

EV Transit Bus Update January 2022

UVA Department of Parking & Transportation

UTS Diesel Bus Fleet

Diesel Usage - 200,000 Gallons/Year

Size of Fleet – 40-44 Buses

Diesel Bus Life Span – 12-15-Years

Next Scheduled Bus Purchase – 4 Buses in Spring 2022

UTS completed evaluation of diesel versus EV in 2020/2021



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Plans & Progress

In December 2019 the UVA Board of Visitors approved a resolution for the University to be carbon neutral by 2030 and fossil fuel free by 2050.

UTS EV Fleet Evaluation:

Alignment with UVA's Goals/Emissions

Costs including Opportunity Costs

Duty Cycles and Recharging Models

Performance of Available Bus Platforms

Partnerships - Virginia Clean Cities, CalStart, UVA Sustainability Communities

Site Visits – Manufacturers, Transit Agencies who have Adopted EV

Ability to Absorb Required Operational Changes

Procurement Approaches



UTS EV Fleet Evaluation – Emissions and Costs

Element	Electric	Diesel
Emissions	Reflective of Grid Grid Transformation Pending	Carbon Monoxide, Hydrocarbons, Particulate Matter, Nitrogen Oxide
Initial Purchase	\$800,000 for a 12-Year Bus Longevity TBD	\$450,000 for a 12-year Bus that UTS uses for 12-15 years
Operating Costs – Fuel	Cost of Electricity	Cost of Diesel is higher and potentially more volatile
Operating Costs – Maintenance	Battery Maintenance and Replacement	Multiple Fossil-Fuel Based Systems
Fuel Infrastructure	Needs to be built at Millmont Vehicle to Grid assumed	Existing
National Investment	Toward EV	Away from Fossil Fuels
Life and Cost of Batteries and Offsets	Battery life expected to increase Battery cost expected to decrease	Offset cost expected to increase

If considering dollar-value only, total cost of ownership is currently higher for EV by \$~175K, mostly due to purchase price. The industry is projecting eventual parity in total cost of ownership for EV versus diesel. The timeline is unknown, but operating are costs already lower.

EV Duty Cycles and Recharging Models

UTS Route Distance
Calculations: + Duration
 + Average Speed
 + Elevation Changes - Regenerative Braking
 + Heating/Cooling Needs
 = Battery and Charging Infrastructure Need

Recharging
Options: UTS route schedules allow
 off-peak and out-of-service charging.
 In-route not considered at this time.



UTS Route (Duty-Cycle) Modeling



ROUTE OVERVIEW



ROUTE OVERVIEW CONTINUED



Other Evaluation Points

Performance of Available Bus Platforms:

- New Flyer
- Proterra
- Gillig
- Arboc
- Performance issues reported in some locations

Partnerships:

- Virginia Clean Cities
- CalStart
- UVA Sustainability Communities

Transit Agencies who have Adopted EV:

- City of Alexandria (DASH)
- Blacksburg Transit (BT)



Results of Evaluation:

For UTS, goals, cost/investment, modeling, platforms, and partnerships confirmed an EV approach. UTS will order 4 EV buses in Spring 2022.

Timeline:

January/February 2022 - Order 4 EV Buses using state contracts

Summer 2022 through Summer 2023 – Design and implement operational changes:

- Duty cycles
- Driver training
- Vehicle fueling and maintenance

Spring 2023 – Install operational, fuel, and maintenance infrastructure at Millmont

Summer 2023 – Receive 4 EV Buses

Fall 2023 – First EV buses in operation

January/February 2024 – Order next round of buses (platform and funding TBD)

P&T Financial Model

Parking & Transportation (P&T) is Business Operation or Auxiliary Service.

No State, Federal, or Tuition funding is available.

The services must be financially self-sustaining through user-fees.

The institution provides support, mostly through debt relief.

Goals:

Provide UVA with land use options by managing parking and transit demand.

Support the University's sustainability and safety/security goals.

Fully partner with regional transit providers.

Reduce parking demand for students and employees and reduce traffic congestion to make more areas of grounds pleasantly walkable/bikeable.

Strategies to Meet Goals

High frequency transit service in very small service area

- Parking intercepts for employees (funded by UVA Health)
- Residential service for students (funded mostly with mandatory student fee)
- On-campus circulation for everyone (funded with mandatory student fee)

Parking management

- Building and allocating parking inventory, setting eligibility and pricing (funded with parking fees)

Alternative transportation (funded by the system)

- Carpool/Vanpool Incentives
- Regional Transportation
- Bike/Walk

Strengths and Opportunities

Unbundling parking fees reduces parking demand.

Investing in transit reduces congestion.

Funding transportation alternatives is difficult to allocate.

No distinct funding for transit to new locations (Old Ivy Road, Fontaine).

Adopting new transit technology (EV) requires major investment.

Capital expansion impacts parking demand.

Garages on the periphery of campus are the most expensive to build but recover the least amount of revenue.

Parking fees create equity issues.

Successful reduction of parking demand reduces revenue.

Discussion

P&T as Infrastructure versus auxiliary service?

Impact of capital projects?

Appropriate level of institutional investment?

Appropriate mechanisms of institutional investment (since infrastructure demands are based on population, fringe benefit pool?)

T&P will discuss further in future meetings