



Fleet Electrification

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Anne Arundel County Fleet Electrification Progress

- Draft ZEB/HEB Fleet Electrification Plan has been developed
- \$5M Earmark from Congressman Anthony Brown for Fleet Electrification was awarded in 2022
- \$586K ARPA grant for the purchase of two electric vehicles in 2022
- \$60K MTA grant for the Transit Development Plan (TDP)
- Pursuing additional funding for new transit ops facility (Feasibility Study In-Progress)
- Future proofing for charging infrastructure at Parole Transit Center
- Hybrid conversion kit purchases will commence in 2022 and beyond
- Solar powered bus stop pilot program

Anne Arundel County Fleet Electrification Progress

ZEB/HEB Transition Plan Key Elements

- SECTION A: TRANSIT AGENCY INFORMATION
- SECTION B: ROLLOUT PLAN GENERAL INFORMATION
- SECTION C: TECHNOLOGY PORTFOLIO
- SECTION D: CURRENT BUS FLEET COMPOSITION AND FUTURE BUS PURCHASES
- SECTION E: FACILITIES AND INFRASTRUCTURE
- SECTION F: PROVIDING SERVICE IN DISADVANTAGED COMMUNITIES (DACs)
- SECTION G: WORKFORCE TRAINING
- SECTION H: POTENTIAL FUNDING SOURCES
- SECTION I: START-UP AND SCALE-UP CHALLENGES

Zero Emissions Bus Transition Plan 2023-2033



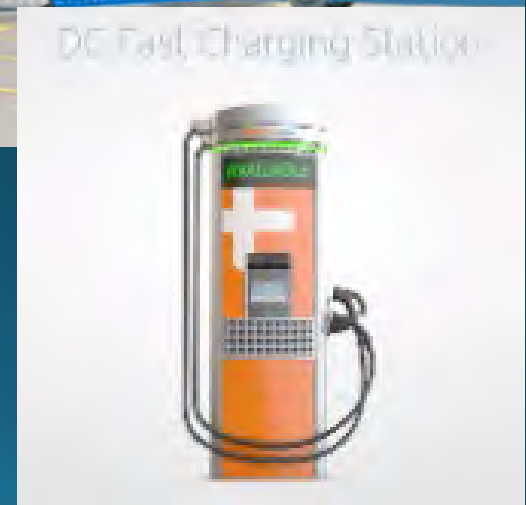
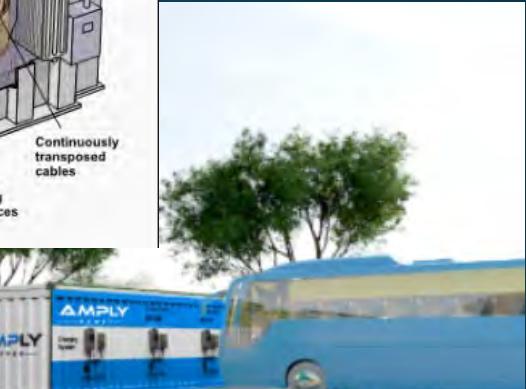
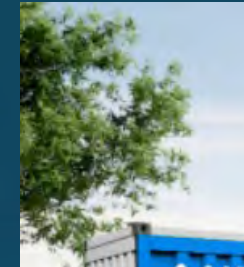
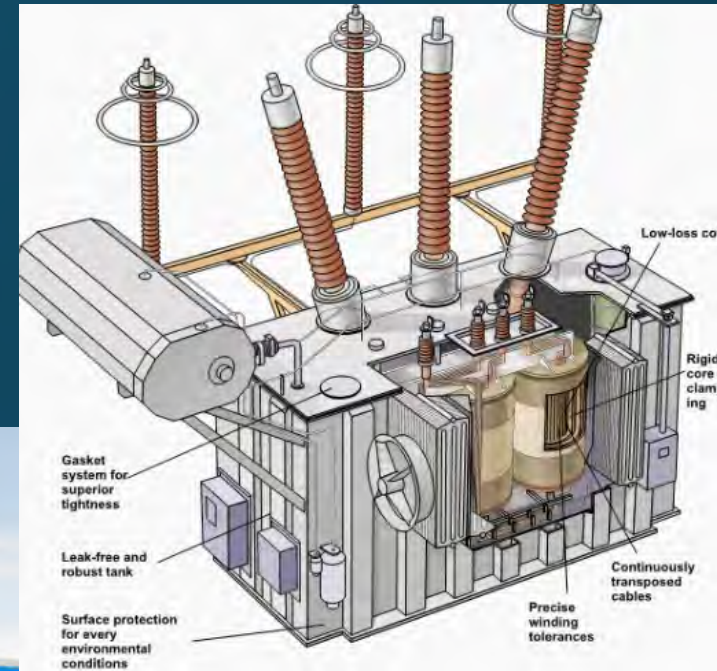
Anne Arundel County
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Anne Arundel County Fleet Electrification Progress

