CENTER FOR TRANSPORTATION AND THE ENVIRONMENT

2025 PROJECT PORTFOLIO













About CTE

The Center for Transportation and the Environment works to improve the health of our climate and communities by bringing people together to develop and commercialize clean, efficient, and sustainable transportation technologies. CTE collaborates with federal, state, and local governments, fleets, and vehicle technology manufacturers to complete our mission.

Active & Pending Projects

This document compiles CTE's active projects as of Q2 2025. These are organized by CTE's core program areas: Technology Development; Smart Deployment; Transition Planning; and Education & Outreach. The Pending Projects section lists projects that CTE has been awarded, but that are still pending initiation or were still pending initiation at the beginning of Q3 2025.

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King County Phase 3 Transit System Electrification Planning

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WideSense BEB Energy Use Prediction Proof of Concept

Technology Development

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Learn About CTE's Approach to Technology Development

CTE has helped hundreds of US companies move cutting-edge technologies into the global marketplace. We assemble and manage research and demonstration projects to showcase breakthrough zero-emission technologies and the companies developing them.

Fuel Cell Hybrid Electric Delivery Van Deployment



Overview

Client: California Air Resources Board

Project Duration: Feb. 2016 – Feb. 2025

Value

Project Value: $9,491,238

CTE Project Value: $4,302,896

Project Managers

Steve Clermont, *Managing Director of Planning & Deployment* (SPM)

Project Staff

Maddie Henderson, *Engineering Consultant*

Project Description

The Center for Transportation and the Environment (CTE) partnered with the University of Texas – Center for Electromechanics (UT-CEM), Unique Electric Solutions (UES), Accelera by Cummins, and the United Parcel Service (UPS) to develop, validate, and deploy fuel cell hybrid electric walk-in delivery vans. The fuel cell hybrid delivery vehicle design is able to achieve extended range through an optimum combination of fuel cell and battery power along with hydrogen energy storage. By implementing a state-of-the-art, high-power capacity battery module, the team designed a vehicle that primarily uses hydrogen as energy storage while the fuel cell and battery pack are optimized to deliver the vehicle's power needs.

During the first phase of the project, the team converted a diesel-powered walk- in van provided by UPS to electric drive with a fuel cell range extender. UT-CEM integrated an Accelera fuel cell, power electronics, hydrogen storage system, and controls into the base electric vehicle. The fuel cell hybrid van design was based on specifications for the UES existing battery-electric walk-in van. The finished demonstration vehicle was shipped to UPS in California for real-world demonstration and validation for approximately one year.

In the second phase, the team deployed an additional 15 vehicles. UPS operated the additional vehicles at UPS distribution centers throughout the state of California. This demonstration plan maximized access to the state's extensive network of high-capacity and high-throughput fueling stations, minimized potential risk to delivery operations, and enabled evaluation of the vehicles in a variety of duty cycles.

- 15 hydrogen fuel cell delivery vans deployed in California
- Zero-emission range exceeding 125 miles
- Awarded DOE's 2023 Hydrogen Program Systems Development & Integration Award

TVIDC Battery State of Health and Best Practices



Overview

Client: Federal Transit Administration

Project Duration: Jul. 2024 – Dec. 2025

Value

Project Value: $260,101

CTE Project Value: $260,101

Project Managers

Erik Bigelow, *Managing Director of Engineering Services* (SPM)

Robert Kasse, *Engineering Services Manager* (PM)

Project Staff

William Chabot, *Engineering Consultant*

Oliver Parker, *Engineering Associate*

Project Description

The Federal Transit Administration (FTA) selected CTE as one of two national nonprofits to manage its Transit Vehicle Innovation Deployment Centers (TVIDC) program. FTA created the program to support multiple transit bus research and innovation objectives, including assessing industry research, testing, and data collection needs to accelerate zero-emission bus (ZEB) adoption. The following project is one of four projects awarded to CTE under the TVIDC program.

