ATLANTA-REGION TRANSIT LINK AUTHORITY

REGIONAL TECHNOLOGY COMMITTEE

January 7, 2021

Regional Technology Committee Meeting
Thursday, January 7, 2021
Proposed Agenda

I. Call to Order – Andy Macke, Chair
II. Approval of the Meeting Minutes for November 5, 2020
III. Approval of the Agenda for January 7, 2021
IV. ATL RIDES Project Update – Daniel Walls
V. Transit Vehicle Electrification Primer – Daniel Walls & Jason Hanlin, CTE
VI. Adjourn

ATLANTA-REGION TRANSIT LINK AUTHORITY

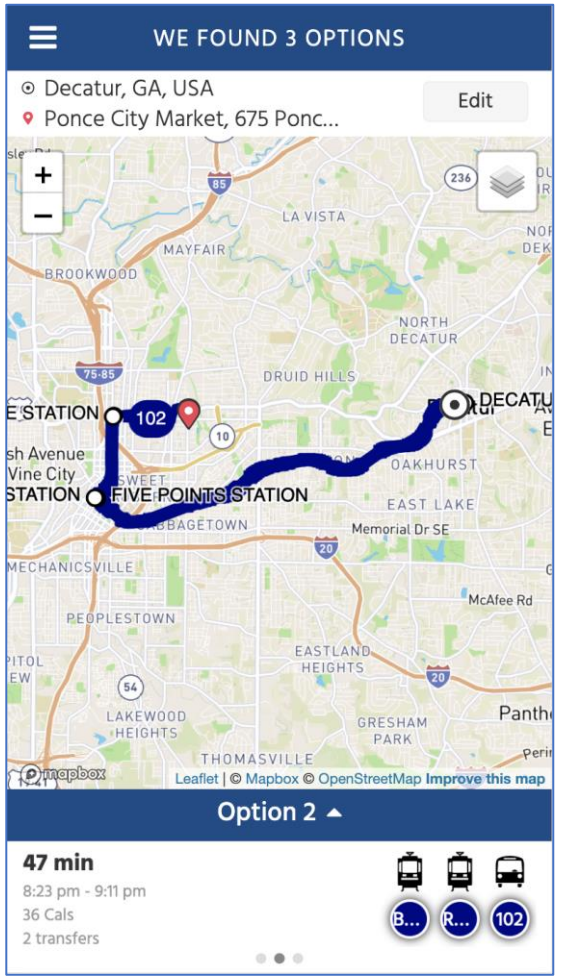
ATL RIDES PROJECT UPDATE

Daniel Walls – Transit Funding Administrator

January 7, 2021

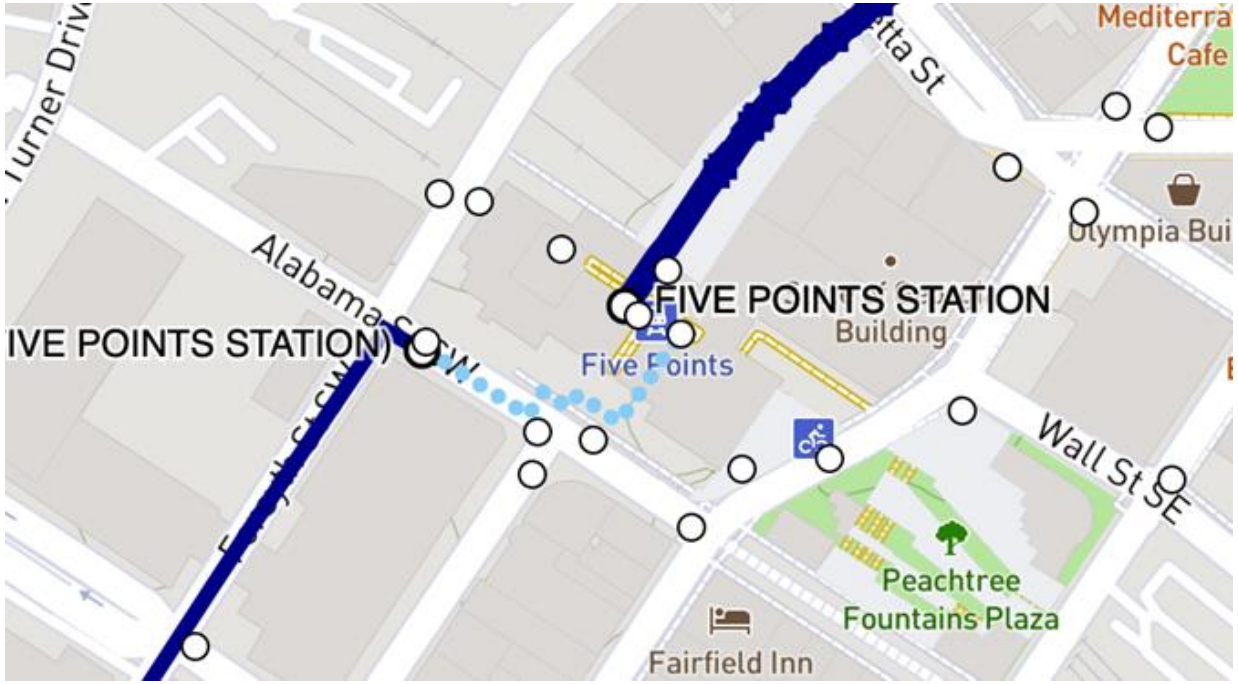
PROJECT UPDATE

- ►Data Management Plan submitted to FTA
- ►Initial ATL RIDES system
  - Route testing
  - Station connectivity
- ►Design and development phase underway
- ►Ongoing coordination and collaboration with FTA