Charging Infrastructure

- Charge Management System/Telematics Strategy
- Charger compatibility w/buses
 - AMPLY InRUSH Container (Universal & Mobile)
 - Chargepoint (Fixed Charging Unit)
- Proper plug (J1772 is the standard American Plug)
- Coordination with DPW and Central Services
 - DPW designs and builds charging infrastructure
 - Central services maintains vehicles
- BGE coordination and permitting
 - Suitable transformer and conduits for charging



Anne Arundel County Fleet Electrification Progress

First Bus Purchase Anticipated

- Optimal EV S1LF
- Per bus cost \$293K (\$586K total)
- Cutaway BEB bus
- Altoona Tested
- 125 Mile Range
- Buy America Compliant



The image shows a white Optimal-EV S1LF electric shuttle bus with its side door open. A person in a wheelchair is boarding the bus using a built-in ramp. Several people are standing nearby, and the bus is parked in front of a modern building. The Optimal-EV logo is visible on the side of the bus.

2022 Optimal-EV S1LF

Optimal-EV is the market leader in the design, validation and manufacture of zero-emission electric low floor shuttle buses.

Optimal provides a suite of low-floor vehicle configurations and equipment options that are quiet, ecologically efficient, and allow for seamless migration to a fully battery-electric fleet.

101.6" 2.58m
Wide Body Enhances Passenger Comfort

ED AVENUE
Available Front Destination Sign

All-Electric Propulsion

11" (280mm) Step-In Height Low-Floor Design

ADA COMPLIANT

NHTSA
FPMVSS Compliant

Anne Arundel County Fleet Electrification Progress

First Conversion Anticipated

- Hybrid Electric Bus (HEB)
- Conversion Kit (XL Fleet Vendor)
- Up to 31 buses are capable to be converted
- Per bus conversion \$19K (Buy America Compliant)
- Estimated 30 percent reduction in fuel and emissions

