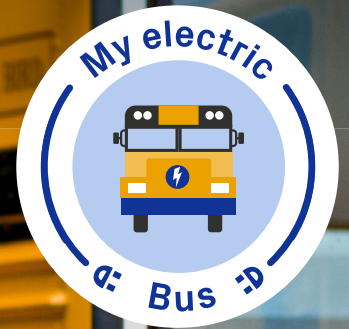


Range and Route Planning

Fact Sheet



A well-suited form of transportation

- School transportation is ideally suited to the use of electric models because of the predictability of the routes. Also, the operating hours are ideal for managing charging because the buses are idle part of the day and all night.

A model for every taste

- The ranges of the various models extend from 120 to 250 km between charging.

Some sample ranges (for models available in Quebec):

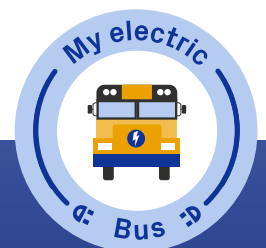
- Lion A (24 passengers): from 120 to 240 km [The Lion Electric Company](#)
- Lion C (72 passengers): from 150 to 250 km [The Lion Electric Company](#)
- Lion D (84 passengers): from 150 to 250 km [The Lion Electric Company](#)
- Micro Bird G5e (30 passengers): up to 161 km [Girardin Blue Bird](#)
- Vision SEV (72 passengers): up to 193 km [Girardin Blue Bird](#)
- Blue Bird TX4 RE electric (84 passengers): up to 193 km [Girardin Blue Bird](#)

A few facts

- With a 4-to-5 hour charge time during the day between the morning and end-of-day trips, it is possible to add nearly 100 km of range with a Level 2 terminal (or more with a quick-charge terminal) and thereby travel between 180 and 330 km per day depending on the particular model of bus being used.
- Unlike private electric passenger vehicles, heating the passenger compartment in the winter does not really affect range.¹ In the winter, the loss of range is only in the area of 10 to 15%, and this is mainly due to the fact that the road is snow-covered and the air is more dense.
- Even with the advances in battery technology, it is unlikely that these operating ranges will increase, as they are sufficient for most needs: rather, it is the cost of the vehicles that will tend to decline.



1. Currently, the majority of electric school buses are equipped with a diesel-powered heating system.



Influencing factors

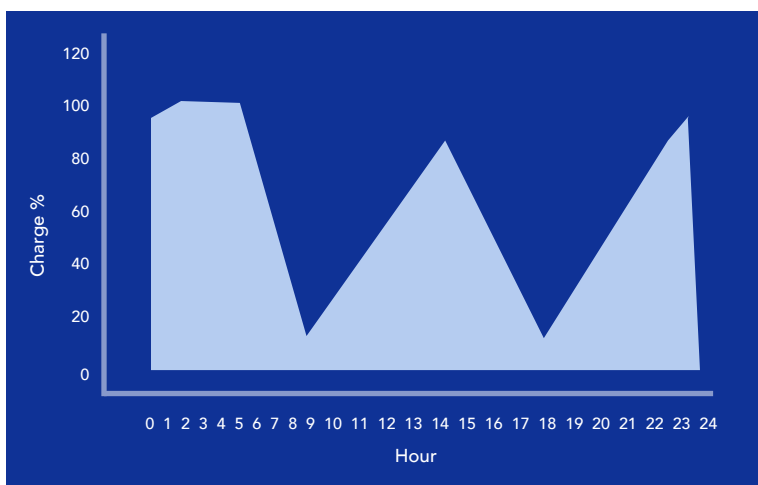
Factors that can impact range are, in order:

- Vehicle speed: A highway trip requires more energy than an urban trip.
- Vehicle mass: A trip with no passengers uses less energy than when at full capacity.
- Road conditions: Snow or rain increases consumption more than on dry roads.
- The age of the battery: There is a loss of range of 2 to 4% per year.
- Outside temperature: In extreme cold, the air is denser and requires more energy to move the vehicle. Also, wind, in the case of highway travel, can affect vehicle range but has little impact at speeds below 50 km/h.
- Driving style: Gradual acceleration and the use of light regenerative braking will use less energy than a more abrupt and aggressive style of driving.

Trip planning rethought

- In larger electric bus fleets, the older vehicles are assigned to shorter trips, since they will have lost some of their range (2 to 4% per year).
- Electric vehicles should be assigned first to the most predictable routes, but especially to routes where daytime charging is available, in order to maximize the potential amount of travel during the day.
- Where vehicles need to be repositioned during the day, the possibility of daytime charging within the operating area needs to be assessed, in order to limit the impact on the vehicle's repositioning range.

Electric school bus daily charge levels



For more information on factors affecting range, please refer to our [fact sheet on Charging](#).

