GPA/TAPA Joint Conference
October 6, 2021

Transportation Electrification in TN & GA

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CDM Smith

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Tennessee Dept. of Transportation

John Lancaster, AICP
Memphis Area Transit Authority

Lee Brown, CFO
Macon-Cobb County Transit Authority
Planning
Throughout 2018, the following Key Contributors and participating organizations worked together to develop a shared vision for electric transportation in the state.

Key Contributors:

- Atlas Public Policy
- Bridgestone
- BYD
- CDE Lightband
- ChargePoint
- City of Nashville

Participants:

- City of Knoxville
- City of Chattanooga
- Cummins Filtration
- Draft Agency
- General Motors
- Greenlots
- GRIDSMART
- Local Motors
- Nissan
- Schneider Electric
- Sierra Club
- SoftServe
In 2019, the “EV Roadmap” was published, which described the following Vision and Mission. The Mission describes, at a high level, how we will achieve the Vision.

**Vision:** Driving Tennessee to become an electric transportation leader in the Southeast

**Mission:** Collaboratively pursuing initiatives that will significantly increase EV adoption from 13,000 EVs today to 200,000 EVs by 2028, guided by shared principles that benefit all residents of Tennessee
Tennessee’s Statewide Network

Primary & Secondary Corridors With Existing Electric Vehicle DC Fast Charging Infrastructure (July 2021)

* Each location includes at least one SAE Combo and one CHAdeMO plug.

Drive Electric TENNESSEE

TVA

TN Department of Environment & Conservation

TDOT Department of Transportation
Tennessee Electric Vehicle Charging Opportunity Map

Primary & Secondary Corridors With State Parks + Distressed & At Risk Counties (July 2021)
Funding
Funding Opportunities

• Volkswagen Settlement Environmental Mitigation Trust

• Diesel Emission Reduction Act Program (DERA)

• Congestion Mitigation and Air Quality Improvement Program (CMAQ)
## DOT Funding and Financing Programs with EV Eligibilities

<table>
<thead>
<tr>
<th>PROGRAM</th>
<th>FY 2021 AMOUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FORMULA PROGRAMS</strong></td>
<td></td>
</tr>
<tr>
<td>National Highway Performance Program (NHPP)</td>
<td>$23.1 B</td>
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<tr>
<td>Surface Transportation Block Grant Program (STBG)</td>
<td>$10.2 B</td>
</tr>
<tr>
<td>Congestion Mitigation &amp; Air Quality Improvement Program (CMAQ)</td>
<td>$2.4 B</td>
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<tr>
<td>National Highway Freight Program (NHFP)</td>
<td>$1.5 B</td>
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<tr>
<td>State Planning and Research (SPR)</td>
<td>$641.5 M</td>
</tr>
<tr>
<td>Metropolitan Planning (PL)</td>
<td>$357.9 M</td>
</tr>
<tr>
<td><strong>DISCRETIONARY PROGRAMS</strong></td>
<td></td>
</tr>
<tr>
<td>Rebuilding American Infrastructure with Sustainability and Equity (RAISE) (formerly known as BUILD)</td>
<td>$1.0 B</td>
</tr>
<tr>
<td>Infrastructure for Rebuilding America (INFRA) Grant Program</td>
<td>$889.0 M</td>
</tr>
<tr>
<td>Advanced Transportation and Congestion Management Technologies Deployment (ATCMTD)</td>
<td>$53.3 M</td>
</tr>
<tr>
<td><strong>OTHER ALLOCATED PROGRAMS</strong></td>
<td></td>
</tr>
<tr>
<td>Federal Lands and Tribal Transportation Program (FLTTP)</td>
<td>$1.0 B</td>
</tr>
<tr>
<td>Highway Infrastructure Program (HIP) (other than for bridges)</td>
<td>$644.0 M</td>
</tr>
<tr>
<td>Puerto Rico Highway Program (PRHP)</td>
<td>$74.9 M</td>
</tr>
<tr>
<td>Territorial Highway Program (THP)</td>
<td>$37.3 M</td>
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<tr>
<td><strong>INNOVATIVE FINANCE PROGRAMS</strong></td>
<td></td>
</tr>
<tr>
<td>State Infrastructure Banks (SIBs)</td>
<td>Varies</td>
</tr>
<tr>
<td>Transportation Infrastructure Financing and Innovation Act (TIFIA)</td>
<td>Varies</td>
</tr>
</tbody>
</table>

