. The propane vehicle industry at large must address these old perceptions,” he says.

Secondly, each region must have at least three or four active local entities, one of which must step up to take a leadership role. Spataru stresses that participants should include propane fuel providers, a political representative, a local transit operator and its vehicle OEM or engine conversion kit provider. “Without at least three participants,” he says, “chances for success are dramatically diminished.”

If propane manages to sneak into the back door of the transit sector, fuel providers then need to address pricing. Spataru notes that most mass transit fleet operators are accustomed to long-term fuel contracts. “The local propane provider can no longer play the summer/winter pricing game. They must provide at least a one- or two-year contract with stable pricing. Fuel

providers must manage their assets, which is the key to their success in the transit market," he says.

Trotter believes propane can gain a bigger market share among alternative fuels in transit, citing the fuel's use in previous transit applications. "Twenty-five years ago the primary fuel in Chicago's transit fleet was propane. The agency ended its propane operations because the engine went out of production."

Trotter indicates that transit agencies across the country are being swayed by public outcry to change their image as diesel-cloud billowing bus menaces, and as a result have driven to alternative fuel options. "Natural gas is available and works well with centrally fueled fleets, but I think propane would have a shot at the transit market if the correct equipment were available."

### **Say hello to hybrids**

Certainly opportunities for propane motor fuel have been hindered by a lack of engines. But, according to Spataru, that problem may be a blessing. "Mass transit of the future is not going to be powered by a big engine, it will be powered by hybrid applications, which can utilize propane in a smaller engine to power a vehicle's electric charging unit. This change [to hybrid-electric buses] shifts the engine paradigm," he says.

Spataru elaborates: "Currently there are only four large engine choices on the transit market, and because of that, OEM bus assemblers must cater to the impulses of these four manufacturers. But as hybrid-electric vehicles become increasingly available, bus manufacturers no longer require a 275-plus horsepower (hp) engine but can use a 100-hp or lower engine. Taking that into account, bus builders now have a larger store of engine manufacturers, which generates competition. And this shift will also allow fleet operators to order vehicles more specific to their needs. They, in essence, will be the assemblers."

Although he's not exactly sure of the timeline, Trotter says he foresees hybrid buses taking off in transit operations. "Transit, from my line of thinking, is ideally suited for hybrids. Buses spend most of their time in stop-start operations and the hybrid-electric vehicle can recover energy if it's set up with a regenerative braking storage system, [where electricity is generated while braking]. It's an ideal duty cycle for hybrids."

Trotter also says many, if not all, bus manufacturers are developing or producing some form of hybrid-electric unit. Therefore, the transit market should anticipate using more of these vehicles in the near future.

Addressing how the propane vehicle industry will react to this new opportunity, Spataru says, "I think a few industry leaders are learning about hybrid-electric technology and how propane can be involved. But I get the impression that a majority of the industry doesn't understand what a hybrid-electric vehicle is. The concept is still too far removed from what they deal with day to day."

### **The natural gas preference and why propane isn't catching up**

When it comes to making headway in the transit sector, propane lags far behind natural gas. One reason, notes Spataru, is fuel delivery infrastructure. "Natural gas is an urban fuel. That is where the pipelines run, and most mass transits physically hub out of urban centers," he says.

Propane, on the other hand, maintains a strong geographical position in rural and suburban areas, with little or no presence in urban centers, according to Spataru.

However there will be more of an opportunity for propane in transit, he notes, as urban sprawl pushes more transit systems into rural regions where propane fuel providers are likely to be found.

In addition to obstacles created by fuel access, Spataru notes that peoples' perceptions of both gaseous fuels may cement the status of natural gas as the leader among alternative fuels in urban transit. "In urban centers the population perceives 'gas' to be natural gas and in rural areas

they think of propane. So from the start, the original frame of mind is an impediment to propane," Spataru says.

Another reason natural gas dominates the transit sector is the strong political presence of gas utilities in urban communities. However, according to Spataru, the propane industry approaches political issues with a hit-and-run strategy, giving it little or no impact in that arena.

"The propane industry has been reactive rather than proactive," says Spataru, pointing out that the propane vehicle industry typically mobilizes only after legislation passes that either discredits the fuel or hinders use of propane in mass-transit applications.

"Rather than dealing with these laws while they are still being proposed, propane vehicle industry participants need to anticipate and deal with these issues while they are still being discussed. The propane vehicle industry needs to wake up," he says. "When propane vehicle industry participants encounter an issue they don't like, they muster all their resources. And when it's resolved, they disappear. There must be more continuity in their political presence, on both the state and federal level. If they want steady success they need to get closer and stay closer to the flag."

Spataru credits the natural gas industry as being more savvy in the political arena chiefly because utilities know how to apply political pressure within the power structures that come to bear on issues related to the urban environment. Natural gas interests also understand that most mass transit organizations are vulnerable to local political structure because a very small percentage of income is brought in through individual fares. Funding for most transit operations comes from federal and state sources.

