**A lesson in electric school buses**
**Montgomery County school board seals deal to get 300 of the buses**

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Hundreds of electric school buses are about to hit the roads in Montgomery County in an effort to cut tailpipe emissions that warm the planet and can affect student health.

The $1.3 million annual contract, which was approved by the county school board Tuesday, is the biggest single-district project in the country to swap combustion-engine school buses for electric vehicles. The county aims to gradually convert its entire fleet of 1,422 buses by 2035.

The sprawling suburban Maryland district will pay an annual fee to lease the electric buses from Highland Electric Transportation. The Boston-based firm will own, operate and maintain the buses for 12 years as well as train drivers and install charging equipment.

By leasing the buses rather than buying them outright, the county is able to avoid the upfront cost of electric vehicles, said Montgomery County Public Schools Transportation Director Todd Watkins. The contract with Highland costs the same amount as the school system typically spends on new buses, gasoline and maintenance for its diesel-powered buses.

Auto industry peers into an electric future and sees bumps ahead

Diesel engines are major sources of harmful pollutants, according to the Energy Information Administration. They account for almost a quarter of the U.S. transportation sector's annual greenhouse gas emissions. Burning diesel also generates dangerous inhalable particles called "particulate matter" and gases that interact with air to form ground-level ozone. Both pollutants contribute to low air quality and can lead to respiratory illnesses in children.

A sweeping study published in 2001 found children riding in diesel school buses are exposed to four times the levels of toxic exhaust as people sitting in a passenger car on the same road. The authors estimated between 23 and 46 out of every million children riding school buses were at risk of developing cancer from the exhaust they inhaled. Federal legislation has required diesel buses to reduce emissions — but electric buses don't produce any fumes.

Montgomery County's first 25 electric buses will begin operating this fall, followed by 61 buses in 2022 and then 120 in each of the two years after that. Spread across five bus depots, Montgomery ranks among the 10 largest school bus fleets in the country.


"It's exciting to be on a groundbreaking thing," Watkins said. "If it works, maybe other school systems will look and say, 'Hey, let's do that, too.'"

About 300 electric school buses are operating in the United States, Watkins said. Because they can cost hundreds of thousands of dollars more than ordinary diesel buses, most school systems are able to afford only a few, usually purchased with donations or grants.

But Highland Electric offers a new model: It will shoulder the high cost of purchasing the vehicles, then earn back its investment through lower maintenance costs.

"We are confident that the electric buses require less labor and fewer spare parts," said Duncan McIntyre, Highland's chief executive. He said the battery has fewer moving parts than an internal combustion engine. The repair budget for a conventional fleet "is more than twice our repair budget."


The small, three-year-old company currently has only one school bus on the road. But this month it raised $253 million from venture capital firms.

Highland plans to buy its vehicles from Thomas Built Buses, a North

Carolina subsidiary of Daimler Benz, and use batteries made by California-based Proterra. Proterra says its school bus batteries can completely recharge in three hours.

During the summer, when students are out of school but electricity demand for air conditioning is running high, Highland Electric can use the bus batteries and charging stations to provide the electrical grid with storage capacity. The buses will charge up in the middle of the night, when demand for energy is low, then sell that power back to the grid the following evening.

"Batteries are capable of shifting the peak in summer when solar falls off at 5 or 6 in the evening but the load is still high," McIntyre said. "Batteries can pick up and help the utility meet the demand."

Some analysts say sales of commercial electric vehicles — school buses, mail trucks and delivery vans — are poised to explode.

"It's the perfect vehicle" to electrify, Watkins said of school buses. "You know how many miles it will go in a day. You know where it will park at night."

Last fall, Dominion Energy rolled out the first buses in a multiyear program to provide electric buses to Virginia school districts for the same price as diesel vehicles. The U.S. Postal Service this week awarded a 10-year, $482 million contract to a Wisconsin manufacturer to produce mail trucks with electric drive trains as well as high-efficiency combustion engines.

President Biden meanwhile has pledged to convert the entire federal fleet to "clean and zero-emission" vehicles.