The lithium-ion battery pack is the single most expensive component of an advanced technology bus, thus extending the life and reducing the rate of capacity fade is critical to reducing the overall cost of ownership, especially if a mid-life battery replacement can be avoided. Understanding which factors contribute most to battery degradation is crucial for determining optimal operational, charging, maintenance, and storage strategies throughout the life of the bus. As transit buses operate with a fundamentally different duty cycle than other vehicle types, only limited information can be transferred from learnings in other industries. Additionally, there is currently no simple, practical method for fleet operators to independently track the state of health (SOH) of their battery packs. CTE will leverage its existing network of relationships with transit agencies and bus original equipment manufacturers (OEMs) to create an expansive, query-able database of advanced technology bus SOH data – calculated using data available to agencies – including SOH over time; bus, battery, and charging specifications and history; average state of charge (SOC) and time spent at high/low SOC; and other relevant variables. CTE will curate a database that is composed of data from agencies operating advanced technology buses from different OEMs, in varied environments, and under varying duty cycles and charging schemes to ensure a robust cross-section of the industry is represented in the data used for this analysis. CTE will use the outputs of this analysis to generate recommended best practices for optimally operating, charging, maintaining, and storing advanced technology buses to maximize the life of the battery packs.

> **"By developing robust battery monitoring methodologies and best practices, we empower transit agencies to optimize maintenance strategies and improve vehicle uptime."**
>
> ***Dan Raudebaugh, CTE Executive Director***

TVIDC Fuel Cell Dominant Bus Proof of Concept

Overview

Client: Federal Transit Administration

Project Duration: Jul. 2024 – Mar. 2026

Value

Project Value: $2,620,193

CTE Project Value: $620,193

Project Managers

Erik Bigelow, *Managing Director of Engineering Services* (SPM)

Rebecka Moreno, *Lead Engineering Associate* (PM)



Project Description

The Federal Transit Administration (FTA) selected CTE as one of two national nonprofits to manage its Transit Vehicle Innovation Deployment Centers (TVIDC) program. FTA created the program to support multiple transit bus research and innovation objectives, including assessing industry research, testing, and data collection needs to accelerate zero-emission bus (ZEB) adoption. The following project is one of four projects awarded to CTE under the TVIDC program.

Current fuel cell systems are a constant power source and battery dominant, which means they require relatively large, heavy, and expensive batteries to cover the variations in power and energy demand. A load-following fuel cell dominant propulsion system eliminates the need for traditional lithium-ion battery packs (utilizing ultracapacitors instead) and the DC-DC converter, and results in increased power density. Removing the battery packs is projected to reduce the propulsion system weight and volume by 50% or more relative to batteries or state-of-the-art fuel cell systems, resulting in efficiency improvements with minimal extra costs. It will increase the durability of heavy-duty transit and coach bus fuel cell engines to 30,000 hours, equivalent to the present longevity of diesel heavy-duty bus engines. By eliminating expensive components and extending longevity, these technology advancements will reduce the manufactured cost of the fuel cell systems by up to 45% and the total cost of bus ownership (TCO) by up to 20%. Reducing bus TCO and bringing zero-emission (ZE) performance and longevity closer to incumbent diesel technology will accelerate ZE adoption throughout transit and other heavy-duty industries. To date, Nimbus Power Systems has developed and tested the cell to be used in this Federal Transit Administration (FTA) program. The founders have spent over 50 years continually improving automotive Proton Exchange Membrane fuel cells for heavy-duty applications, which positions them to develop a more durable, powerful, and cost-effective fuel cell for heavy-duty bus applications. The founders and leadership group were responsible for the UTC fuel cell engines that have been operating in AC Transit service since 2010 and they continue to build upon the system's success. A concept fuel cell system architecture, including energy storage and key component selection, has been completed. Under the Transit Vehicle Innovation Deployment Centers program, Nimbus, with the help of the Center for Transportation and the Environment (CTE), will be able to proceed to the next step of building the full-size fuel cell system breadboard. This FTA project will support the integration and bench testing of the first true fuel cell dominant propulsion system and fuel cell, patented by Nimbus Power Systems. This project would support future fleet demonstration programs and sales into the 40-foot transit bus and 45-foot coach bus applications. This technology advancement is a first-of-a-kind, zero-emission, heavy-duty transit bus fuel cell dominant power system that will become a premier offering in the rapidly expanding market for diesel engine replacement.

As of August 2025, Nimbus has developed detailed design specifications, completed the final design of the system, and specified the component specifications. Nimbus is in the process of building and procuring the fuel cell system components, building the fuel cell system, and validating the system. CTE is also beginning the market survey component of the program.

- Eliminating costly batteries and converters reduces manufacturing costs by up to **45%**.
- **A 20%+ boost** in system efficiency reduces operating costs.
- **30,000+ hours** of service life ensures reliability on par with diesel engines.

