



# WEST VIRGINIA UNIVERSITY STUDY FINDS PROPANE SCHOOL BUSES DRAMATICALLY DECREASE HARMFUL EMISSIONS

## DOMESTICALLY PRODUCED ALTERNATIVE FUEL PROVEN TO LOWER NITROGEN OXIDES, IMPROVE AIR QUALITY

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After more than a year of testing, researchers from West Virginia University concluded emissions measured from propane school buses are significantly lower than those from diesel buses. About one million students in more than 900 school districts across the nation ride to school in propane school buses each day.

West Virginia University researchers studied nitrogen oxides (NOx), highly damaging emissions that are federally regulated due to their negative impact on human health and the environment. According to the Environmental Protection Agency, exposure to NOx exhaust can trigger health problems like asthma, bronchitis and other respiratory issues. The primary source of NOx is motor vehicles, including school buses.

“This study is monumental from an emissions and health perspective for students, schools and communities across the country,” said Tucker Perkins, president and CEO of the Propane Education & Research Council (PERC). “Children arriving to school in propane buses aren’t exposed to harmful NOx emissions; they feel better and are more prepared to learn.”

In this comprehensive study commissioned by PERC, West Virginia University’s Center for Alternative Fuels Engines and Emissions (CAFEE) completed two types of tests at different times during 2018 on four Blue Bird school buses. Test routes included both city and highway roads, and a stop-and-go route similar to standard school bus operation. Researchers installed a portable emissions measurement system to measure exhaust emissions on each vehicle and

performed test runs on each bus with both cold and hot starts, for a total of 36 test routes.

The study's results demonstrated that distance-specific NOx emissions measured from the diesel bus were significantly higher than those measured from the propane bus for tests conducted in early 2018. Specifically:

- **For the city route**, which included city and highway roads, NOx emissions were 15 to 19 times higher for the diesel school bus. NOx was reduced by 95 percent with the propane bus.
- **For the stop-and-go route**, NOx emissions were 34 times higher for the diesel school bus. NOx was reduced by 96 percent and carbon dioxide by 13 percent with a propane bus.

Subsequent testing performed in late 2018 with newer model year and lower mileage propane and diesel buses validated the previous test results.

"In real-world applications, particularly those with significant low-speed or low-load operation, propane vehicles can provide dramatically lower NOx emissions compared to similar diesel vehicles," said Ross Ryskamp, Ph.D., associate director for testing and development at CAFEE. "These findings are significant due to the fact that NOx and ozone are major non-attainment concerns for many areas across the nation." Ryskamp also said the findings from the in-use tests of high NOx emissions for medium- and heavy-duty diesel vehicles are supported by other studies in literature.

As a nonprofit research center that works extensively on emission reduction research, CAFEE also conducted research that exposed the Volkswagen emissions violations in 2015, resulting in a \$14.7 billion settlement. Nearly \$3 billion is set aside for the sole purpose of funding transportation projects in each state that reduce NOx emissions, like adoption of propane school buses.

"We're seeing the unmatched benefits of propane and how advanced this domestically produced fuel option is," added Perkins. "On top of decreasing emissions, these reliable vehicles offer superior performance in cold weather and low total ownership costs."

Propane, when used in on-road engines, is commonly referred to as autogas. The full study, entitled "In-Use Emissions and Performance Testing of Propane-Fueled Engines," can be found [here](#) [PDF](#).