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Case Study:

Propane School Buses Reduce Transportation Department Maintenance Costs

Challenge

Faced with the challenge of maintaining buses within strict budgets, school district transportation departments across the United States look to cost-saving fleet alternatives.

By the Numbers

- More than 14,000 Blue Bird Vision Propane buses.
- Nearly 850 school districts operating propane school buses.
- Maintenance savings of up to 50 percent per bus.

School Transportation

As district transportation departments across the nation work within tight budgets, many turn to buses operating on alternative fuels. School buses fueled by propane autogas have an incremental cost of about \$7,000 more than diesel. Testimonials from school district transportation directors demonstrate that this incremental cost is quickly recouped through lower maintenance expenses, leading to overall reduction in total ownership expenses.

Bibb County School District, Macon, Georgia

Central Georgia's Bibb County School District operates a fleet of 200 diesel, gasoline, and propane-fueled school buses that transport almost 12,000 students throughout the urban area. Seventy-three of the buses are Blue Bird Vision Propane, model years from 2014 to 2019. In a typical year, the propane buses travel 16,000 miles.

Director of transportation, Anthony Jackson, says that the school district keeps its buses for 12 to 15 years, and the return on investment for a propane school bus is approximately three years. According to Jackson, engine tune-ups on the district's propane buses are less expensive than tune-ups for diesel buses.

Bibb County School District saves about \$3,000 per service for its propane fleet compared to its diesel fleet. The district's technicians use 7 quarts of oil per oil change for its propane buses compared with 20 quarts needed for diesel buses. The number of oil changes for propane buses averages three times per year, equaling 21 quarts, and two times per year for diesel, equaling 40 quarts. The district uses about 875 quarts less oil each year by operating propane school buses, saving \$2,275 annually. Another cost-cutting factor has been filter replacement. Jackson estimates that the filter packages for each propane bus is about \$40 per service and for each diesel bus is \$82.50 per service.

Other savings come in the form of diesel-only needs. Fuel additives cost about 3 cents per gallon for diesel, which adds up to about \$7,000 on the 230,000 gallons of diesel the buses consume annually. After-treatment devices cost \$300 in maintenance per bus per year on diesel. Together that's a \$29,000 savings for the propane buses.

The school district's technicians report that the propane buses are more user-friendly and easier to work on than the diesel buses. "The maintenance and repair parts for propane aren't as heavy, making them less cumbersome," said Jackson. "Plus, the propane engine is clean. It's not covered with grease and grime like diesel engines often are."

Since adopting propane buses, on-time performance has improved significantly on routes that were once serviced with diesel buses that required regeneration. And, Jackson has not experienced any drivability concerns related to the emission's system. Emissions are cleaner and noise pollution is down. Compared to diesel, propane engines operate about 50 percent quieter, which increases safety and decreases driver fatigue.

Boulder Valley School District, Boulder, Colorado

Boulder Valley School District has a fleet of 266 school buses and transports about 5,600 students. The bulk of the fleet operates on diesel, with 27 Blue Bird Vision Propane school buses. This school district has 500 square miles of challenging terrain to operate — from flat to high mountain terrain. On average, the propane buses travel 80 miles per day, or 6,000 miles per year.

To demonstrate the maintenance cost savings of the district's propane buses, the director of transportation developed a direct comparison. "According to my data, if we take into consideration 10 propane buses and 10 diesel buses from the same manufacturer, the diesel is, on average, \$0.67 per mile to operate versus propane, which is \$0.48 per mile," said Albert Samora. Like Boulder Valley School District, more than 800 school districts are saving 20 to 50 percent on a cost-per-mile basis with propane buses.

His maintenance calculations show that the district's diesel buses each cost \$53.60 a day to operate. The propane buses cost \$38.40, for a savings of \$15.20 per day. "This comes to a daily savings of \$152 and adds up to about \$4,000 of savings per month," he said.

Boulder Valley School District's technicians change the oil every 5,000 miles according to manufacturer recommendation. On the diesel buses, it's every other service for an oil change, but, overall, the cost is still lower for the propane buses. Propane bus costs are also lower due to no additional fuel additives, and "less worries with the expensive exhaust (DPF) on the diesel buses, which can exceed \$8,000," said Samora.

In addition, Samora reports that the school district's propane buses start well in cold weather and warm up quickly. In fact, the fuel system provides for unaided cold-weather starts to minus 40 degrees Fahrenheit, saving both time and money.

Cook-Illinois Corporation, Chicago, Illinois

About 250 of Cook-Illinois Corporation's 2,200 fleet operate on propane, traveling almost 15,000 annually in cold winters and heavy traffic. The 2010 to 2018 model year propane buses are used for daily routes and charter and field trips for multiple school districts in and around Chicago.