TVIDC Transit Bus Data Validation and Standardization



Overview

Client: Federal Transit Administration

Project Duration: Sep. 2024 – Dec. 2026

Value

Project Value: $773,328

CTE Project Value: $673,328

Project Managers

Erik Bigelow, *Managing Director of Engineering Services* (SPM)

Carson Downs, *Strategic Software Developer* (PM)

Project Staff

Will Chabot, *Engineering Consultant*

Andersson Niepoky, *Associate*

Project Description

The Federal Transit Administration (FTA) selected CTE as one of two national nonprofits to manage its Transit Vehicle Innovation Deployment Centers (TVIDC) program. FTA created the program to support multiple transit bus research and innovation objectives, including assessing industry research, testing, and data collection needs to accelerate zero-emission bus (ZEB) adoption. The following project is one of four projects awarded to CTE under the TVIDC program.

Transit agencies face growing challenges in accessing and integrating operational data from a diverse range of telematics and charging platforms. This project will address those challenges by creating standardized reference connections to key data sources, enabling consistent, reliable data integration to support informed decision-making across operations, maintenance, and procurement.

This project begins by defining data sources and requirements through consultations with at least five transit agencies and major telematics providers. These engagements will identify critical data needs and prioritize the most valuable data connections based on their impact on operational efficiency and fleet transition planning. Building on this foundation, the team will catalog available data signals, mapping specific metrics such as state of charge, energy use, and efficiency to their sources, and analyze frequencies to develop a minimum viable data model.

Next, the project will design and build test integrations with the help of ZeroMission, developing automated tools to fetch and process data from provider application programming interfaces. The final technical task includes detailed reporting on data availability, integration challenges, and future storage needs, offering insights that can inform broader industry data standards.

By the end of this project, CTE will produce a Data Trust Scorecard which grades each provider on field completeness, definition clarity, timestamp accuracy, data retention, and other key metrics. Transit agencies could then use this scorecard in their negotiations with telematics providers to set expectations for their needs prior to procurement. CTE will also produce a Minimum Viable Telemetry Package, which will be a subset of the data model consisting of high-value signals. Telematics providers would then supply a sample file that must validate against this package. Lastly, CTE will develop OpenAPI documentation using API's publicly available resources in order to allow data consumers to easily automate and create their own connectors for their data.

Throughout the effort, dedicated project management will ensure timely delivery, partner engagement, and wide sharing of tools and findings.

As of October 2025, CTE has consulted with transit agencies, established contact with telematics agencies and third-party data providers, and developed a memo summarizing the results of these discussions. CTE has also engaged with ZeroMission, tasking them with multiple project deliverables. CTE is now working on the integrating various APIs.

> **"By improving data integration, we're not only helping agencies better manage their bus fleets, we're also setting the stage for the next wave of innovation in advanced vehicle technologies."**
>
> ***Dan Raudebaugh, CTE Executive Director***

TVIDC Transit Bus Life Cycle Maintenance Costs Assessment



Overview

Client: Federal Transit Administration

Project Duration: Aug. 2024 – Nov. 2025

Value

Project Value: $433,711

CTE Project Value: $403,711

Project Managers

Erik Bigelow, *Managing Director of Engineering Services* (SPM)

Chase Stell, *Managing Consultant* (PM)

Project Staff

Carson Downs, *Strategic Software Developer*

Oliver Parker, *Engineering Associate*

Project Description

The Federal Transit Administration (FTA) selected CTE as one of two national nonprofits to manage its Transit Vehicle Innovation Deployment Centers (TVIDC) program. FTA created the program to support multiple transit bus research and innovation objectives, including assessing industry research, testing, and data collection needs to accelerate zero-emission bus (ZEB) adoption. The following project is one of four projects awarded to CTE under the TVIDC program.

Transit agencies across the U.S. are investigating a transition to zero-emission buses (ZEBs). Transit agencies must understand the cost differences between ZEB and incumbent technologies to make purchase decisions and budget for future ZEB operations. Specific maintenance cost data for all bus technologies are difficult to obtain because agencies don't analyze their cost data in detail and do not make these data available to the industry.

