



York Region Transit Fleet Electrification Update

Updated: September 2021

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Temperature Impacts on Battery

- 25-30% range loss
- More frequent charging observed during the summer and winter compared to spring and fall



Customer Experience

- General excitement and interest for the initiative



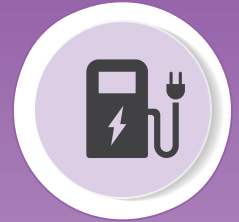
Driver Experience

- Additional driver training and support for on-route charging
- Positive feedback on the implementation and day-to-day operation of buses
- Range anxiety



Operational Impact

- On-route charging required to maintain service
- Facility and schedule adjustments required to accommodate on-route charging



Charger Usage

- Driver and mechanic training is a continued area of focus
- Additional post-delivery support required by staff and manufacturers
- Charger reliability impacts bus availability

Electric Bus Operating Costs

Electric bus operating cost information was tracked throughout the first year of the trial and compared directly to diesel fleet of similar size and age. A cost per kilometre analysis was completed along with a fuel cost comparison.

It is important to note the information provided is specific to the first year of operations and not representative of life cycle cost.

Table 1: Cost Per Kilometre (based on 80,482 kilometres driven, July 2020 – June 2021)

Electric Bus: \$0.27/km

Diesel Bus: \$0.38/km

Total operating cost for the six electric buses totalled \$21,394.91

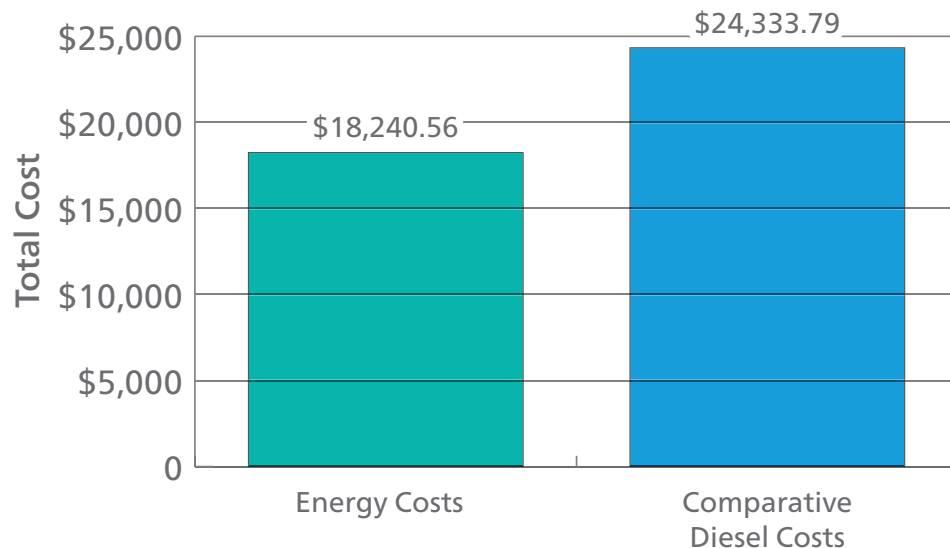
- \$18,240.56 in electricity costs
- \$3,154.35 in preventative maintenance costs

Total operating cost for six comparative diesel buses totalled \$30,569.29

- \$24,333.79 in diesel costs
- \$6,235.50 in preventative maintenance costs

Figure 1 shows the actual energy costs incurred for electric buses compared to diesel buses travelling the same distance between July 2020 and June 2021.

