

COLD WEATHER ELECTRIC SCHOOL BUS CASE STUDIES

This report details six case studies of electric school bus (ESB) use across North America in regions that are rural, mountainous, and experience cold weather, in order to provide a perspective on the efficacy of ESBs in challenging conditions.

- West Grand, Colorado
- Three Rivers, Michigan
- Salt Lake City, Utah
- Prince Edward Island, Canada
- Havre, Montana
- Morris, Minnesota

WEST GRAND, COLORADO

West Grand School District in Kremmling, Colorado added one Blue Bird Type-D electric school bus (ESB) to their fleet in 2020. During the winter, the area can endure harsh subzero conditions, with the average temperature during morning commutes falling anywhere between -33 and -18 degrees Fahrenheit. Despite these extreme conditions, cabin heat on the school bus remained responsive, reliable, and comfortable. In addition to withstanding poor weather conditions, the district reports that the school bus has been able to climb the long and steep routes that surpass 9,000 feet in elevation. West Grand utilizes a heated garage to protect the school bus batteries from freezing temperatures so that the school buses are ready to operate immediately in the morning. The school district is so pleased with their ESB experience that they will receive two more ESBs in 2025 through the EPA Clean School Bus program.

THREE RIVERS, MICHIGAN

Three Rivers Community Schools in Three Rivers, Michigan has used two Lion C electric school buses since 2020. Temperatures in Michigan on average can dip below zero during winter months, reaching as low as -20 degrees Fahrenheit in Three Rivers. Overall, Three Rivers Community Schools reports that their electric school bus fleet has driven exceptionally and, in fact, often outperforms their diesel counterparts in cold weather. Three Rivers has found that ESBs' overall heavier weight and the fact that their weight is centered between the axles (as opposed to more front-heavy diesel school buses) have made ESBs less likely to fishtail in snowy conditions. The district was one of 27 Michigan school districts selected to receive funding for two more EBS through the EPA Clean School Bus Program.

SALT LAKE CITY, UTAH

Salt Lake City School District has a total of 12 ESBs, a combination of Micro Bird Type-A buses and Blue Bird Type-D buses, eight of which they first received in 2021. Even on the coldest days, when temperatures reach -30 degrees Fahrenheit and electric heater use reduces range by 18 percent, the school buses can cover the longest routes of about 90 miles per day by utilizing midday charging and regenerative braking. The battery gain from regenerative braking is especially prevalent in mountainous regions when vehicles drive down a mountain pass. The school district has even deployed the electric school buses on field trips to ski mountains and local canyons, finding the school buses are able to cover their most challenging routes. The transportation department has a goal of a 75% electrified school bus fleet by 2035 and drivers are eager to receive more ESBs.



ELECTRIC SCHOOL BUS NETWORK



PRINCE EDWARD ISLAND, CANADA

In 2021, Prince Edward Island (PEI) received 12 Lion Electric buses. As of 2024, PEI now has 107 electric school buses. Despite the island's cold and windy winter months, the use of electric school buses has offered unique advantages. Because of the school buses evenly distributed battery weight, both stability and overall driving ability is improved in snowy conditions. After test driving their ESB, PEI's transportation supervisor found that wind negatively impacts the school bus's range more than cold temperatures. The transportation supervisor noted that these harsh conditions similarly impact the range of fossil fuel school buses, so overall ESBs proved beneficial due to the improved driving ability in winter conditions. In pursuing full electrification, the transportation department will strategically deploy school buses based on route length, with a plan to order school buses with longer range capability (200 km or 124-miles) to service longer rural routes. The transportation supervisor believes that full electrification of the 350 school bus fleet will occur within the next ten years.

HAVRE, MONTANA

Havre Public School District, in the rural town of Havre, Montana, received two Lion-C electric school buses in 2023, making it the first district in Montana to receive electric school buses. Havre experienced temperatures as low as -60 degrees Fahrenheit due to wind chills during the polar vortex in the winter of 2024, with school bus delivery just a few days prior to the month-long Arctic blast. The school district says that the school buses run great, sometimes even better than their diesel and gas counterparts. The school buses are reported to have handled the extreme temperatures just fine with an impressive control system and ability to perform on ice. The district applied for two more ESBs through the EPA Clean School Bus program and envisions more coming in Havre and surrounding towns.

MORRIS, MINNESOTA

Morris Area School District is one of the first districts in Minnesota to add electric school buses to its fleet, with two Lion-C ESBs that were delivered in 2022. In Minnesota, a common concern was that the school buses would fail in the harsh winters. The school has found that has not been the case, as at below zero temperatures, range only decreases by 10-15 percent. The school buses came with diesel powered auxiliary heaters to keep students warm, but they have not been necessary. The school buses are pre-warmed while still plugged into the grid to reserve battery power for on-route needs and are able to stay warm running on battery power. The superintendent is pleased with fuel savings, noise reductions, and alignment with a community-wide focus on clean energy. With current state and federal grants, schools throughout Minnesota plan to add 22 additional electric school buses to their fleets statewide.

Questions?

Contact

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