This project will collect detailed maintenance data sets (through 2024) from U.S. transit agencies to update the average maintenance costs for diesel, hybrid, compressed natural gas, battery electric bus, and fuel cell electric bus technologies. Data will be analyzed by vehicle system for comparisons on a system and sub-system level. Allowing for a better understanding of what systems drive the maintenance costs for each technology, aiding agencies in planning for future expenses during transition. The output will be a comparison tool used by the industry to help plan the transition to ZEBs. Each participating agency will be provided with its own analysis results, which will be combined with all agencies in an anonymized data set for the publicly available tool. Some graphs included in this tool will be costs per mile across categories such as engine, energy storage system, exhaust, cooling, air intake, etc. The tool will also provide insight into the share of planned versus unplanned maintenance costs per mile, as well as the changes in the shares of these costs as buses age.

CTE has collected data from participating agencies and is currently performing data analysis. CTE has created a draft of the comparison tool, and the draft is currently in internal review. CTE is also beginning to create agency-specific reports with findings from the analysis.

Maintenance costs vary widely. Standardized data helps agencies compare real-world expenses.

No centralized benchmarking. This tool provides an industry-wide cost comparison for better planning.

Agencies need data-driven investment strategies. Understanding lifecycle costs ensures smooth fleet transitions.

WideSense Small Business Innovation Research Key Performance Indicators Analysis

Overview

Client: WideSense

Project Duration: Feb. 2024 – Mar. 2025

Value

Project Value: $999,339

CTE Project Value: $120,000

Project Managers

Erik Bigelow, *Managing Director of Engineering Services* (SPM)

Robert Kasse, *Engineering Services Manager* (PM)

Project Staff

Anna Staddon, *Managing Consultant*

Christine Ohenzuwa, *Lead Engineering Associate*

Project Description

The Center for Transportation and the Environment (CTE) served as a third-party evaluator to determine the effectiveness of the WideSense product in improving the efficiency of battery electric transit bus operations. CTE worked with WideSense to conduct key performance indicator performance monitoring for a transit agency both before and after implementation of the WideSense software platform in support of Widesense's 2022 National Science Foundation Small Business Innovation Research Phase II program to measure the effect of WideSense implementation on zero-emission transit operations.

Smart Deployment: Battery Electric

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Alexandria Transit Company Low-No 2023 Battery Electric Bus Deployment

Overview

Client: Alexandria Transit Company

Project Duration: Jul. 2024 – Dec. 2028

Value

Project Value: $23,984,700

CTE Project Value: $150,000

Project Managers

Kylie McCord, *Director of Planning & Deployment* (SPM)

Thomas Duke, *Managing Consultant* (PM)

Project Staff

Maddie Henderson, *Engineering Consultant*

Project Description

The Center for Transportation and the Environment (CTE) is supporting Alexandria Transit Company (DASH) in the expansion of its battery electric bus (BEB) fleet and associated facilities. This effort is funded through the Federal Transit Administration's 2023 Low or No Emissions Vehicle Program (Low-No) and aligns with DASH's broader policy goal of converting the entire fixed-route bus fleet to 100% zero-emission technology by 2037, with all new bus purchases required to be zero-emission starting in 2027.

As of Q2 2025, DASH has 14 BEBs in operation, comprised of 40' and 60' New Flyers and 40' Proterra/Phoenix BEBs. ABB and Rhombus depot chargers support the current BEB fleet, with plans to implement on-route charging in the future. DASH is working on a facilities expansion to increase bus storage and expand charging infrastructure.

To support this transition, CTE is providing DASH with technical advisory services focused on optimizing their energy use, charging strategies, and infrastructure planning for a future 100% BEB fleet.

More specifically, CTE is conducting charge and rate modeling to evaluate energy needs and charging operations at DASH's bus depot, as well as to determine which routes are feasible for depot-only charging. For bus routes that are not feasible, CTE is evaluating the role of an on-route Opportunity Charger to extend range and reduce the need for additional fleet expansion.

CTE is also supporting DASH in the review and development of bus and charger specifications by providing a thorough infrastructure analysis. This analysis includes assessing depot charging capacity under current and future configurations to estimate how many BEBs can be reliably supported by the current infrastructure. The results of this work will inform long-term fleet planning, guide infrastructure investments, and provide DASH with a plan for achieving its 2037 zero-emission goals.

