



Clean Energy is the largest provider of vehicular natural gas (CNG and LNG) in North America with a broad customer base in the refuse, transit, shuttle, taxi, police, intrastate and interstate trucking, airport and municipal fleet markets. Tens of thousands of vehicles fuel daily at strategic locations in the United States and Canada. Customers include Los Angeles International Airport, Massachusetts Bay Transportation Authority, State of New York, SuperShuttle, Foothill Transit, Waste Management, Dallas-Ft. Worth International Airport, SYSCO Foods, Denver International Airport and the US Navy.

## Hybrid diesel/electric buses fall short on performance, economy; cost more. Why buy them?

In early tests at transit systems around the country, new hybrid diesel/electric buses, including "magic buses," are falling short of promise in performance and fuel economy, say newspapers from coast to coast (Seattle Post-Intelligencer, 12/13/2004 and The New York Times, 12/26/2004). Transit systems testing diesel hybrids include Seattle, Connecticut, New York and New Jersey, among others. Emissions have been reduced relative to pure diesel, but as the articles point out fuel economy is ranging lower than anticipated for the new buses, which cost an average of \$150,000–\$200,000 more than today's diesel buses. Managers are concerned that they may never recoup the incremental costs through reduced fuel consumption. Effectiveness is limited by having to schedule shorter routes between refueling. The "magic" is illusory.

By comparison, today's CNG- and LNG-fueled buses cost an average of \$35,000 more than diesel, with grants available to buy down that differential. And while today's natural gas buses largely meet upcoming EPA 2007 standards and are on track to meet or surpass 2010 standards at minimal increased cost, next-generation diesel buses are struggling to meet the standards, and then only by using what may be prohibitively expensive filter traps and other add-ons, thus reversing the cost differential with natural gas.

At the same time, a number of forward-thinking transit systems around the country have dedicated to natural gas — Southern California's MTA alone operates more than 2,000 natural gas buses — which have proven reliable, effective and efficient, with radically reduced emissions compared to diesel buses today.

Comparison:

Natural gas	Diesel/hybrid
\$35,000 incremental cost	\$150-200,000 incremental cost
Less expensive fuel	Requires ultra low sulfur fuel (\$0.10–\$0.20 premium)
Proven technology	Still experimental
Direct pathway to hydrogen technology	Limited link to hydrogen technology
Meets 2007 EPA emission standards	Does not meet all 2007 EPA emission standards
Fueling infrastructure required	No infrastructure requirements

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