Figure 1: Energy vs Diesel Costs, July 2020 – June 2021



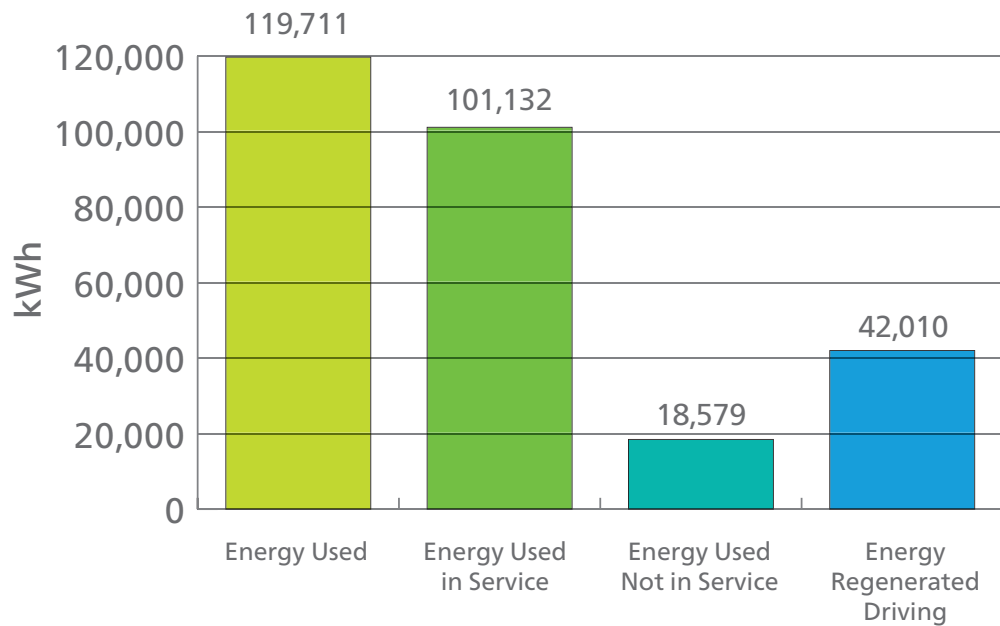
- The total distance travelled for the six electric buses was 80,482 kilometres
 - New Flyer buses averaged 17,000 kilometres
 - Nova Bus buses averaged 6,100 kilometres
- Total energy costs (\$0.23 per kilowatt-hour) \$18,241
 - Diesel costs (\$0.94 per litre) for the same distance driven \$24,334
 - Total annual savings \$6,093

Electric Bus Efficiency

Electric bus efficiency information was tracked throughout the first year of the trial with an average energy efficiency of 1.54 kilowatt-hours per kilometre.

Figure 2 shows the amount of energy used (in kilowatt hours) by the electric buses between July 2020 to June 2021. Also shown is the energy regenerated from driving and braking events.