Anaheim Transportation Network Low-No 2023 Battery Electric Bus Deployment

Overview

Client: Anaheim Transportation Network

Project Duration: Nov. 2024 – Apr. 2026

Value

Project Value: $12,557,500

CTE Project Value: $247,000

Project Managers

Niki Rinaldi El-Abd, *Senior Managing Consultant* (SPM)

Anna Staddon, *Managing Consultant* (PM)

Project Staff

Chloe Frank, *Associate*

Project Description

The Center for Transportation and the Environment (CTE) is supporting the Anaheim Transportation Network (ATN) in procuring 40’ and 60’ battery electric buses funded by its 2023 Low or No Emission grant.

CTE has helped ATN understand its options for purchasing off of available state contracts and which buses best suit its needs. CTE has also provided an overview of available contracts and has supported ATN in issuing a request for information (RFI) to prospective bus original equipment manufacturers (OEMs). ATN, with assistance from CTE, reviewed the bus procurement documents for the selected bus OEM and state contract. CTE conducted a technical review of ATN’s specifications for potential risks based on CTE’s experience with zero-emission buses.

CTE will support ATN in negotiating options and contract execution. CTE will participate in pre-production discussions with the selected bus OEM to confirm the design and review quality control, quality assurance, and production procedures that will be in place for this order. Once the buses enter the production line, ATN and CTE will meet with the bus OEM regularly during the bus build to track progress through the end of the project. CTE will provide continuous guidance and oversight to ATN on bus procurement, design, and manufacturing.

Atlanta-Region Transit Link Authority (ATL) Low-No 2021 Battery Electric Bus Deployment



Overview

Client: The Atlanta-Region Transit Link Authority

Project Duration: Jul. 2022 – May 2026

Value

Project Value: $8,264,915

CTE Project Value: $639,208

Project Managers

Todd Walton, *Senior Engineering Consultant* (SPM)

Cynthia Gibson, *Lead Managing Consultant* (PM)

Project Staff

Jackson Danis, *Engineering Consultant*

Ethan McNally, *Engineering Associate*

Project Description

The Center for Transportation and the Environment (CTE) is partnering with the Atlanta-Region Transit Link Authority (ATL), Atkins, Motor Coach Industries (MCI), and Heliox on a battery electric bus (BEB) deployment project supported by a $5.47M grant from the 2021 Federal Transit Administration's Low or No Emission Vehicle Program (Low-No). CTE worked with ATL to deploy 10 MCI battery electric coach buses and 10 Heliox 150 kW chargers to serve its Xpress commuter bus system in the Atlanta metro area. This project is also supported by a make-ready grant from Georgia Power, which will install the required electrical infrastructure to support the 10 vehicles and enable future expansion for up to 20 vehicles in a later phase.

The two parties began working together in 2018 when CTE completed a needs assessment to determine the vehicle performance, energy, and charging requirements for a fleet of up to 20 electric coaches based at ATL's South Ops facility. CTE also researched and compiled information on vehicles and chargers available at the time that would meet ATL's requirements and worked with Atkins to develop preliminary conceptual infrastructure layouts that serve ATL's needs and allow for future expansion.

CTE provided route, charge, and rate modeling to determine performance, energy, and charging requirements. CTE assisted ATL with the final bus and charger specifications. CTE managed communication and scheduling oversight for the construction phase that kicked off in January 2023. Since January 2023, CTE provided project management support during the construction phase, which concluded in May 2024. Bus delivery began in December 2023. Currently, there have been six BEBs delivered. CTE's next step is to schedule on-site validation testing to analyze the performance of the bus and update route models and operating and charging recommendations, if necessary. Performance validation reports are set to start later in 2025.

Augusta Transit Low-No 2022



Overview

Client: City of Augusta (Augusta Transit)

Project Duration: Jul. 2023 – Aug. 2026

Value

Project Value: $6,271,325

CTE Project Value: $540,500

Project Managers

Todd Walton, *Senior Engineering Consultant* (SPM)

Chase Stell, *Managing Consultant* (SPM)

Project Staff

Ethan McNally, *Lead Engineering Associate*

Andersson Niepoky, *Associate*

Project Description

The Center for Transportation and the Environment (CTE) partnered with the City of Augusta for a successful award under the Federal Transit Administration's 2022 Low or No Emission Vehicle Program (Low-No). CTE is working with the City of Augusta's transit agency, Augusta Transit, to deploy five GILLIG battery electric buses. Augusta has also partnered with Georgia Power to design and install three ChargePoint chargers.

