School District's Propane Buses Lead to Widespread Benefits

District: Neosho School District
Industry: Education
Location: Neosho, Missouri
Vehicles: (17) Blue Bird Propane Vision; 2 more on order (71-passenger and 48-passenger special needs buses)
Fueling: On-site propane autogas station

By the Numbers

- 17 propane school buses
- 49% reduction in per gallon fuel costs
- $1,000 additional savings per bus per year in maintenance costs

Challenge

In 2014, Neosho School District looked to replace aging diesel buses in favor of an alternative fuel that would eliminate diesel maintenance issues, improve fuel efficiency and offer environmental benefits while saving money. The district covers approximately 240 square miles and crosses into two counties. Some of the district's routes are so rural that no cell phone or radio signals are available, so reliability was of the utmost importance when choosing an alternative fuel.

Result

Ten years later, the district is pleased with its propane buses and has more on order. The propane buses are part of a 58-bus fleet that transports 2,000 students on hilly and winding roads, and are used for everything from 45 daily routes to field trips and special activities. Each bus travels about 10,000 miles per year.

In addition to saving 49% per gallon of fuel, the district estimates that it saves about $1,000 per bus per year on maintenance costs with its propane buses.

Betting on Propane

Over the years, Missouri state reimbursements for school transportation have dropped from 75% to less than 20%. School districts had to tap their own general school funds to make up for the shortfall.

At the same time, "The district was looking at how we could do our part to help our local environment by going green," said Michelle Embrey, former transportation director for the district.

District officials considered compressed natural gas buses, but their research showed that installing a CNG fueling station was costly and complex. Propane autogas offered an easier transition along with money-saving potential.

Advancements in propane technology, ease of implementation and projected overall affordability spurred the district to do something new in 2014. While the district typically purchases six buses each year, administration chose to invest in three years' worth of propane buses to allow for an accurate calculation of cost savings and clear comparison of benefits between fuels.

Ready to Roll

To fuel the new buses, the district entered into a multiple-year fueling contract with propane supplier AmeriGas, Inc., receiving a rebate of $2,000 per bus at the time of purchase. The district received another $20,000 from the Missouri Propane Education & Research Council's propane autogas rebate program. The plan offers rebates of $2,000 per propane bus, up to 10 per district, at the time of delivery.

As part of the contract, the propane provider installed a fueling station at the district's transportation facility. The station included two 1,000-gallon tanks and a pump capable of fueling two buses at the same time. AmeriGas fills the onsite tanks weekly and provides fueling training at no cost, ensuring that fuelers are recertified every two years.

Marty Marks, current director of transportation, said onsite fueling is critical to the department's success. "Fueling on-site is imperative to timely fueling. Buses do not have to be driven to an off-site location, saving time and additional fuel," he said. "Additionally, if the pump system should require repairs, AmeriGas will expedite the repair and will send a fuel truck to fuel our buses during the repair."

Before putting the propane buses on the district's general education and special education routes, drivers received training in propane bus operation. "You turn the key to start position and wait while the bus cycles and starts," said Marks. "No additional training is needed as the propane bus drives just like any other bus."

"One driver came up with a challenge to get the best mileage out of the propane, which got the other drivers involved as a friendly competition," Embrey said. The challenge helped the district increase its miles per gallon to 5 mpg for the propane buses.

Central States Bus Sales, the state's Blue Bird dealer, worked with ROUSH CleanTech to train the school district's mechanics on the propane fuel system and bus maintenance. The district didn't need to make changes to its bus repair facility, which helped keep costs low. Requirements for a propane vehicle facility are generally the same as those for conventionally fueled vehicles.

Measurable Financial Results

By adding propane buses to its fleet, Neosho School District has enjoyed savings on both fuel and maintenance. On average, propane autogas costs 50% less than diesel. As part of its negotiated contract with AmeriGas, the district pays $1.61 per gallon of propane. By comparison, the district pays $3.10 per gallon for diesel. In addition, the district capitalizes on alternative fuel federal tax credits of 37 cents per gallon of propane.

“Any savings from alternative fuel buses helps our transportation department serve as better stewards of the district’s money,” said Embrey. Marks added that, “all savings have been utilized for department improvements such as fueling stations, radios and a gated facility.”

The district runs about 185,000 miles with its propane buses. For the 2017-2018 school year, Embrey estimated fuel savings, along with the alternative fuel tax credit, of $34,000 for the 17 propane buses.

With propane autogas, no exhaust after-treatment or diesel emissions fluids are required like with diesel to meet today’s strict emissions regulations. Propane school buses don’t need particulate trap systems, turbochargers and intercoolers. Plus, propane uses less engine oil. For example, an oil change for a Blue Bird Vision Propane school bus uses seven quarts, compared with over 17 quarts for a typical diesel engine.