Figure 2: Energy Usage/Recovery, July 2020 – June 2021



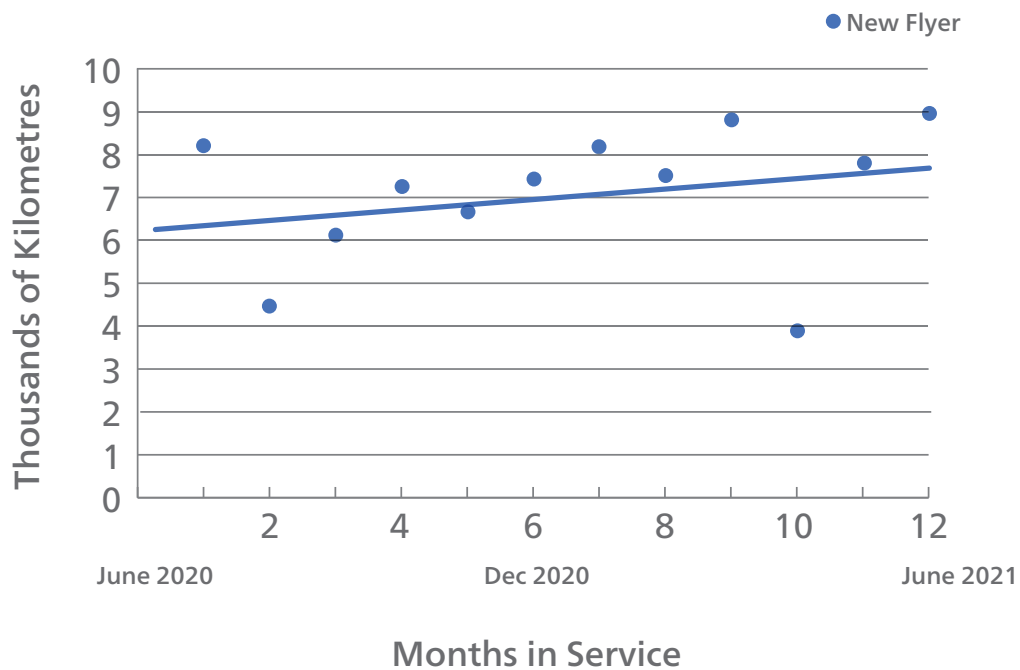
Mean Distance Between Failure

Mean distance between failures is the average number of in-service kilometres travelled between vehicle breakdowns or road calls. This measure is used to track maintenance programs and reliability of service.

The reliability of the electric buses continues to improve as months in service increase. As kilometres travelled increase in year two of the trial, staff anticipate a more accurate understanding of overall reliability.

Figure 3 shows the projected trendline for mean distance between failures for the four New Flyer electric buses. This shows the reliability of the electric fleet steadily increasing.

Figure 3: Mean Distance Between Failure, July 2020 – June 2021

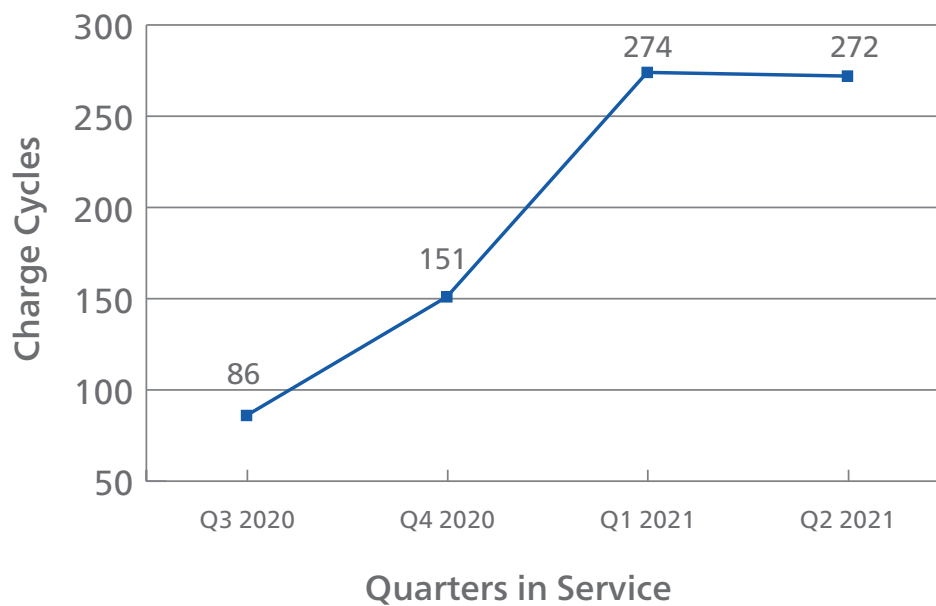


Charger Usage

Charger usage and reliability was monitored throughout the first year of the trial, including charging completed at the garage and the on-demand charger located at Newmarket Terminal. Since electric buses went into service, charging cycles increased by approximately 80 per cent quarter-over-quarter until Q2 2021. Charger usage will continue to rise as ridership and kilometres travelled increase in year two of the trial. In 2021, six additional electric buses will begin using the in-garage and on-demand chargers.

Figure 4 shows the number of charge cycles incurred per quarter for the six electric buses.

Figure 4: Quarterly Charge Cycles, July 2020 – June 2021



Emission Reductions

Emission reduction data was tracked throughout the first year of the trial, resulting in a total reduction of approximately 67 tonnes of carbon dioxide emissions. Staff continue to monitor additional emission reductions as ridership and kilometres travelled increase in year two of the trial.

Figure 5 shows the total amount of carbon dioxide emissions (in tonnes) for electric buses compared to diesel buses from July 2020 to June 2021.

Figure 5: CO₂ Emissions Comparison, July 2020 – June 2021