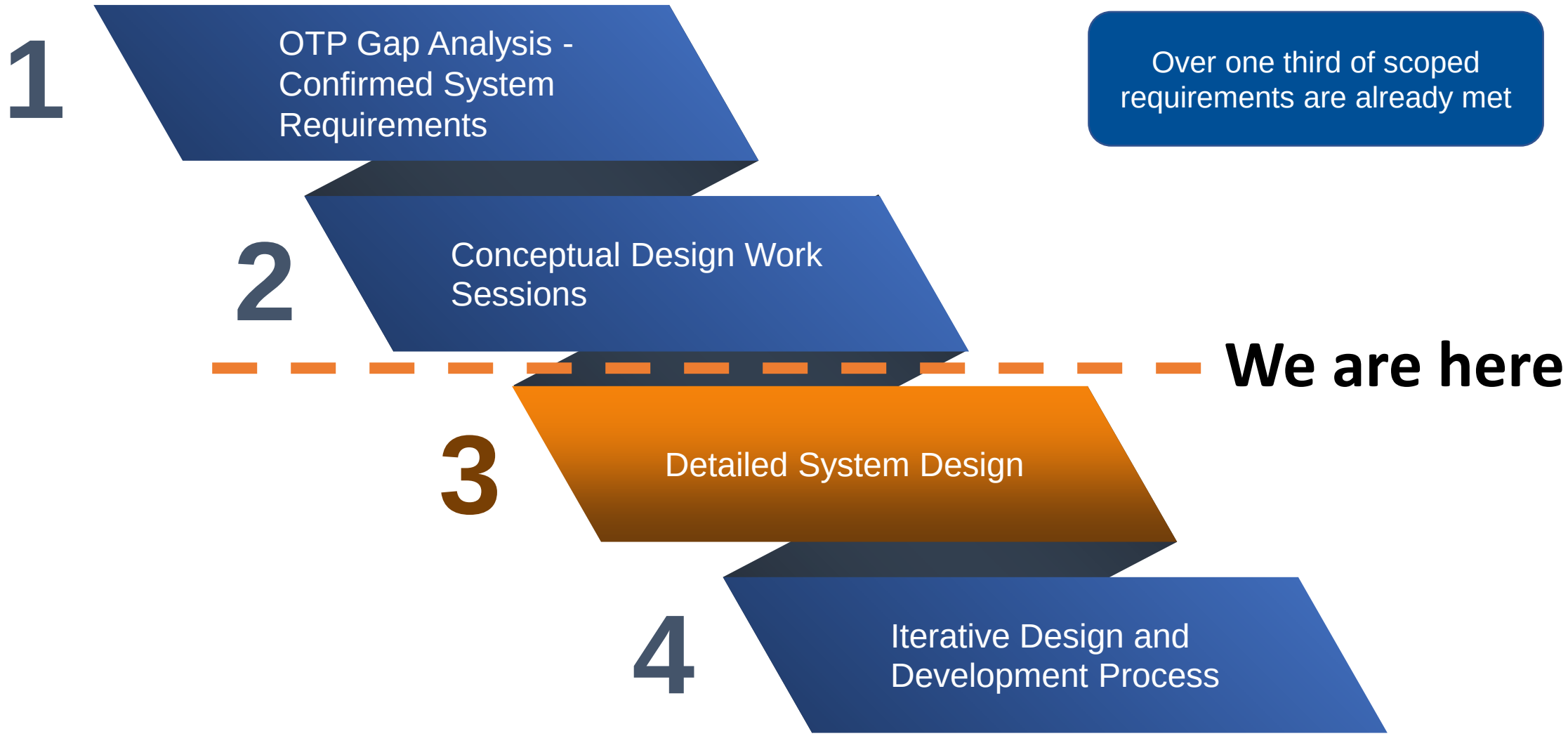


INITIAL ATL RIDES SYSTEM UPDATES

- ►Ongoing route testing
- ►Station connectivity updates:
  - Audited pedestrian network connectivity around stations (i.e. missing sidewalks, properly marked entrances, overcrossings)
  - Updated surrounding pedestrian network in Open Street Map (OSM)
- ►Potential for community support in updating OSM



DESIGN AND DEVELOPMENT



ONGOING AND NEXT STEPS

- Continued coordination with FTA
- Project team developing detailed system design
- Working Groups will be asked to provide feedback for:
  - User interface design mock-ups
  - System configuration for new features

Questions?

ATLANTA-REGION TRANSIT LINK AUTHORITY

Transit Vehicle Electrification Primer

Daniel Walls and Jason Hanlin (CTE)

January 7, 2021

ELECTRIFICATION – A REGIONAL OPPORTUNITY

- 2020 Annual Report and Audit analysis:
  - By 2030, 657 buses across the region will exceed their ULB
  - Conversion to battery electric buses (BEB) could save $197 million in lifecycle vehicle, fueling, and O&M costs
  - Potential emission reduction of 80-92%
  - Cleaner and more compact maintenance facilities
  - Better customer experience

- <u>Regional coordination will be key</u>
  - Investing in consistent and compatible infrastructure across operators will be critical to the region's future

Planning for an Electric Bus Fleet

Jason Hanlin
DIRECTOR OF TECHNOLOGY DEVELOPMENT
Center for Transportation & the Environment

January 7, 2021

Agenda

- About CTE
- FTA Low-No Program
- Technology Review
- Benefits and Considerations
- Planning and Executing a BEB Deployment
- Current Atlanta-region Projects

About CTE

WHO WE ARE

501(c)(3) nonprofit engineering and planning firm

OUR MISSION

Improve the health of our climate and communities by bringing people together to develop and commercialize clean, efficient, and sustainable transportation technologies

PORTFOLIO

$571 million

- *Research, demonstration, deployment*
- *90 Active Projects totaling over $316 million*