According to John Benish, Jr., CEO of Cook Illinois, the school bus contractor operated propane buses in the 1980s, and returned to propane in 2010 with the advancements in liquid propane systems.

Cook-Illinois tracks its maintenance costs both by hourly rates and parts used. "We are experiencing about 50 percent savings per propane bus in our parts and labor compared to our diesel buses," said Benish.

In the past five years, the company has replaced 40 engines due to premature engine failure. Benish said the mechanics have rebuilt a lot of diesel bus engines, but not one of the propane engines.

The cold weather affects the bus maintenance, too. "In Chicago, there is a lot of salt put on the roads due to all the snow. All that diesel equipment — the diesel emission filters, diesel particulate filters, diesel oxidation catalyst, turbo chargers — is under the bus and gets frequently damaged," said Benish.

Cool-Illinois' service team prefers the propane buses because "they are easier to work on and there are no gel issues." Benish finds that it's the mechanics and the drivers who interact with the buses daily are the people who really understand the benefits of propane.

He believes that propane school buses are more reliable than today's diesel buses. "Diesel had its day. It's just so tough to keep them on the road today. I sleep at night better knowing the propane buses are going to start, especially on cold days," said Benish.

Detroit Public Schools Community District, Detroit, Michigan

Detroit Public School Community District's 215-bus fleet operates on diesel, gasoline and propane. About 75 percent (163) are Blue Bird Vision Propane, model years from 2016 to 2018. These buses

travel more than 13,000 miles each year transporting about 10,000 children. Challenges of its Metro Detroit urban location are snow and ice, railroad crossings, and potholes.

According to Brian Flaggs, general manager of the district's transportation provider ABC Student Transportation, propane buses are easier to maintain than diesel because the propane engine is simpler, with fewer moving parts. He says they also run quieter and use less oil.

Flaggs says they use 7 quarts for propane compared to 18 for diesel, with the average cost difference of \$100 each oil change.

According to Flaggs, the mechanics prefer propane versus diesel because the alternative-fuel buses run cleaner and have fewer fumes. Unlike diesel exhaust systems, propane doesn't emit strong-smelling fumes. During refills, maintenance technicians avoid the frequent spills and diesel odor on their clothes and hands because propane fueling is a closed-loop system. Plus, school buses fueled by propane emit virtually zero particulate matter and reduce harmful nitrogen oxide emissions.

Maintenance Facility

Of the four school districts, none had to make changes to their maintenance facility to operate propane buses. Requirements for a propane bus repair facility are generally the same as those for conventionally fueled vehicles, helping keep costs low since there is no need for modifications to the building or building design. [1]

Each school district has also reduced its per gallon fuel costs by adopting propane school buses. The cost-saving benefits have led all four school districts to continue to purchase propane buses.

About Blue Bird Corporation: Blue Bird (Nasdaq: BLBD) is the leading independent designer and manufacturer of school buses, with more than 550,000 buses sold since its formation in 1927 and approximately 180,000 buses in operation today. Blue Bird's longevity and reputation in the school bus industry have made it an iconic American brand. Blue Bird distinguishes itself from its principal competitors by its singular focus on the design, engineering, manufacture and sale of school buses and related parts. As the only manufacturer of chassis and body production specifically designed for school bus applications, Blue Bird is recognized as an industry leader for school bus innovation, safety, product quality/reliability/durability, operating costs and drivability. In addition, Blue Bird is the market leader in alternative fuel applications with its propane-powered, electric-powered and compressed natural gas-powered school buses. Blue Bird manufactures school buses at two facilities in Fort Valley, Georgia. Its Micro Bird joint venture operates a manufacturing facility in Drummondville, Quebec, Canada. Service and after-market parts are distributed from Blue Bird's parts distribution center located in Delaware, Ohio. For more information on Blue Bird's complete line of buses, visit www.blue-bird.com.

About ROUSH CleanTech: ROUSH CleanTech, an industry leader of alternative fuel vehicle technology, is a division of Roush Enterprises based in Livonia, Michigan. ROUSH CleanTech designs, engineers, manufactures and installs propane autogas and electric fuel system technology for medium-duty Ford commercial vehicles and school buses, and compressed natural gas fuel systems for school buses. As a Ford QVM-certified alternative fuel vehicle manufacturer, ROUSH CleanTech delivers economical, clean and domestically produced fueling options for fleets across North America. Learn more at ROUSHcleantech.com or by calling 800.59.ROUSH.

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