CTA's Electric Bus Program

ICC Electric Vehicle Policy Session

Wednesday, April 4, 2018

CTA currently operates a fleet of 1,458 electric vehicles, and that number continues to grow.

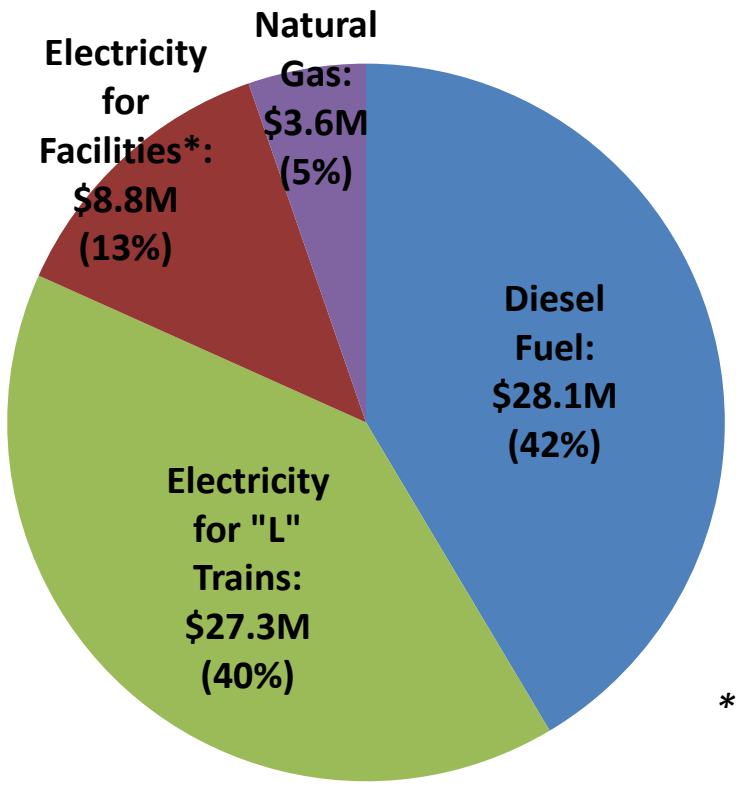
Overall Transit Service	
Service area	Chicago + 35 suburbs
Average weekday ridership	1,539,383
Coverage	81% of public transit trips in the 6-county area

Rail Service	
Number of electric rail cars	1,456
Daily rail miles traveled	233,906
Annual rail ridership	231.2 M

Bus Service	
Number of diesel buses	1,862
Number of electric buses	2
Daily bus miles traveled	161,192
Annual bus ridership	248.9 M

Bus fuel represents the largest portion of CTA's $68M annual energy expense.

CTA 2017 Costs by Energy Commodity



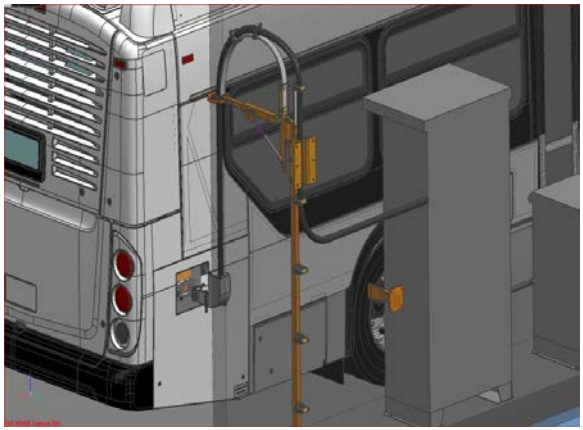
CTA 2017 Consumption by Energy Commodity

