School District's Propane Buses Lead to Widespread Benefits

District: Neosho School District
Industry: Education
Location: Neosho, Missouri
Vehicles: 18 Blue Bird Propane Vision (71-passenger and 48-passenger special needs buses)
Fueling: On-site propane autogas station

Challenge
With aging buses to replace, a Missouri school district looked to alternative fuel options that would eliminate diesel emission issues and offer environmental benefits while saving money.

Result
The Neosho School District purchased 18 Blue Bird Propane Vision school buses. The new buses joined a 58-bus fleet that transports 2,700 students on the rural area's hilly and winding roads.

Betting on Propane
Over the years Missouri state reimbursements for school transportation has dropped from 75 percent to 16 to 20 percent. Schools districts had to tap its own general school funds to make up 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, 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.

While the district typically purchases six buses each year, the administration chose to invest in three years' worth of propane autogas 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 their propane provider, receiving a rebate of $2,000 per bus at the time of purchase.

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. The school district supplied some of the labor required for installation.

Before putting the new buses on the district's general education and special education routes, drivers received training in propane bus operation. "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, the district'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 Results

By adding propane buses to its fleet, Neosho School District has noted savings on fuel and maintenance. On average, propane autogas costs up to 50 percent less than diesel. As part of its negotiated contract, Neosho pays a locked-in rate of $1.39 per gallon of propane. By comparison, the district pays $2.01 per gallon for diesel, although it has been closer to $3 over the past few years. In addition, the district capitalizes on federal tax credits of 50 cents per gallon.

For the 2017-2018 school year, Embrey estimates fuel savings, along with the alternative fuel tax credit, brought total savings to $34,000 for the 18 propane buses. "Any savings from alternative fuel buses helps our transportation department serve as better stewards of the district's money," Embrey said.

With propane autogas, no exhaust after-treatment or diesel emissions fluids are required like with diesel to meet today's strict emissions regulations. Propane vehicles 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. With propane buses, the district has decreased its oil and paid less for filter packages.

"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. The district mechanics have noticed a longer wait time to obtain propane bus parts than for diesel buses.

More saving shows 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. Unlike diesel vehicles, these buses can start up in temperatures as low as -40 degrees Fahrenheit. The district's electric bill is significantly lower because the propane buses don't rely on block heaters.

Improvements Inside and Outside

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."

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.

"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.

In terms of environmental impact, the propane buses emit 571 fewer pounds of particulate matter and 13,600 fewer pounds of NOx annually compared to the diesel models they replaced.

Sharing Experiences

Overall, the Neosho School District is satisfied with its investment in propane autogas buses, which each travel about 11,500 miles annually. As district officials consider additional bus purchases in two years, they plan to closely monitor the return on their investment and the status of the alternative fuels excise tax credit.

Since adding propane buses to the fleet, Embrey has discussed the alternative fuel with other district transportation departments. For districts considering propane buses, her top suggestions involve the purchases of the buses, fuel and infrastructure. She suggests buying more than just a few buses at a time. Having a larger volume has allowed the district to more accurately calculate cost savings and benefits. With regard to infrastructure, Embrey said it is "much easier to start with a larger tank size and additional fueling stations than to try to go back and retrofit an area to accommodate them." She also strongly recommends locking in a propane fuel rate. Embrey starts her research months ahead of the annual propane contract renewal to ensure the district receives the lowest rate, which also allows for better budgeting.

At least one district has purchased a propane bus based on Neosho's experience. Currently more than 15,500 propane school buses transport about 1 million students across the U.S.

Embrey noted that her district's drivers are sold on propane. "The drivers who have them don't want their propane buses taken away."

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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.

(Case study completed in 2019)