The district reports that service time and costs for oil and filter changes for each propane bus were approximately 50% less than for diesel. “The estimated repair cost is three to four times cheaper on a propane system than on a diesel system,” Marks said. “And between savings on DEF, oil, fuel filters, air filters and regen filters, we’re seeing about $15,000 saved annually outside of fuel savings.”

Satisfied Technicians and Drivers

District technicians have noted the ease and similarities of propane to other fuel types, commenting that the propane exhaust system is much easier to work on in comparison to the diesel exhaust system.

“The mechanics especially like the location of the propane engine as they can easily work within the space. Plus it takes them a lot less time to do each service,” Embrey said. Across the U.S., propane vehicle technicians report a higher level of satisfaction, citing a clean, safe and efficient work environment because propane vehicle maintenance is faster, easier and less costly compared to vehicles that run on diesel or gasoline.

Staff in the transportation department feel safe when working on and operating the propane buses. Propane autogas fuel tanks are 20 times more puncture-resistant than gasoline or diesel tanks and can withstand four times the pressure. The tank mounting systems are designed at twice the National Fire Protection Association requirement. Embrey said that the district’s drivers are sold on propane. “The drivers who have them don’t want their propane buses taken away.”

“They like that acceleration speeds are very consistent, if not better than other fuel types,” Marks said. “Propane buses can hold speed while maneuvering hills. And there is no chemical smell from the fuel.”

The quiet operation of propane buses has benefited both drivers and passengers. “It took a while for students to realize they didn’t have to talk so loud when they were in the propane buses,” Embrey said. “When drivers can hear student conversations in the back of the bus, it adds to safety and comfort.”

Drivers also appreciate that the buses heat up much faster in cold temperatures, which is especially beneficial on shorter routes, keeping students much more comfortable.

Flawless Cold Weather Performance
More savings show up for the district in the winter. Due to the chemical properties of propane autogas, the propane buses warm up faster and have no cold start issues compared to diesel models. Propane school buses can start up in temperatures as low as negative 40 degrees Fahrenheit. The district's electric bill is significantly lower because the propane buses don't rely on block heaters.

"The propane buses have performed great in extreme cold weather," Marks said. "There is no need to add additional fuel additives or plug buses in to prevent fuel freezing. Even when temps are negative 10 degrees, our propane buses start with ease."

Improvements Inside and Out
A warm cab is another comfort for drivers, and the improved atmosphere extends outside the bus. When the district's buses are parked nose to tail at student pick-up time, exhaust fumes can fill the air around and even inside buses. Unlike diesel buses, propane vehicles emit virtually no particulate matter and far less nitrogen oxides (NOx). Buses fueled by propane also emit fewer greenhouse gases and total hydrocarbon emissions when compared to diesel buses.

Propane itself is not a direct greenhouse gas when released into the air. Rather, it's a nontoxic, non-carcinogenic and non-corrosive fuel that poses no harm to groundwater, surface water or soil. The Environmental Protection Agency and California Air Resources Board measure NOx, particulate matter, non-methane hydrocarbons, carbon monoxide, carbon dioxide, methane, formaldehyde and nitrous oxide. Propane buses equipped with a ROUSH CleanTech fuel system — like Neosho School District's — are lower in all eight measured outputs by an average of 64%.

"The propane buses allow us to greatly reduce our idle time with the buses as well as reduce the amount of diesel emissions we had within our district," Embrey said. The district's mechanics also appreciate the lack of harmful fumes in the service garage.

The district's new 2024 Blue Bird propane buses emit 90% less NOx emissions than the Environmental Protection Agency's strictest standard.

Sharing Experiences
Overall, Neosho School District is satisfied with its investment in propane buses and leadership continues to closely monitor the return on their investment. District staff frequently share their positive experience and learnings with other districts. Neosho representatives have spoken at the Missouri Association of School Business Officials conference to promote propane autogas as an alternate fuel source.

Other districts have purchased propane buses based on Neosho's experience. Currently more than 22,000 propane school buses transport 1.3 million students across the U.S.

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About Neosho School District: Neosho School District is located in Neosho, Missouri and may be better known as Wildcat Nation. The district is comprised of 13 campuses that span from the Historic Downtown Square to Goodman, Missouri. The district has more than 4,650 students that call NSD their educational home. Neosho School District prepares the youth of our community to be people who are intelligent, driven and make lives better for those around them.

About MOPERC: The Missouri Propane Education & Research Council is a not-for-profit organization authorized by the Missouri Legislature. Dedicated to propane education and public awareness, MOPERC provides industry training, consumer safety, appliance rebates and market development programs. The council is composed of 15 volunteer directors and administered by an executive staff. Visit PropaneMissouri.com.

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