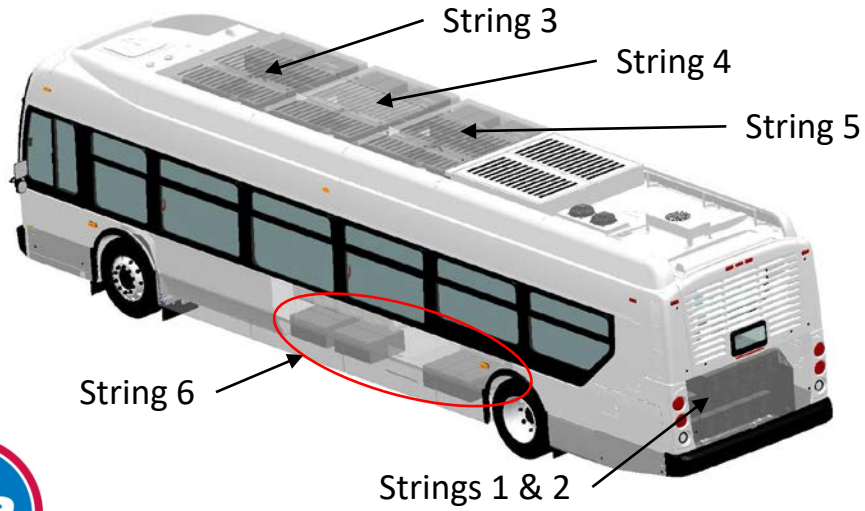
Commodity	*2017 Use*
Electricity – "L" Trains	429 GWh
Electricity – Facilities*	128 GWh
Diesel Fuel	16.1 M gals
Natural Gas	550,630 DTh

** Facilities includes electricity for CTA's 2 e-buses.*

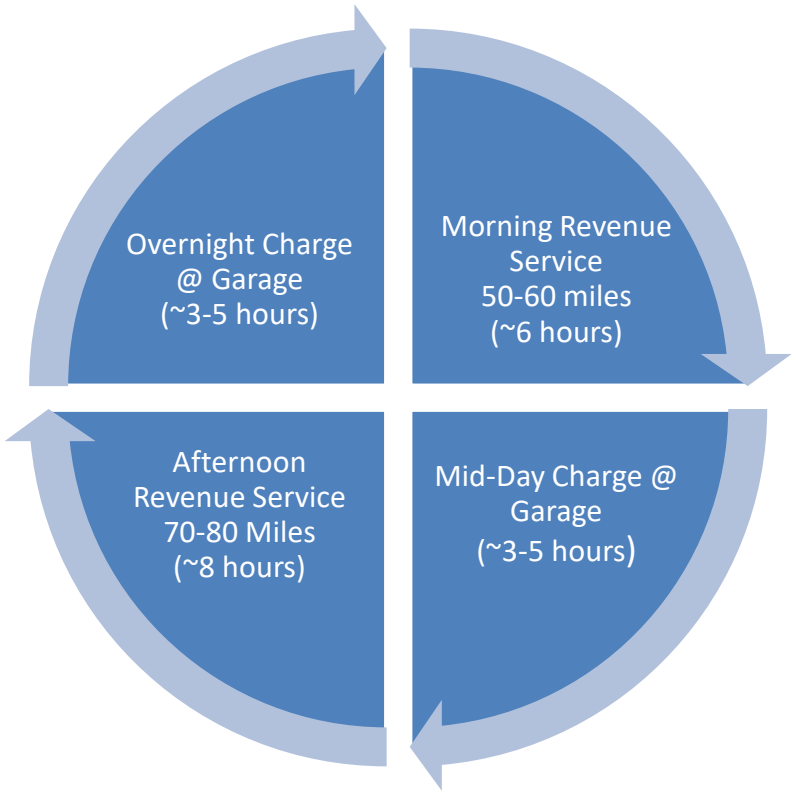
CTA has successfully operated 2 New Flyer e-buses for 3+ years.

- 300 kWh total across 6 battery packs
- 100-mile range
- Slow-charge in the garage on 100 kW charger





CTA's current e-buses serve the AM and PM rush periods, 120 to 140 miles/day.

