

ELECTRIC SCHOOL BUSES

A GOOD CHOICE FOR BUSINESS

Electric school buses offer many advantages over their diesel-powered counterparts. From a quieter ride to reduced emissions, electric school buses bring a lot to the table. One benefit that stands above the rest is their very low operating cost, and school bus operators across New England are taking notice. Private fleet operators recognize that going electric makes them more competitive.

In the summer of 2022, Cyr Bus Line of Old Town became the first private school bus fleet in Maine to purchase an electric school bus. Since then, the bus has provided reliable service and notable savings in fuel and maintenance costs. The benefits of going electric are not lost on the company. In addition to their electric bus, they are installing a 300-panel solar array on the roof of their buildings and investing in an upgraded 800-amp electric service to handle even more vehicle chargers. In the coming year, they plan to buy two additional Thomas Built electric buses to bring the fleet up to three. "We like to stay ahead of the curve" says Mike Cyr, co-owner of the company.



1 Cyr Bus Line electric school bus

About Cyr Bus Lines

The team at Cyr Bus Line currently operates in five locations, serving 17 school districts in 5 Maine counties. John T. Cyr started his company in 1912 with a fleet of 32 horses, hauling wood, trash, and people. The company has been growing ever since. "We are probably the oldest school bus company in the world" says Mike Cyr, great grandson of the founder and current co-owner, along with his sister Becky Whitmore and her husband DJ. This generation of the Cyr family is following in the footsteps of their father, Joe Cyr, who significantly grew this company from the 1960s until he retired a few years ago. Mike remarks "His philosophy was to be the first, learn and lead, so that's what I am trying to do." This forward-thinking philosophy is guiding their transition to the electrified future of school transportation.

About the Bus and Equipment

Cyr Bus Lines purchased a stock Thomas Built Saf-T-Liner C2 Jouley from W.C. Cressey and Son of Kennebunk and, aside from a decal saying it is 100% electric, it looks like a standard Thomas Built Saf-T-Liner C2 inside and out. This type C bus can seat up to 81 passengers and was developed in partnership with Proterra, a leading electric transit bus manufacturer. The bus was partially funded through a Diesel Emissions Reduction Act (DERA) grant from the Maine Department of Environmental Protection with the remainder coming from Cyr Bus Lines. The company plans to purchase the same model for their next two electric buses.

According to Thomas Built, the Jouley offers up to 138 miles of range from a 226 kWh lithium-ion battery pack. The bus has 295 peak horsepower that is

conveyed to the rear wheels using a 2-speed transmission. Like other electric school buses, it offers regenerative braking that charges the battery when slowing down. It also offers standard air conditioning for the driver that is also used to keep the battery pack cool while fast charging. The Jouley only supports level 3 DC “fast charging” which allows it to refill its battery pack in 3 hours or less when plugged into a 60 kW or greater DC fast charging station. Level 3 DC charging also makes it possible for the bus to support vehicle to grid (V2G) operation with the appropriate charging station. V2G allows for the bus to help supply energy to stabilize the grid while the bus is idle. The bus is equipped with an electric cabin heater that can be programmed to preheat the bus before leaving the depot to conserve battery capacity while on route.

For the initial bus, Cyr Bus Lines chose a lower powered 25 kW DC charging station. The Delta DC Wallbox offers a lower charge speed than many of the other DC charging

LET THE SUN SHINE

While electricity prices are significantly more stable than diesel fuel prices, they still fluctuate based on market conditions. One way to help control this cost is by making the power on site with a solar panel array. Solar panels convert sunlight into clean electric energy that can be used on site or exported back to the power company for a bill credit. Cyr Bus Line is in the process of installing 300 hundred solar panels at their Old Town facility to own their own fuel source. These panels can produce up to 120 kW during peak sun which could meet the power demands of their existing charging station four times over. Because the cost of operating a solar array is minimal, once the capital expense is paid off, the power provided is practically free.



Aerial view of Cyr's solar array in Old Town



2 Electric bus and charging station

stations on the market; this comes with the advantage of supporting both three-phase and split-phase AC power input from the utility company. Three-phase power is typically available at larger commercial facilities and may not be available everywhere without a utility upgrade. Additionally, this charging station is less expensive than other higher powered DC charging stations. This charger allows Cyr to quickly 'top off' the

battery pack on the bus between morning and afternoon runs. Now that Cyr Bus Line is expanding their electric bus fleet, they are also upgrading their charging infrastructure for a faster recharge time. This includes both higher powered charging stations and the upgraded electrical service to support them.

Operational Experience

Cyr Bus Line uses the electric bus on in-town routes where its cost savings can be best realized. Since the bus is owned outright by Cyr, they can use it for any of their contracted school routes. The bus currently runs a 50-mile route twice per day serving Old Town and charges in-between morning and afternoon runs. "This bus is perfect for an in-town run" says Mike Cyr. The bus is assigned to one driver, Roger, who has taken a particular liking to the bus ("goes very well, lots of torque"). Cyr plans to assign future electric buses to individual drivers as well. Since introduction, the bus has covered just over 5,000 miles and has not required any repair or maintenance beyond greasing a few fittings. Mike Cyr noted that a diesel bus would have required an oil and filter change by this point, so the savings are already starting to roll in. Additionally, Mike calculated that while a comparable diesel bus would cost \$0.70 per mile to operate, the electric bus only costs \$0.25 per mile. Over the long term, Cyr expects to see significant savings in both cost and headache since the bus does not have a complicated and malfunction-prone diesel emissions control system. Between a 64% per mile operational cost savings and a drastically reduced maintenance bill, the advantages of an electric bus are clear.

While overall the bus has been a resounding success, there have been a few bumps in the road. The first driver assigned to the bus ended up being uncomfortable driving it, so Cyr had it reassigned. "Sometimes change can be hard for people" offered Mike Cyr. The current driver has no complaints since it is clean, quiet, and has plenty of



3 The electric bus next to the solar array

torque. The other issue was not with the bus but with the smaller charging station and extreme weather. The only day the bus was unable to complete a full day of service was during an extreme cold snap in February of 2023. Due to the temperature being far below zero, the bus consumed additional power. When it returned to the depot for a mid-day recharge, it was unable to

refill quick enough to have sufficient range for the afternoon run. Higher powered charging stations and increased awareness of equipment needs in abnormally cold weather will help avoid this situation in the future.

Summary

The success demonstrated by Cyr Bus Line shows that electric school buses can provide significant business advantages. Cyr knows that electrification is the future for school transportation and is invested in staying one step ahead of the curve. Cyr will continue to roll out their electrification plan with two additional buses, high power charging stations, and solar array. The significant savings in both maintenance and operational costs and the superior driving and riding experience demonstrate the clear advantages of electric buses over diesel. Cyr Bus Line's leadership is a model for other fleets in Maine as they transition to meet the statewide goal for 75% of new school bus acquisitions in the state to be zero emissions by 2035. Nationally, there is rapidly growing support for electric school buses from bus manufacturers and the federal government. All major manufacturers now offer electric bus models in a variety of sizes, and the U.S. Environmental Protection Agency is providing up to \$5 billion in Clean School Bus funding (grants and rebates) over the next five years to help fleets to go electric. Visionary fleets like Cyr Bus Line are leading the charge.