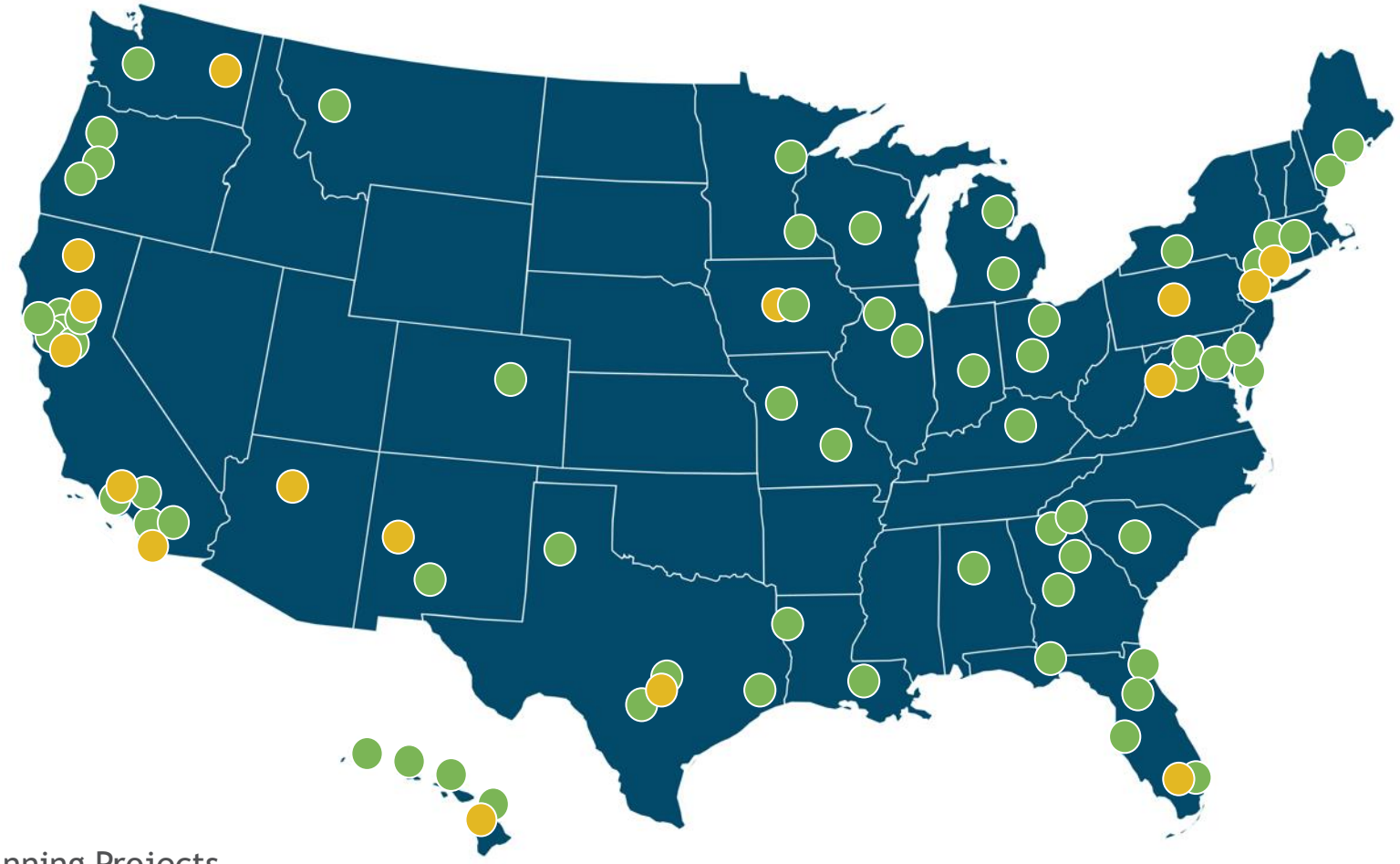
OUR FOCUS

Zero-Emission Transportation Technologies

NATIONAL PRESENCE

Atlanta, Berkeley, Los Angeles, St. Paul

CTE Zero Emission Bus Projects



ZEB Planning Projects

ZEB Deployment Projects

Our Four Service Areas

Prototype Development & Demonstration

We support technology providers through technology research, development, and demonstration.

Smart Deployment

We support early adopters by providing the best technical solutions for initial deployments.

Fleet Transition

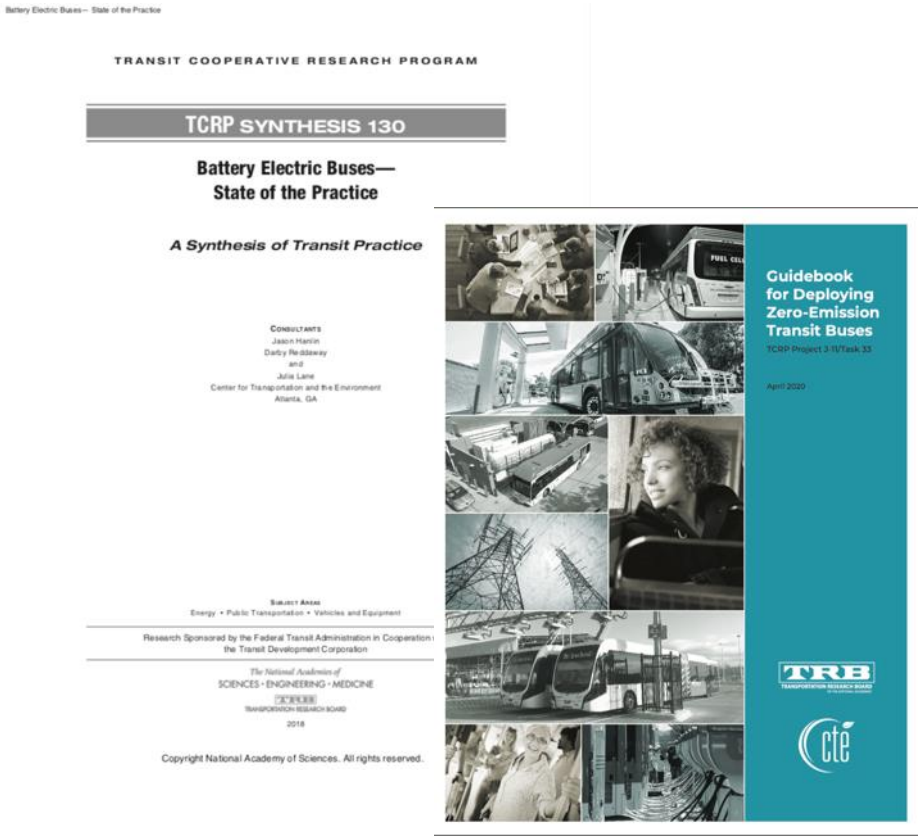
We help fleet operators implement strategic plans for full electrification.