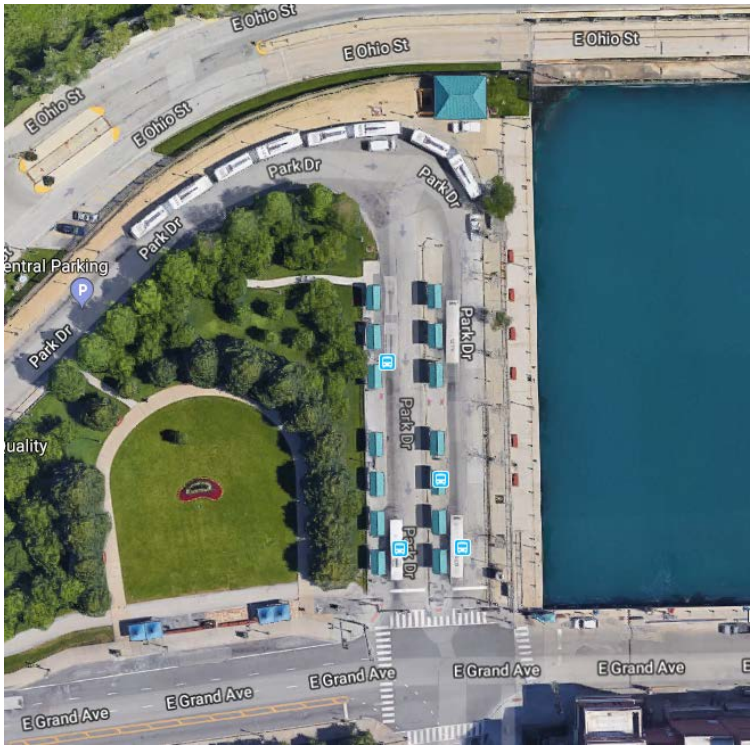


CTA will purchase at least 20 additional e-buses in the next couple years.

- Federal grants secured for purchase for buses and charging infrastructure
- Procurement in process now; proposal deadline was March 21
  - Base order of 20 e-buses, 5 fast-chargers, and design/build of en-route charging stations
  - Options for additional 25 e-buses
- Contract anticipated in mid-2018
- 5 pilot e-buses delivered and garage charger installed in 2018
- 8 months of testing for pilot e-buses, followed by design review
- 2 en-route chargers installed within 6 months of pilot delivery
- Delivery of remaining order and installation of 2 more en-route chargers

E-buses will operate on Route #66 Chicago Ave and charge at terminals.

CTA's Navy Pier Bus Terminal



Examples of En-Route Overhead Chargers

Garage charging vs. en-route charging

Consideration	*Garage Charging*	*En-Route Charging*
Suitability for CTA bus operations	– Existing long-range transit e-bus technology cannot fulfill all CTA bus service schedules + E-buses can operate on any CTA route	+ E-buses can fulfill all CTA bus service schedules – E-buses are limited to CTA routes with en-route charging infrastructure
Cost of buses: initial and operating costs	– Larger battery packs cost more, increase bus weight, more kWh/mile	+ Smaller battery packs cost less; buses are lighter and use less kWh/mile
Initial cost of charging infrastructure	+ Slow-chargers cost less to purchase and install + No issues obtaining space	– Fast-chargers cost more to purchase and install – Eventually, space will be constrained
Cost to charge buses	? Depends whether buses need to charge mid-day when demand fees are imposed	? Depends whether CTA can spread charging events to reduce demand peaks
Reliability of charging infrastructure	+ Chargers can be maintained at a central location – Concentrated location also means concentrated risk of power outages	– Dispersed locations are harder to maintain + Dispersed locations spread the risk of power outages

How can the "utility of the future" support CTA's e-bus operations?

- Explore the potential for dynamic, demand-responsive charging
- Map grid capacity for charging infrastructure at CTA's garages and bus terminals
- Consider special rate structures or classifications for EV fleets

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