### LEGEND
- Construction and installation of EV charging infrastructure and related projects
- Workforce development and training related to EV infrastructure
- EV acquisitions and equipment-related expenses
- Planning for EV charging infrastructure and related projects
- Construction and rehabilitation of EV charging infrastructure to support operational and maintenance, and associated regulatory freight transportation projects
- Installation of EV charging infrastructure in rural areas

*Note: Funding and financing programs subject to appropriations by the U.S. Congress and state authorization.*
CMAQ-Funded Bus Electrification Projects
What’s Happening Now
TN’s EV Registrations
An Emerging EV Leader

Tennessee is becoming the number one location to build, own, and drive EVs

TN Registered EVs

(6/30/21):

13,812

EV Manufacturing:

#1 in the Southeast

Leaf (since 2013)
Smyrna

ID.4 (in 2022)
Chattanooga

Lyriq (in 2022)
Spring Hill
EV rates are TVA regulated to the charging station meter. Station owners set the price for charging services.
Primary & Secondary Corridors With Existing Electric Vehicle DC Fast Charging Infrastructure (July 2021)

* Each location includes at least one SAE Combo and one CHAdeMO plug.
Looking Ahead
Bipartisan Infrastructure Bill

• New Dedicated Federal Funding:
  • Charging and Fueling Infrastructure Grants - $2.5B
  • National EV Formula Program - $5B [FY22-FY26]
  • Electric/Low Emission School Buses - $5B
  • Low/No Emission Transit Buses - $5.25B

• Freight Alternative Fuel Corridors

• Federal Joint Office of Energy and Transportation
Contact Info

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Long Range Planning Division
Senior Air Quality Planner

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John Lancaster
Director of Planning & Scheduling
Memphis Area Transit Authority
Bus Electrification Panel
Joint Tennessee Georgia American Planning Association Conference
October 6, 2021
Chattanooga, Tennessee
Memphis 3.0 Comprehensive Plan

- A Plan for Memphis as it enters its Third Century
- Two-Year Comprehensive Plan Process
- Develops a Shared Vision & Master Plan for the City
- Connects Land Use with Transportation
- Produced Goals & Objectives, policies and strategies – A “to-do” list for the City
Adopted Transit Vision
MATA’s Sustainability Program

- Adopted by the MATA Board February 23, 2021
- Measure and reduce Green House Gas Emissions (GHGs)
  - Fleet Vehicles and Buildings
- Track and measure fuel usage by type and cost
- Current and future actions
  - Invest in green fleets, electric buses, electric charging infrastructure
  - Set sustainability standards for MATA facilities
  - Create partnerships with local sustainability working groups or advisory committee
  - Join APTA’s sustainability commitment
- Set goals for Climate Action Plan
What Goes Into the Electric Bus Decision Process?

- Vehicle Type, Size, Range
  - Grade
  - Distance
  - Span of Service
  - Available Recharging Time (3 hours?)
  - Available Recharging Locations
- Emergency Planning
  - Generators?
- Draw of ancillary equipment
  - Farebox
  - Destination Signs
  - Communications/Wi-Fi
  - HVAC
  - Counters
  - Lighting
- Infrastructure
  - Utilities
# MATA’s Electric Bus Program Funding