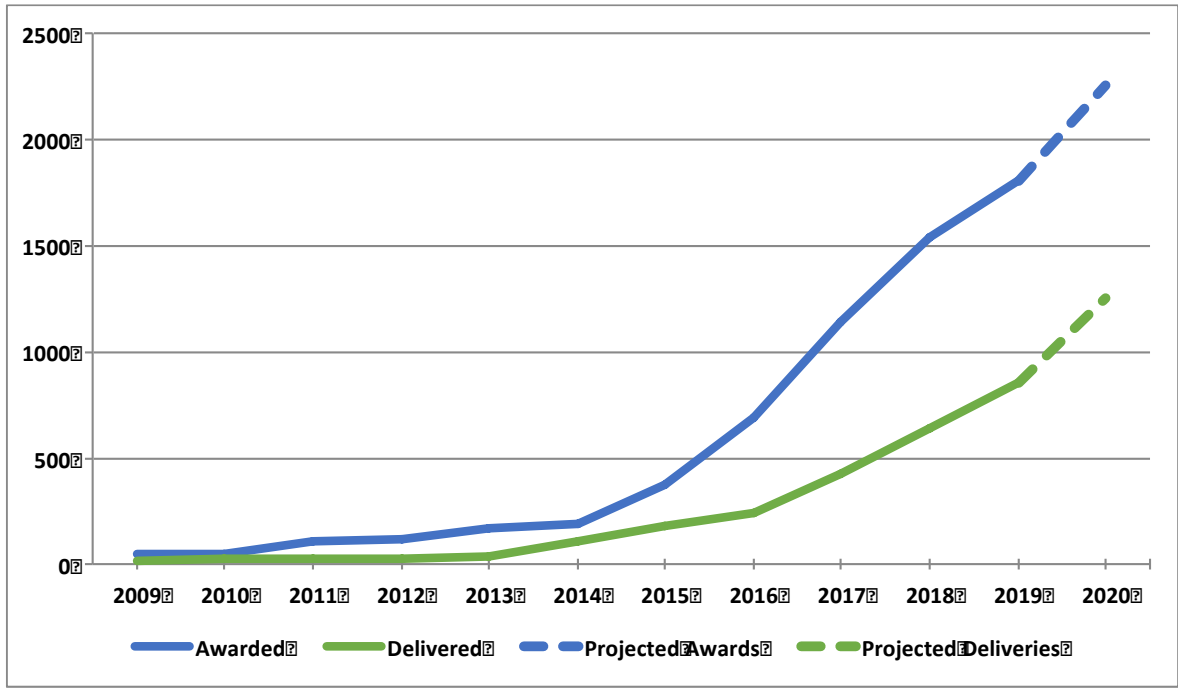
Education & Outreach

We help organizations of all shapes and sizes stay ahead of the technology curve.

BEB Industry Growth and Resources

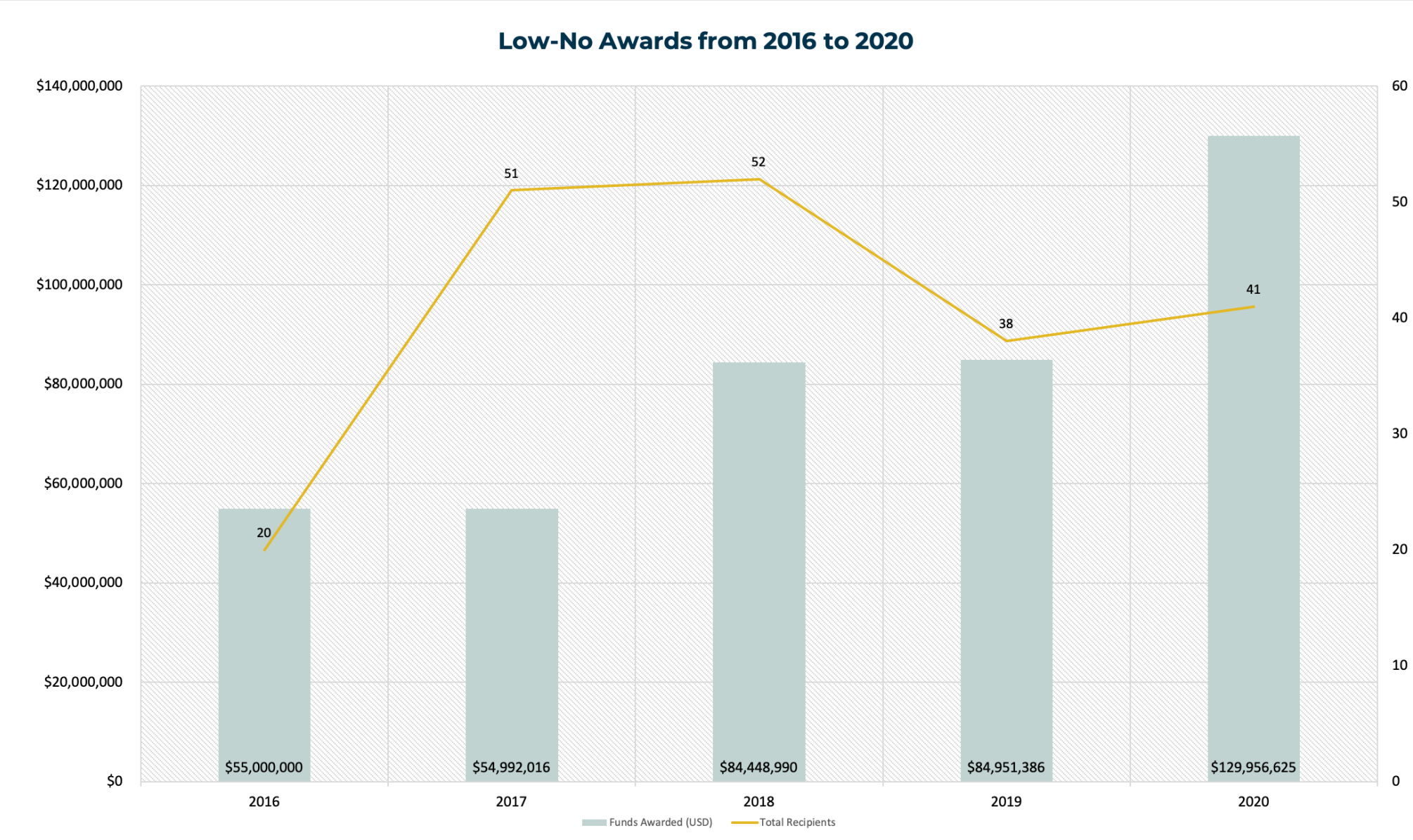
TCRP's **2018 Battery Electric Buses – State of the Practice synthesis** provides a snapshot of the current state of the BEB market and practices while the **2020 Guidebook for Deploying Zero Emission Transit Buses** provides a comprehensive guide for ZEB deployments