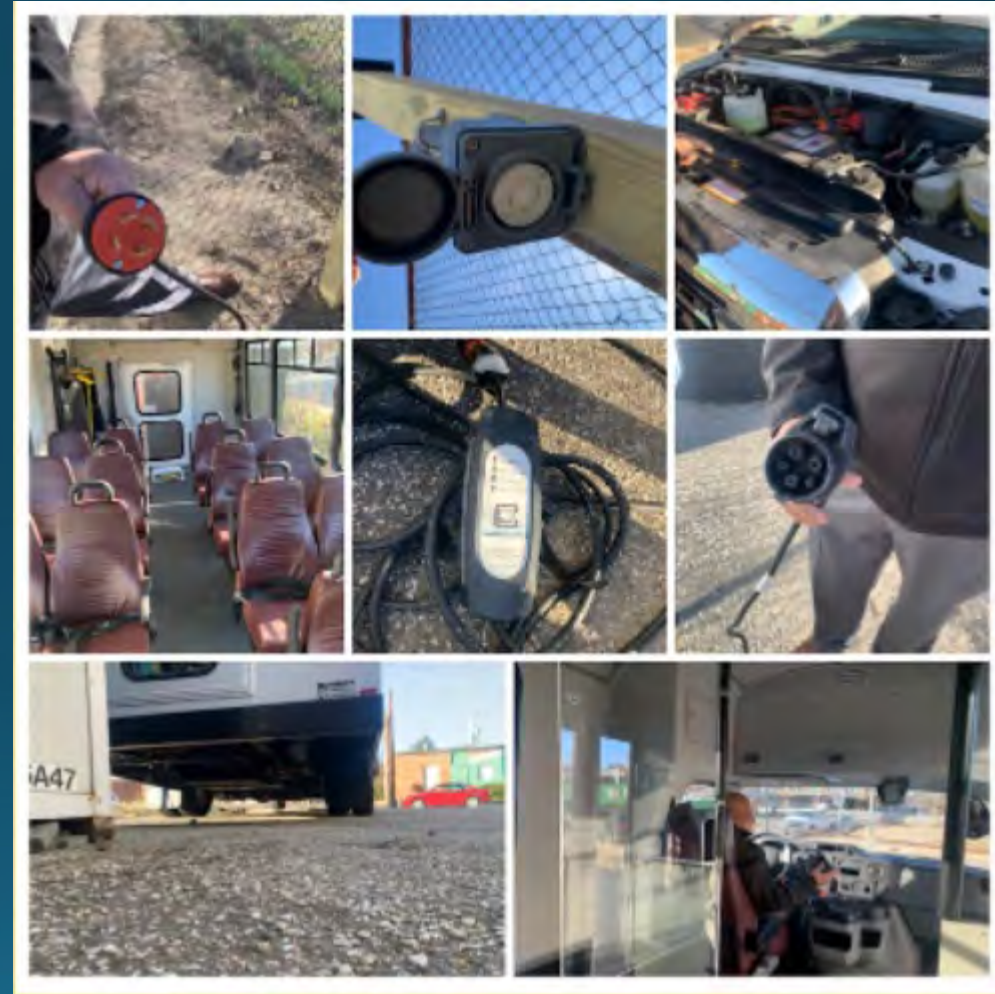


County Connector (BWI)

Operated by Dream Management (Based in Baltimore City)

- First Electric Bus operating within Anne Arundel County
- Operated using LDC funds by BWI Partnership
- In-house electrical contractor built out charging infrastructure (Overnight Charging)
- One of three buses that provides service for the line due to range consideration
- Additional Driver Training

Note: CE Electric Bus Tour held April 18th, 2022 along one of our new routes as part of demonstration.



Howard County RTA

Current Electrical Fleet

- Three Electric BYD Buses
- Three Electric Chargers (At Savage, MD Ops Facility near Annapolis Junction)
- One Conductive Charger (Columbia Mall in Howard County)
- Charge Management System (Avoid peak hour charging and maintains operational vehicles for routes throughout service timeframe)
- Transformer built into facility as well as conduits to support charge infrastructure
- Three bus bays and lifts
- Buses operate on a route that is 15 miles in length interchangeably throughout the day
- Bus Operations Manual & Driver Training



Best Practices

- ZEB/HEB Plan (This is a living document based on the accelerated rate of progress in the electric transit vehicle industry)
- DC Fast Charger is essential (Charges fully in two hours) and allows for partial managed charges throughout the day
- Charge Management System with software as a service is essential
- Telematics is a vital management strategy
- Proper plug for charging and compatibility test of plug when integrating with charging infrastructure
- Bus manual from manufacturer
- Training for mechanics to maintain vehicles
- Training for drivers to operate vehicles
- Electrical infrastructure up front costs are a major consideration
 - ROI may not be realized in the short term
 - Utility costs are lower than fuel costs by as much as 50%
 - Conversion can allow up to 30% reduction in fuel costs and emissions
- A resilient charging micro grid is ideal for avoiding providing a fully electric fleet
- Clean electrons may not be the source of charging power
- Support vehicles for charging towing or a subcontractor to perform those functions
- Pursue various sources of federal, local, and private funding

Contact Information

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