<table>
<thead>
<tr>
<th>Funding Source</th>
<th>Quantity of Buses</th>
<th>Federal Funding</th>
<th>State Funding</th>
<th>Other Funding</th>
<th>Local Funding</th>
<th>Total Funding</th>
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</thead>
<tbody>
<tr>
<td>CMAQ</td>
<td>10</td>
<td>$11,120,000</td>
<td>$0</td>
<td>$0</td>
<td>$2,780,000</td>
<td>$13,900,000</td>
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<tr>
<td>BUILD Grant</td>
<td>9</td>
<td>$12,000,000</td>
<td>$0</td>
<td>$0</td>
<td>$5,647,000</td>
<td>$17,647,000</td>
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<tr>
<td>VW Settlement</td>
<td>3</td>
<td>$0</td>
<td>$0</td>
<td>$2,112,750</td>
<td>$989,250</td>
<td>$3,102,000</td>
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<tr>
<td>Total</td>
<td>22</td>
<td>$23,120,000</td>
<td>$0</td>
<td>$2,112,750</td>
<td>$9,416,250</td>
<td>$34,649,000</td>
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</tbody>
</table>
## MATA’s Electric Bus Program Costs

<table>
<thead>
<tr>
<th>Funding Source</th>
<th>Quantity</th>
<th>Cost per Unit</th>
<th>Total Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric Buses</td>
<td>22</td>
<td>$850,000</td>
<td>$18,700,000</td>
</tr>
<tr>
<td>Depot Chargers</td>
<td>15</td>
<td>$175,000</td>
<td>$2,650,000</td>
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<tr>
<td>Opportunity Chargers</td>
<td>12</td>
<td>$175,000</td>
<td>$2,100,000</td>
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<tr>
<td>Electric Distribution Costs</td>
<td>1</td>
<td>$1,650,000</td>
<td>$1,650,000</td>
</tr>
<tr>
<td>Installation &amp; Construction</td>
<td>1</td>
<td>$2,507,500</td>
<td>$2,507,500</td>
</tr>
<tr>
<td>Project Contingency (20%)</td>
<td>1</td>
<td>$5,516,500</td>
<td>$5,516,500</td>
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<tr>
<td><strong>Total Estimated Project Cost</strong></td>
<td></td>
<td></td>
<td><strong>$33,099,000</strong></td>
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</table>
Standard Battery Electric Bus
Another Battery Powered Bus
MATA’s Electric Bus Network
# Electric Bus Program Consultant Scope of Work

<table>
<thead>
<tr>
<th>Tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Project Management to Assist MATA</td>
</tr>
<tr>
<td>2. Develop Bus Vendor Demonstration Program</td>
</tr>
<tr>
<td>3. Assist with Coordination of Demonstration Program</td>
</tr>
<tr>
<td>4. Assist with MLGW and TVA Electric Demand and Power Supply for Electric Bus Program</td>
</tr>
<tr>
<td>5. Develop Bus Charging Infrastructure Program</td>
</tr>
<tr>
<td>6. Assist with Battery Electric Bus Procurement Specifications</td>
</tr>
</tbody>
</table>
Electric Bus Telemetric Data

DATE: Fri, Aug 16, 2019
BUS: 51944
MODEL: XE40
ESS CAPACITY: 480 kWh
TRIP: 1

TRIP DETAILS
09:44 am 24.52 73.20 2.19 24.10
Start Time Mileage (miles) SOC MAX (%) Net Energy Consumption (kWh/mile) Total regen energy (kWh)
11:28 am 85.59 62.00 31.00 0.31
End Time Average Temperature (°F) SOC MIN (%) Net Energy Consumption (kWh/hour) Regen ratio
01:44:03 14.14 53.76 Net Energy Used (kWh)
Duration Average Speed (mph)

NET ENERGY CONSUMPTION BY SUB-SYSTEM kWh/mile
Motor 0.40 (18%)
Elect. Heater 0.19 (9%)
LV Accessories 1.60 (73%)
HV Accessories