Source: Center for Transportation and the Environment

FTA's Low or No Emission Vehicle Program



$184M Appropriated for 2021 Low-No Program

BEB Industry Drivers

Drivers and Benefits

- ✓ Cleaner, quieter, simpler than conventionally fueled counterparts
- ✓ Zero tailpipe emissions
- ✓ Lower well-to-wheel emissions
- ✓ Lower energy and operating costs
- ✓ Significantly contributes to sustainability programs
- ✓ Increased product availability/options

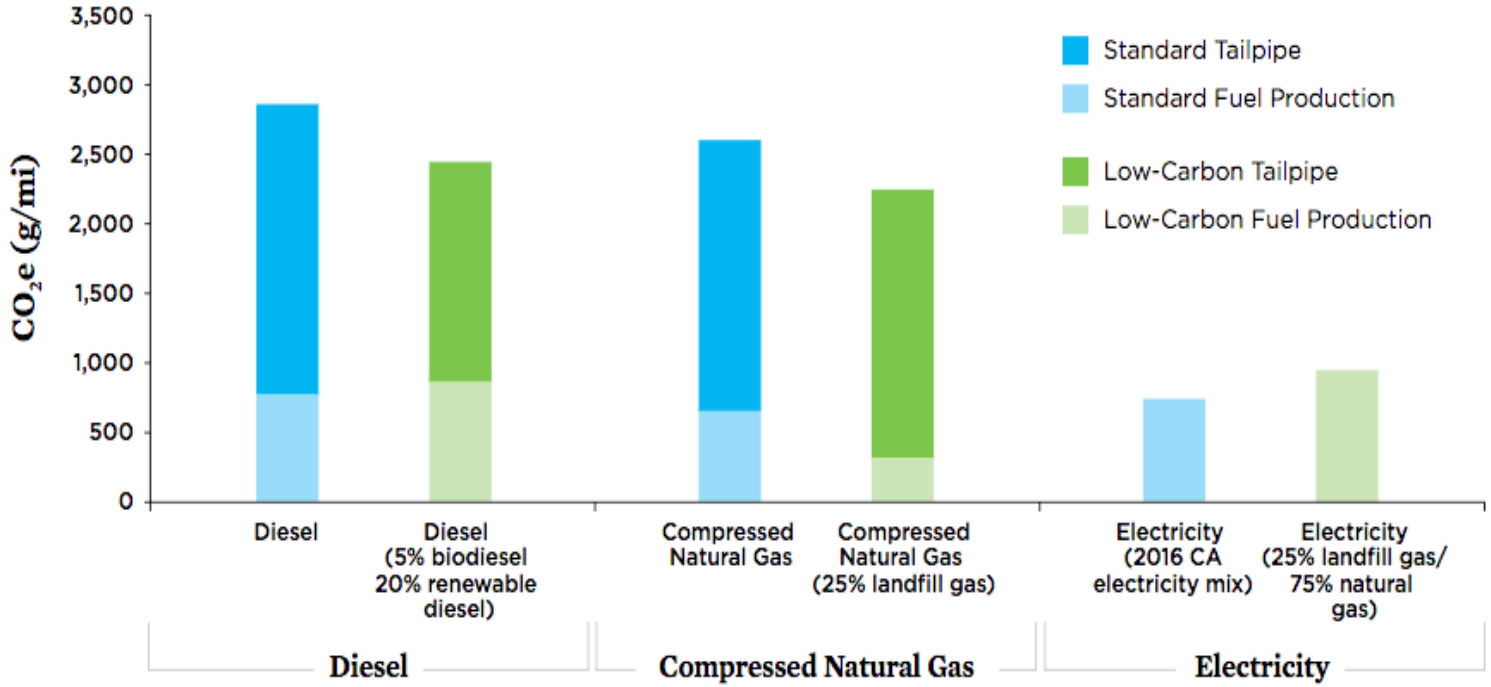
Challenges to Address

- ○ Range limitations
- ○ Required charging times
- ~~○ Complicated utility rate structures~~
- ○ Higher capital costs

Technical support and advanced tools need to be utilized for making objective BEB procurement and planning decisions specific to the individual needs of the transit agency. If done correctly, transit agencies can, and are, realizing the benefits of BEBs.

Environmental Benefits

- Life cycle **global warming emissions** almost 75% less than diesel and CNG buses
- Life cycle **particulate matter emissions** almost 20% less than diesel and CNG buses

