RTS Key Performance Indicator (KPI) Report

April 2021

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April 2021 was the first month in which RTS of Gainesville, Florida deployed its recently acquired 40' Gillig BEBs. This report highlights the key performance metrics that the Center for Transportation and the Environment (CTE) tracked over the month. Future reports will be in PowerPoint form, with charts displaying trends in performance.

Utilization

Throughout the first month of deployment, all three buses combined to drive a total of 3,424 miles. Table 1 below outlines the distance traveled by each bus and the electric fleet as a whole. Bus 2002 drove about twice as far as the other electric buses this month.

Table 1: Mileage by bus and fleet mileage

Metric	Bus 2001	Bus 2002	Bus 2003	Fleet
Miles	809	1,738	877	3,424

As the fleet enters more regular service, CTE will track the number of hours in service per bus for use in future KPI reports.

Energy Consumption

The three buses consumed 5.1 megawatt-hours (MWh) of energy in April. This is equivalent to 46 gallons of diesel fuel per electric bus, compared to 599 gallons of diesel fuel per bus in the diesel fleet.

Future KPI reports will provide insight on how energy consumption varies by route and driver. Energy regenerated by driver, energy remaining after service, and battery state of charge (SOC) remaining after service will also be tracked.

Fuel Efficiency

Over the first month, the electric fleet averaged a fuel efficiency of 2.0 kWh/mile. In coming months, additional mileage will likely drive that value down, but this benefit might be mitigated by increased temperatures and HVAC loads.

Table 2 below breaks down bus-specific fuel efficiencies and how they compare to the diesel fleet efficiency and target efficiency set by RTS staff. As defined by RTS, these targets represent the advertised fuel efficiency of comparable 2020 diesel buses, which would have been purchased in place of the electric buses had the Low-No award not been granted.

Table 2: Fuel efficiency by bus and fleet

Metric	Bus 2001	Bus 2002	Bus 2003	Electric Fleet	Diesel Fleet	Target
Fuel Efficiency (kWh/mi)	1.9	2.1	2.0	2.0	n/a	8.2
Fuel Efficiency (MpDGE)	19.1	18.0	18.1	18.3	4.15	4.5

Table 2 shows that thus far in the deployment, the electric fleet is drastically outperforming both the current diesel fleet and the target. The electric fleet's fuel efficiency is four times better than the target and four-and-a-half times better than the existing diesel fleet. This is consistent with what CTE has seen in other deployments but may worsen as summer months require more energy to complete service.

In future KPI reports, fuel efficiency will also be broken down by route, time of day, and temperature.

Fuel Cost

Through the first month of deployment, the total cost of deploying RTS's three electric bus was $3,395. Figure 1 below breaks down the different costs that went into this calculation.

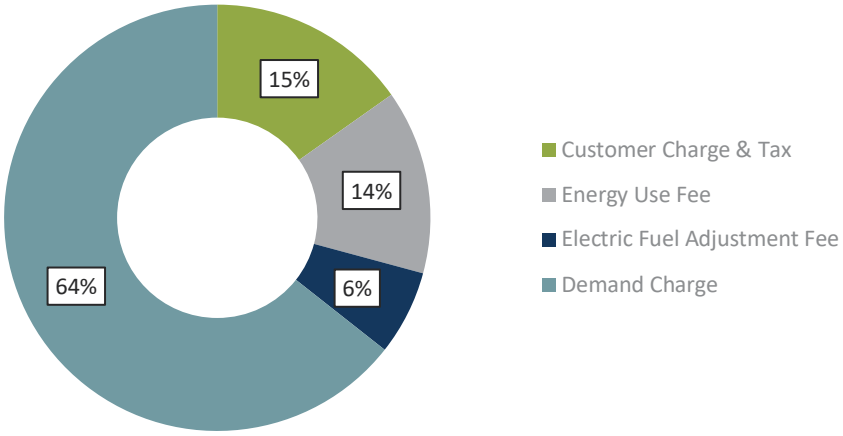

Figure 1: Utility bill breakdown by charge type

These costs were calculated using energy data from ViriCiti and ChargePoint due to the fact that the chargers are not separately metered. Because the electric fleet drove so few miles in April, the gross cost of electricity is low compared to other bill components. As more miles are driven per month, the cost of energy charged will increase, raising the proportion of the bill occupied by the energy use fee and the electric fuel adjustment fee, while the demand charge's share of the total cost falls. If the demand charge occupies a significant portion of the utility bill in coming months, CTE plans on working with RTS to develop a charge management and demand mitigation strategy to minimize costs while still meeting operational requirements.

Because gross costs provide limited insight into the financial requirements of providing revenue service, Table 3 breaks this information down into fuel cost per mile. The target fuel cost per mile was developed using the standard price of one diesel gallon ($2.15) and the target fuel efficiency (4.5 MpDGE) mentioned previously in this report.

Table 3: Fuel cost per mile

Metric	Electric Fleet	Diesel Fleet	Target	Bus 2001 Proportion	Bus 2002 Proportion	Bus 2003 Proportion
Fuel Cost per Mile ($/mi)	$0.99	$0.47	$0.48	31%	37%	32%

The electric fleet's inflated fuel cost per mile is primarily caused by the low miles driven in April. In future months, as more miles are driven and the fixed (customer charge and tax) and semi-fixed (demand charge) costs comprise a smaller proportion of the overall utility bill, RTS can expect to see the fuel cost per mile drop significantly. However, increased temperatures and HVAC loads may prevent RTS from fully reaping the benefits that increased mileage can bring.

Future KPI reports will provide insight into how fuel cost per mile varies by route.

Maintenance & Availability

In April, RTS spent $2,050 on maintenance labor for the electric fleet and incurred no costs for parts.

Future reports will include detailed breakdowns on the types of maintenance issues encountered and fleet availability.

Emissions Reductions

In the month of April alone, RTS avoided emitting 8.5 U.S. tons of greenhouse gases by using three electric buses in place of three diesel buses. This includes 12.5 lbs. of CO, 14.0 lbs of NOx, 0.3 lbs VOC, and 0.1 lbs SOx. This is the equivalent of:

- Powering 1.4 homes over the course of a year OR,
- Charging 938,000 smartphones OR,
- Planting 128 trees and letting them grow for ten years OR,
- Saving 9.4 acres of U.S. forest for a year

In future months, RTS can expect these equivalencies to grow exponentially as the buses are more regularly put into service.

Charger Utilization, Maintenance, and Availability

The chargers were used on twenty-two out of the thirty days in April 2021 and delivered 7.0 MWh to the electric fleet. When compared to the total energy used by the buses in that month (5.1 MWh) it's evident that only 73% of the energy that flowed through the charger was used by the buses. Some of this loss (8%) can be attributed to losses in the charging process, as energy conversion losses and bus auxiliary loads during charging prevent some energy flowing through the ChargePoint charger from making it into the bus battery. If this loss continues to be significant, CTE plans to work with RTS to develop charge strategies that may mitigate this.

Thus far the charger has not encountered any maintenance issues and was available for use every day in April.