ROUTE

STATE OF CHARGE AND ODOMETER MILES

SUB-SYSTEMS AND REGEN POWER

MATA
MEMPHIS AREA TRANSIT AUTHORITY

GO901 MOBILE
Memphis Innovation Corridor

Electric Bus Rapid Transit (BRT) Line
Bus Rapid Transit (BRT) Characteristics

- High Frequency Transit
- Longer Span of Service
- Dedicated Right of Way
- Branded Service
- Stations, not Stops
  - Fewer with more amenities
- Becomes a Trunk Line of the System
BUILD Grant Scope

• Procurement
  • Nine electric buses
  • Charging infrastructure
    • Depot Chargers (5 total)
    • Opportunity Chargers (2 total)
  • Automatic Traffic Management System (ATMS)
    • To include Transit Signal Priority (TSP)
  • Ticket Vending Machines (41 total)
    • To be installed at Will Hudson Transfer Center and relocated shelters

• Implementation
  • Fixed Route BRT Service
# BUILD Grant Funding Sources

<table>
<thead>
<tr>
<th>Federal/Local</th>
<th>Source</th>
<th>Funding Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federal</td>
<td>BUILD Grant</td>
<td>$12,000,000</td>
</tr>
<tr>
<td>Local</td>
<td>BUILD Match</td>
<td>$5,647,000</td>
</tr>
<tr>
<td>Total Federal and Local</td>
<td></td>
<td>$17,647,000</td>
</tr>
</tbody>
</table>
Small Starts Capital Investment Grant (CIG) Scope

- **Right-of-Way**
  - ROW Acquisition (from 36 properties)
  - Easements (from 18 properties)

- **Construction**
  - Bus Rapid Transit Stations (31 level boarding platforms at 16 stations)
  - Bus Only Lanes
  - Laneage Reconfiguration along Union Avenue
  - Curb Extensions and Pedestrian Improvements (Downtown)
  - ADA/Accessibility Improvements
  - Traffic Signal Improvements
    - Signal Modifications/Reconstruction (41 total)
    - Pedestrian Crossings (2 total)
    - Fiber Optic Communications
Typical mConnect Station
Medical Center – Union at Health Sciences Park
Features and Amenities – BRT Stations

- Real-Time Bus Arrival Information
- Security
  - Cameras
  - Emergency Call Box
- Off-Board Fare Collection
- Level Boarding
Transit Only Lanes

- B.B. King Blvd Northbound
- North 2\textsuperscript{nd} Street Southbound
### Small Starts CIG Funding Sources

<table>
<thead>
<tr>
<th>Federal/Local</th>
<th>Source</th>
<th>Funding Amount*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federal</td>
<td>Small Starts</td>
<td>$45,756,000</td>
</tr>
<tr>
<td></td>
<td>STBG</td>
<td>$6,800,000</td>
</tr>
<tr>
<td></td>
<td><strong>Total Federal</strong></td>
<td><strong>$52,556,000</strong></td>
</tr>
<tr>
<td>Local</td>
<td>Small Starts Match</td>
<td>$18,689,000</td>
</tr>
<tr>
<td></td>
<td>STBG Match</td>
<td>$1,700,000</td>
</tr>
<tr>
<td></td>
<td><strong>Total Local</strong></td>
<td><strong>$20,389,000</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Total Federal and Local</strong></td>
<td><strong>$72,945,000</strong></td>
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</tbody>
</table>

*Year of Expenditure Dollars
Small Starts CIG Schedule

• Notice of Funding Recommendation – March 2022
• Execute Small Starts Grant Agreement – November 2022
• Begin Right-of-Way Acquisition – March 2022
• Begin Utility Relocation – November 2022
• Begin Construction – July 2023
• Construction Complete/ Begin Revenue Service – July 2026
New Operations and Maintenance Facility
Future Regional Electric Bus Network?
Thank you!

Visit us on the Web:

www.matatransit.com
www.go901transit.com
Lee Brown
Chief Financial Officer
Macon-Bibb County Transit Authority
Contact Information

Lee Brown
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Macon-Bibb County Transit Authority

lbrown@mta-mac.com
# Panel Members

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<tr>
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<td>Chief Financial Officer</td>
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