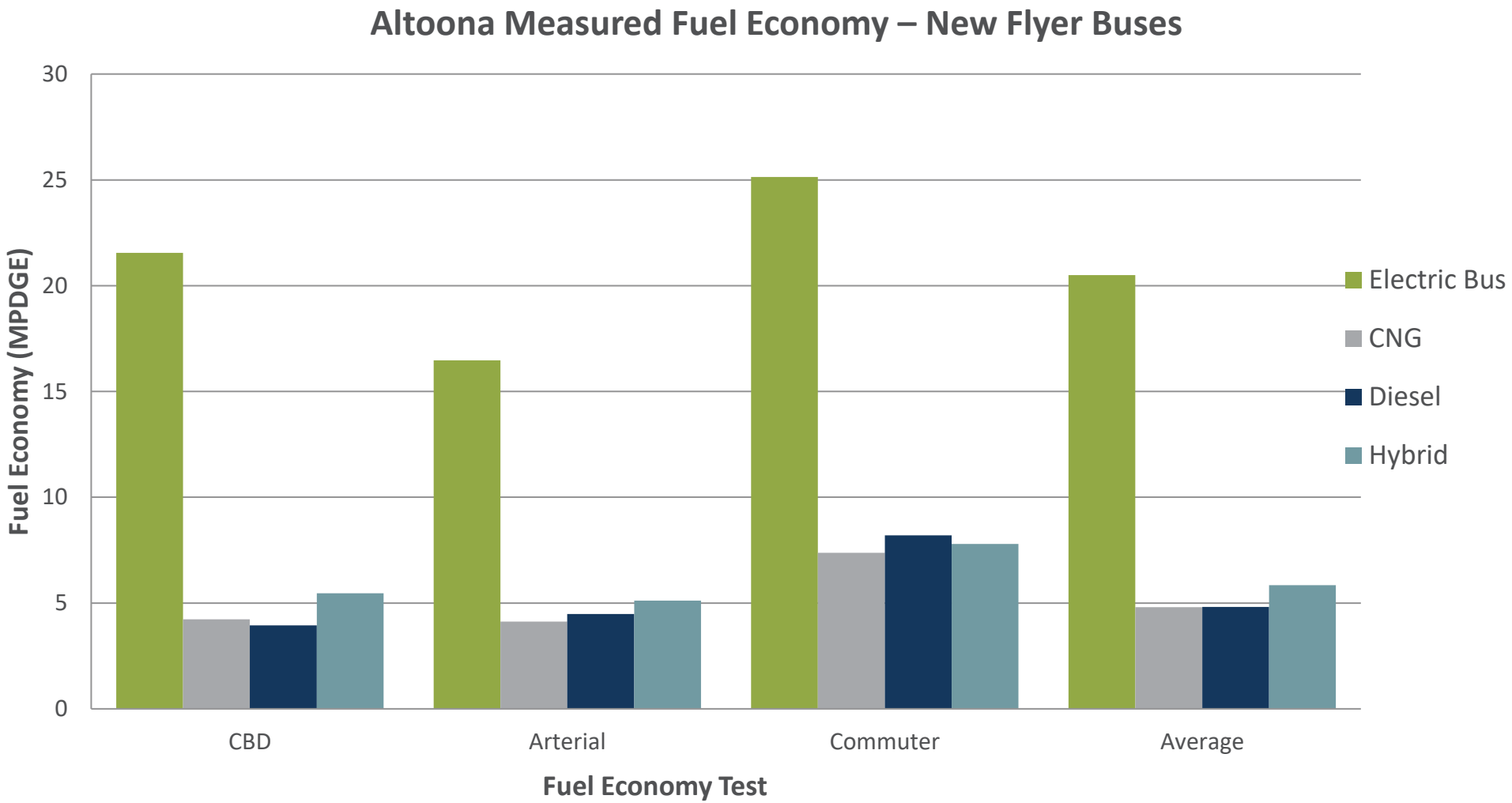


Global warming emissions from transit buses powered by low-carbon fuel blends are lower than those from vehicles powered by conventional fossil fuel–based diesel and natural gas.

Note: CO_2e stands for carbon dioxide equivalent.

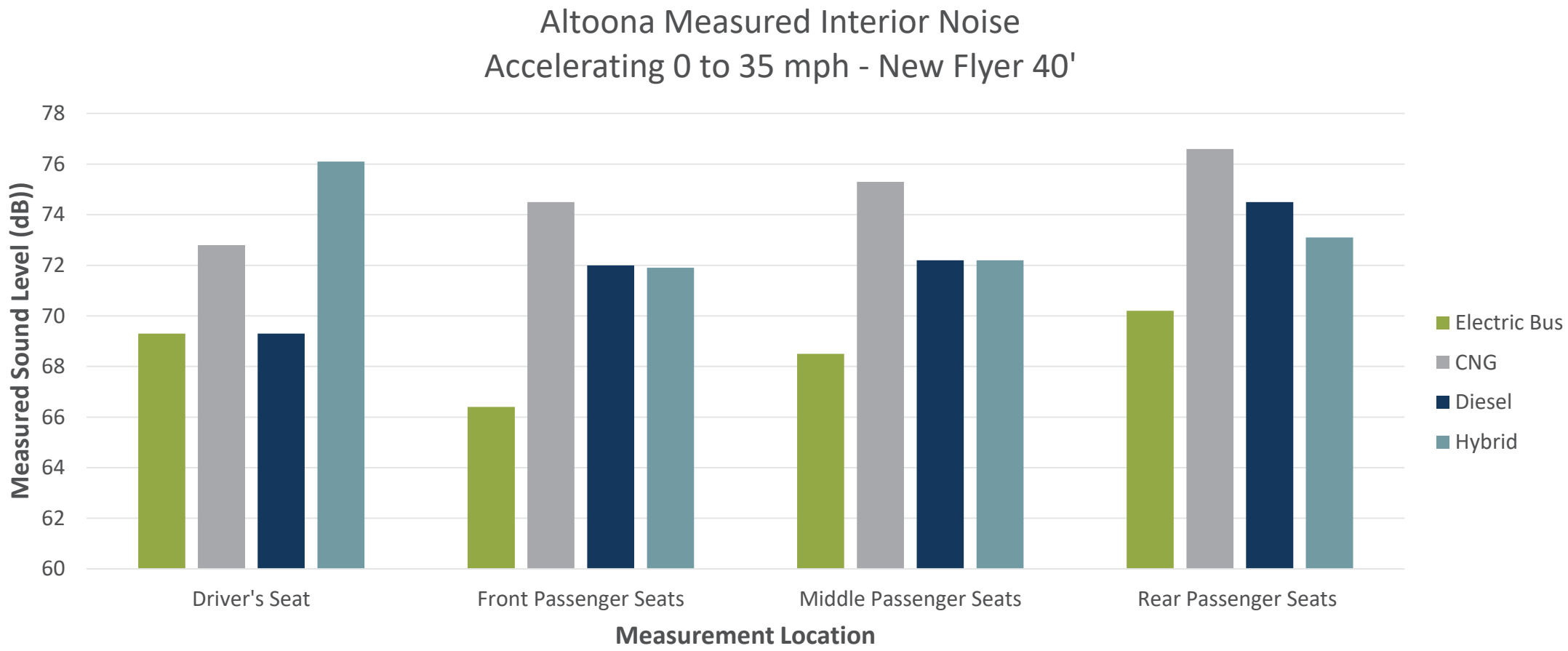
Source: Chandler, et al

Efficiency Benefits



Source: Center for Transportation and the Environment

Noise Benefits



Source: Center for Transportation and the Environment

Long-range Battery Electric Buses

Example Bus Specifications

- 150 - 650 kWh batteries
- Up to ≈150 mile range
- $750K - $1M

Example Charging Specifications

- 50 - 125 kW plug-in chargers
- Charge at the bus yard
- Overnight or mid-day charging

Fast-charge Battery Electric Buses

Example Bus Specifications

- 150 - 200 kWh batteries
- “Unlimited” range
- $750K - $1M

Example Charging Specifications

- 150 - 600 kW chargers
  - Overhead charging
  - Inductive charging
- Charging for 5 - 10 min per hour

Plug-in Charging

Equipment

- Lower power
  - Currently limited to ≈120 kW
- 1 dispenser per vehicle
  - Might be multiple dispensers per charger
- Chargers next to bus or remote dispensers