Also, Spataru says, gas utilities can command attention on the transit issue because their long-term investments have created a stable base on which they can rest.

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— Charles Anderson,  
WestCAT

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## A word from fleets

The transit sector is represented not only by actual fleet operators, but also the communities in which those fleets operate. The propane vehicle industry can gain a clearer perspective on real-world issues by listening to what fleet managers in these communities have to say.

Charles Anderson, general manager for the San Francisco Bay-area transit company Western Contra Costa Transit Authority (WestCAT), says there's a huge push at the state level to get the transit community to anoint natural gas as its exclusive alternative fuel source. This pressure is spurred not only by air-quality concerns and the drive to reduce reliance on imported oil but also by the vested interests of local gas utilities, says Anderson. "The position in California seems to be the utilities saying, 'Let's enforce the use of natural gas because we happen to be selling it.'"

The California Air Resources Board (CARB) shows minimal interest in propane, as Anderson notes that the agency is pushing to pass a law to mandate that transit operators in the state use natural gas by the year 2002.

Echoing a familiar sentiment from the transit sector, Anderson says he isn't keen on the lack of engine choices for propane buses. "The current power rating of the [Cummins propane] engine isn't quite enough to do what we need. I think the market exists for [propane to serve] properties like WestCAT." And he should know about the Cummins engine's performance, since his fleet is part of a test project involving the 5.9L LPG engine.

"If there were a suitable engine on the market, using propane would be very attractive," Anderson says. "But until then, other alternative fuels with developed engines may win my interests."

WestCAT received a grant to acquire four 32-foot buses and eight paratransit vans, all powered by propane. Expressing some displeasure with propane engine options, Anderson notes that WestCAT was offered a grant that would have allowed conversion of remaining vehicles in the WestCAT fleet. Instead the company decided not to go that route because it believed the engines would not perform properly for the applications in which they would be used. "Without engine development, we don't think we can use propane in our vehicles."

Anderson concludes by saying the now-shelved Detroit Diesel propane engine project would have been exactly what he is looking for in a mass transit engine.

The propane experience has been a positive one for another California transit fleet, the Los Angeles Dept. of Transportation (LADOT), which has been operating propane units since 1985. Early last year LADOT purchased 34 32-foot Eldorado Transmark buses equipped with Cummins propane engines for its DASH (Downtown Area Short Hop) system. Since then, it has added 14 more of the same vehicle, plus eight mid-sized transit vehicles, all with dedicated propane engines.

Steve Cannistraci, senior heavy-duty equipment mechanic for LADOT, says, "At this point all our future vehi-

cles are scheduled to be to propane-powered. We're committed to using alternative fuels wherever possible."

For the DASH's purposes, Cannistraci says the Cummins engine has adequate power for the application. Compared to diesel, he notes, the performance is similar but the propane vehicles run quieter.

LADOT operates other alternative fuel vehicles with hybrid-electric and CNG technology. Approximately 40 CNG vehicles probably will be replaced by propane units in the next year. The reason behind this change, explains Cannistraci, is the relative convenience and cost-effectiveness of propane refueling facilities.

"For our situation, CNG is difficult in terms of fueling infrastructure," he says. "We operate all our vehicles through private contractors. The contracts last three to five years, so the maximum term for a contract is five year and setting up a fueling facility could cost a \$1 million, which we can't recoup through fuel savings in such a short time. Also, relocating CNG fueling facility once a contract is up is an almost insurmountable obstacle."

A propane station, he notes, is financially and physically easier to set up and transport.

Throughout the country Cannistraci says he observes other transit operators looking at alternative fuel with varying levels of interest. "Some are looking into AFVs because they are responding to political pressure. Others are examining the more technical end. But of those that have

explored, several have invested high dollar amounts, gone through bumps and grinds and either stayed with alternative fuel or returned to diesel."

Cannistraci says that to gain a stronger hold in the transit market, the propane vehicle industry needs more representation and greater involvement from OEM engine manufacturers.

Cannistraci says he can relate to Anderson's observations about a need for more engine options and his interest in the doomed DDC propane Series 50 engine.

"We have over 100 40-foot buses waiting to be replaced," Cannistraci says. "The 5.9-liter Cummins engine will not work in that weight class. There needs to be OEM support. You have many propane vehicle industry participants that need to diversify. Or else, because CNG has multiple engine options, if we get stuck politically, we can't go back to diesel. We'll have to choose natural gas if there is no propane alternative. And we don't want to be forced into conversions. We want something that an OEM is going to stand behind."

Metropolitan areas are expanding and with that expansion comes a need for more buses and transit-related vehicles to cover larger territories. As the propane vehicle industry gets its feet wet in this growing sector, customers wait for engine manufacturers to meet their needs by offering propane-powered options, providing the foundation on which a market can be built. PV

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14	<input type="checkbox"/> Kraus Alternate Fuels Inc.	163
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