Environmental Defense Fund

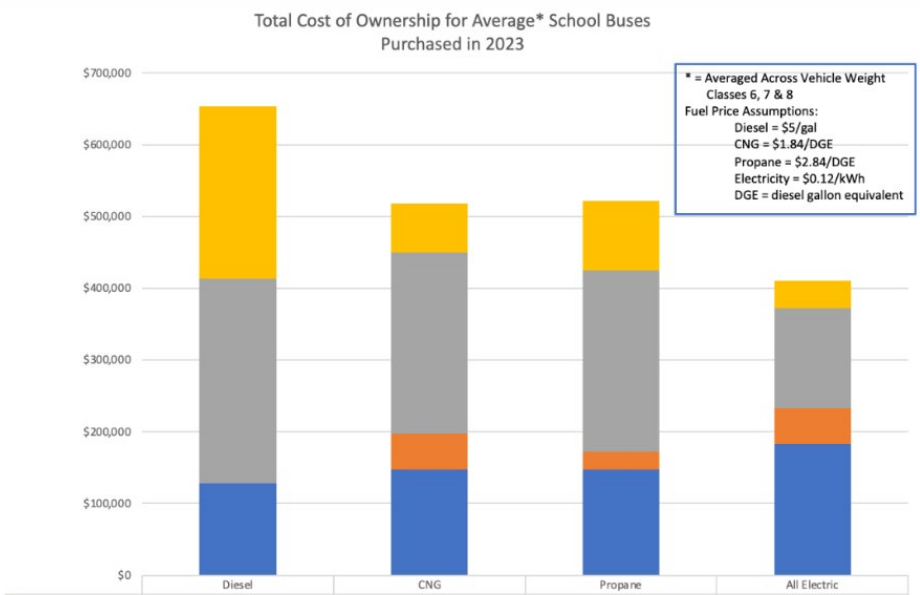
ECONOMIC AND ENVIRONMENTAL BENEFITS OF THE ELECTRIC SCHOOL BUS

GREEN POWER MOTOR COMPANY

INTRODUCTION

The school bus is a class 6, 7, or 8 vehicle. As of 2023, there are approximately 485,000 school buses operating in the U.S. and the vast majority of these buses are powered by fossil fuels. Diesel dominates the current fleet, with a few examples of natural gas & propane. As a result, transitioning to all electric school bus fleets would reap significant greenhouse gas, air quality, and public health benefits. As we'll see in our analysis below, electric school buses are cost competitive with the dirty alternatives: although upfront electric costs are higher, operating savings result in a favorable total cost of ownership.

This informational sheet compares the total cost of ownership among diesel, compressed natural gas, propane and electric school buses. TCO sums all costs of a vehicle over its lifetime. This includes vehicle capital cost, vehicle fueling infrastructure, lifetime fuel costs and lifetime operation & maintenance costs.

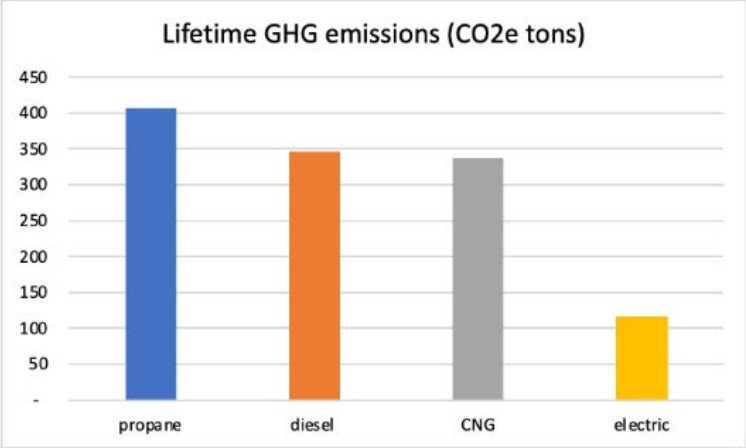


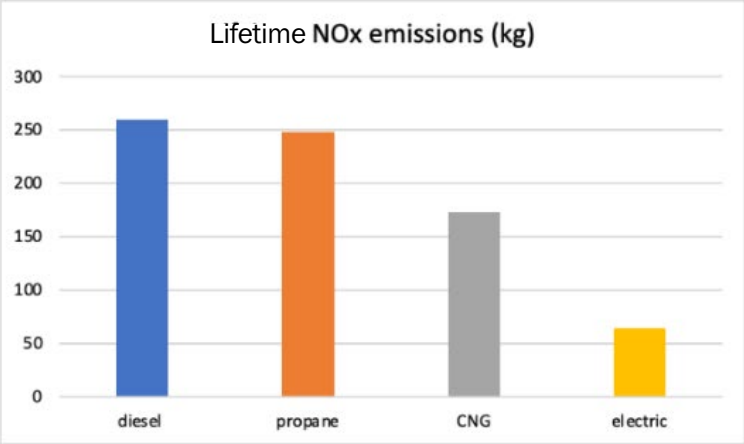
	Diesel	CNG	Propane	All Electric
Fuel	$240,000	$68,000	$97,000	$38,000
Ops & Maint	$285,000	$253,000	$253,000	$139,000
Infrastructure Purchase	$0	$50,000	$25,000	$50,000
Vehicle Purchase	$128,000	$147,000	$147,000	$183,000

TCO COMPARISON:

ELECTRIC BUSES ARE CHEAPER OVER THEIR LIFETIME

From the figure above, it is clear that the electric school bus has the highest vehicle and fueling infrastructure cost. However, the electric school bus has the lowest fuel and maintenance costs, which outweighs upfront costs. Summing these four values gives us the TCO of each vehicle: $653,000 for diesel, $518,000 for CNG, $522,000 for propane, and $410,000 for electric. Thanks to the electric school bus's fuel efficiency (22 miles per diesel gallon equivalent compared to the average fossil fuel powered school bus of 6 mpdge) as well as lower maintenance costs, a 2023 electric school is the least expensive option compared to its fossil fuel-powered counterparts.





CASE STUDIES

An operating electric school bus releases zero tailpipe emissions. On the other hand, an operating fossil fuel-powered school bus releases tailpipe greenhouse gas emissions (namely carbon dioxide & methane) as well as air pollutants that are harmful to the environment and human health. To demonstrate this, we examined the lifetime greenhouse gas emissions and nitrogen oxide (NOx) emissions of a diesel, propane, compressed natural gas and electric school bus.

The average GHG emissions from a fossil fuel-powered school buses are 363 tons of CO2e compared to the electric school bus's 116 tones of CO2e over the lifecycle. Note that most of the GHG emissions associated with the electric vehicle came from upstream processes such as vehicle production and the electricity assumed to be made up of 50% natural gas power and 50% renewable power.

In addition, the average NOx emissions from a fossil fuel-powered school bus amount to 227 kg compared to 64 kg from an electric school bus

Thanks to the electric school bus's fuel efficiency as well as lower maintenance costs, a 2023 electric school is the least expensive option compared to its fossil fuel powered counterparts

CONCLUSION

Over a 12-year lifetime, the 2023 electric school bus to be the least expensive and have the most environmental and air quality benefits compared to fossil fuel powered school buses.

School buses are prime candidates for electrification because more diving means more savings. With a driving average of 260 days per year (5 days of operation per week) at an average of 60 miles of daily range, the upfront cost of switching to electric can be recouped in five years.

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