Planning considerations

- Siting - space constraints
- Power upgrades

Overhead Charging

Equipment

- 1 charger for multiple buses
- Pantograph – moving parts on the bus
- Inverted pantograph – moving parts on the charger

Planning considerations

- Siting
  - Land rights, clearances
  - Electrical infrastructure
- Maintenance
- Redundancy
- Scheduling

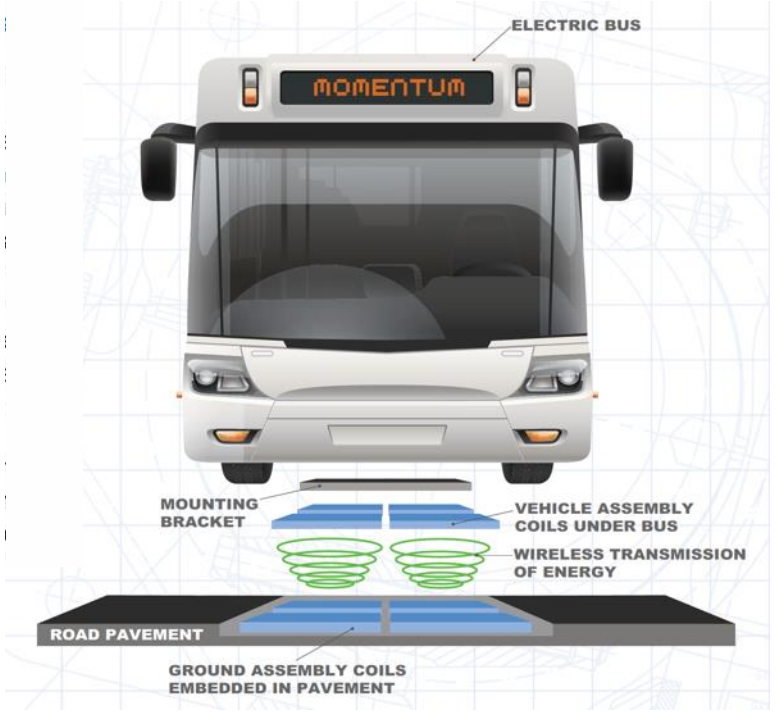
Wireless Charging

Equipment

- Higher power (up to 250 kW)
- 1 charger for multiple buses
- No moving parts

Planning considerations

- Siting
  - Land rights
  - Electrical infrastructure
- Poor alignment reduces efficiency
- Redundancy
- Scheduling



Source: CARTA

Executing a BEB deployment

- Develop team and secure funding
- Conduct detailed planning efforts
  - Vehicle energy modeling
  - Realistic charge modeling (especially for on route charging)
- Specification development
- Procurement
- Vehicle and charging equipment build
- Acceptance and validation
- Revenue service deployment
- Data collection and performance measurement

Georgia's Zero Emission Bus Projects

UNIVERSITY OF GEORGIA

Xpress

marta

Hartsfield-Jackson Atlanta International Airport®

MTA Macon-Bibb County Transit Authority We Keep Macon Moving!

CAT CHATHAM AREA TRANSIT

*

** Both UGA and CAT received GO Transit Bond Funds for the purchase of their fleets*

UNIVERSITY OF GEORGIA

- 20 Proterra Catalyst E2 buses (440 kWh) – Delivered 2020
- Additional 13 BEBs currently being procured
- 10 Depot chargers @125kW
- Partnership with GA Power
- Real world data for students
- Eliminate 2,500,000 gal diesel over 12-year lifespan

Georgia Power

cte

- Future Deployment of Battery Electric Coaches
- Issued RFI in 2018 - Van Hool, MCI, BYD
- Performed route analysis and energy assessment
- Awaiting maturity of electric coach market

MCI D45 CRTe LE passed Altoona testing Dec 2020 – report released
http://apps.altoonabustest.psu.edu/buses/522

marta®

- 6 New Flyer Excelsior CHARGE buses
- Depot & On-route charging
- High Visibility Routes
- Anticipated Service Date of Q4 2021
- Fleet eliminates ~900 tons of GHG/year
  (equiv to taking ~195 passenger vehicles off the road)

cte

Thank you!

Jason Hanlin
jason@cte.tv
404-808-6489

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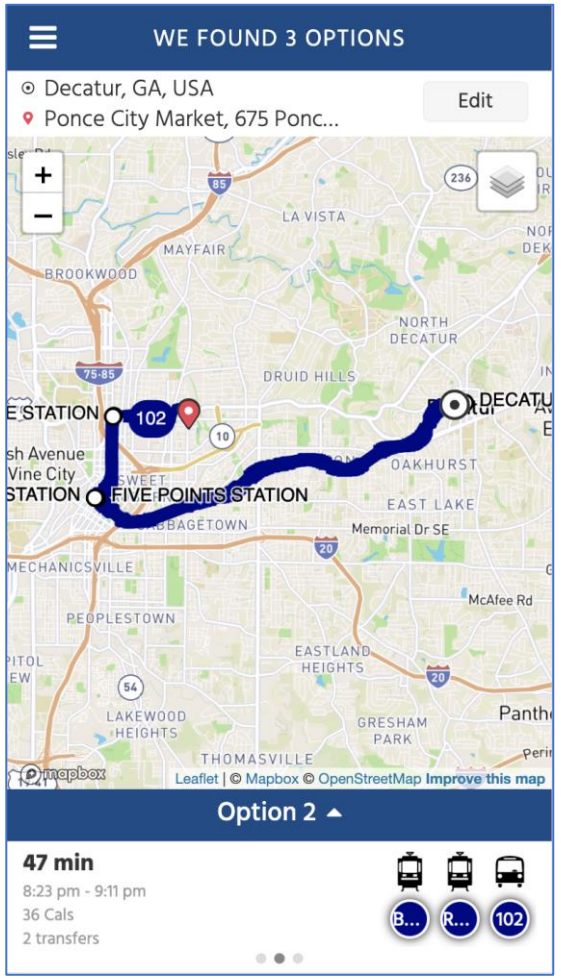

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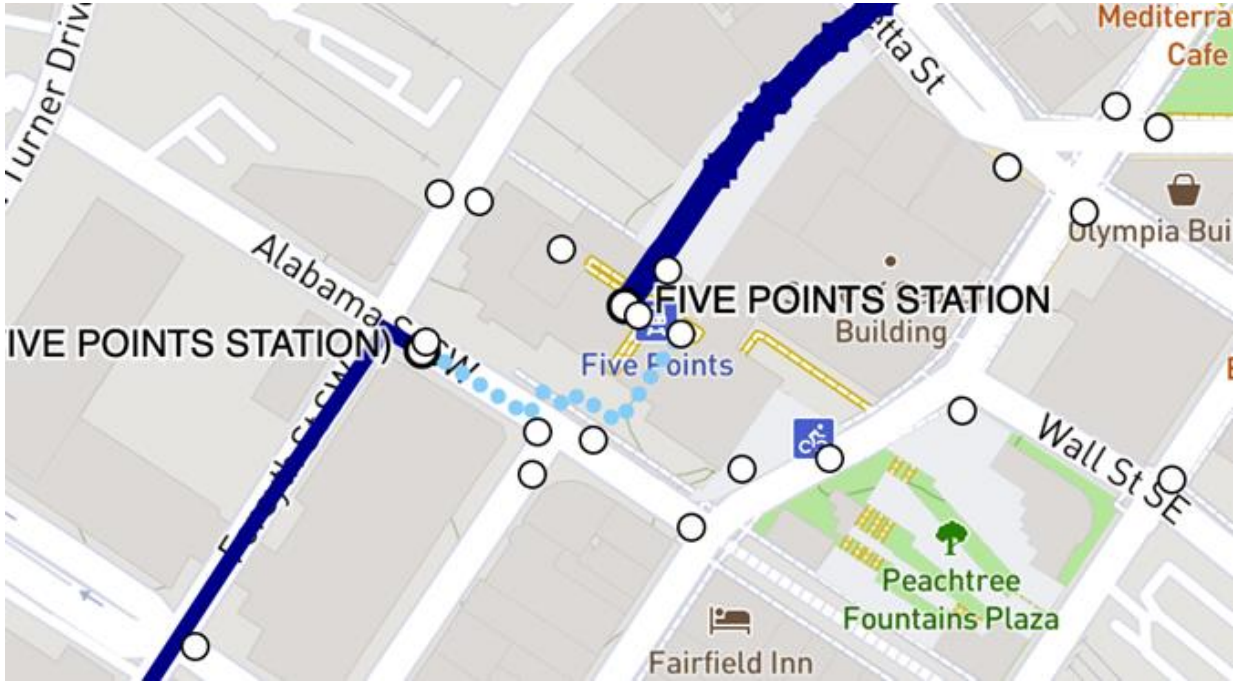

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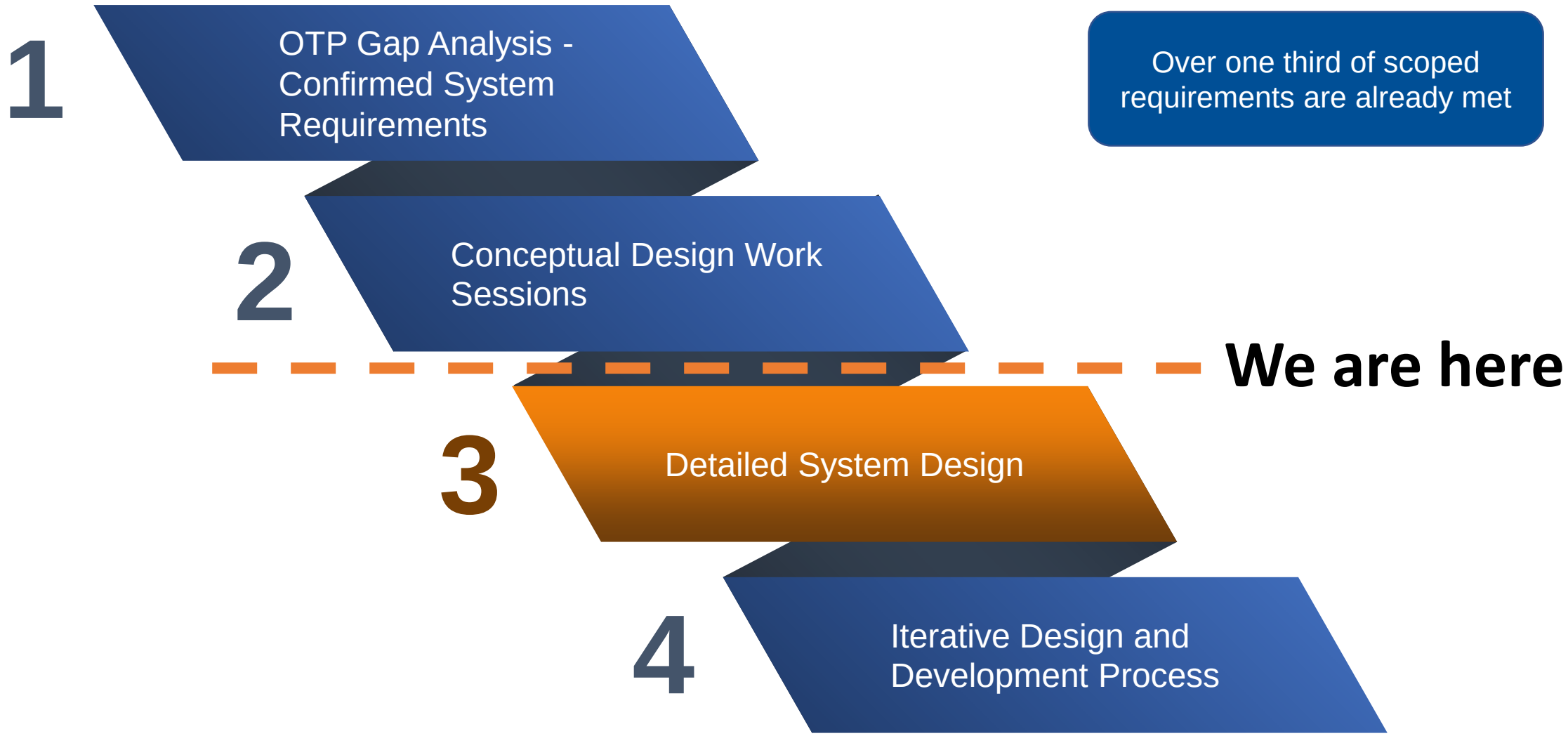

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