CTE utilizes its Zero-Emission Smart Deployment Methodology to guide this project. The current project timeline includes eight phases: Project Planning and Initiation; Requirements Analysis; Bus Procurement and Build; Infrastructure Procurement, Design and Build; Bus and Infrastructure Deployment; Deployment Validation and Key Performance Indicators (KPIs); Project Close-Out; and Project Management, Administration, Reporting, and Control.

As of August 2025, the BEBs had been delivered. In September 2025, CTE will collect data as part of the performance validation to validate route performance, auxiliary/HVAC load tests, regenerative braking tests, charging and battery capacity tests, and driver efficiency tests. After the buses enter into revenue service, CTE will collect and analyze operational data in the form of quarterly KPI reports for a period of 12 months. During 2Q25, the charging equipment infrastructure build was completed with grid-side and bus-side commissioning scheduled to occur after bus delivery.

The project is anticipated to be completed in Q3 of 2026.

Broome County Transit Low-No 2021 Battery Electric Bus Deployment

Overview

Client: Broome County Transit

Project Duration: Apr. 2022 – Jun. 2027

Value

Project Value: $4,742,495

CTE Project Value: $508,000

Project Managers

Steve Clermont, *Managing Director of Planning & Deployment* (SPM)

Alyssa Fritts, *Managing Consultant* (PM)

Project Staff

Rebecka Moreno, *Lead Engineering Associate*

Grace Leslie, *Managing Consultant*

Project Description

The Center for Transportation and the Environment (CTE) has partnered with Broome County Transit (BC Transit) to deploy six 40' GILLIG battery electric buses (BEBs) and purchase six Heliox/Siemens 180 kW chargers. BC Transit was the only transit agency in New York to receive 2021 Low or No Emission (Low-No) funding from the Federal Transit Administration. In addition to the 2021 Low-No award, a local share of federal funding was granted to BC Transit, paired with state funds from the New York State Energy Research and Development Authority's Truck Voucher Incentive Program, to support Broome County's first BEB deployment.

CTE has been providing project management and technical support to Broome County to achieve a successful BEB deployment by 2025. This initial deployment of six BEBs will inform BC Transit's future zero-emission bus deployments and the agency's goal of transitioning to a zero-emission bus fleet by 2035. This milestone target date of fleet electrification by 2035 is in alignment with the Broome County Metropolitan Planning Organization's Long-Range Plan.

Unique to this project, BC Transit will implement an overhead-mounted installation of dispensers with an original, retractable arm system designed to pull the cables closer to the ceiling and out of the way of the buses, improving safety and saving space in their small depot. PlugIn Stations Online is leading the design, analysis, and construction process for the charging infrastructure, with the New York Power Authority managing the site build.

CTE provided periodic inspection support during the bus build and GILLIG buses arrived onsite in August 2025. CTE will conduct validation testing prior to revenue service deployment set for October 2025. Following service deployment, CTE will begin providing monthly key performance indicator reports for Broome County.

Goal:
Transition to a 100% zero-emission bus fleet by 2035

Six 40' GILLIG battery electric buses

Six Heliox/Siemens 180 kW chargers

Technology Development | **Smart Deployment** | **Transition Planning** | **Outreach & Education**

Broome County Transit Low-No 2024 Battery Electric Bus Deployment

Overview

Client: Broome County Transit

Project Duration: Dec. 2024 – Jun. 2028

Value

Project Value: $10,903,905

CTE Project Value: $366,900

Project Managers

Steve Clermont, *Managing Director of Planning & Deployment* (SPM)

Alyssa Fritts, *Managing Consultant* (PM)

Project Staff

Rebecka Moreno, *Lead Engineering Associate*

Grace Leslie, *Managing Consultant*

Project Description

The Federal Transit Administration awarded Broome County (BC Transit), a grant under the 2024 Low or No Emissions Vehicle Deployment (Low-No) Program. The grant provides funding to purchase and deploy seven zero-emission GILLIG 40' electric buses, as well as purchase and install five dispensers for the Heliox Flex 180 kW chargers at Broome County's transit facility in Vestal, NY. The grant will also provide funding for workforce development training and a facilities expansion including implementation of solar equipment, microgrid control, and a battery equipment storage system onsite. The Center for Transportation and the Environment (CTE) has been engaged by Broome County to provide technical assistance and manage the project.

As part of the workforce development training, CTE will evaluate the impact of transitioning to zero-emission technologies on BC Transit's workforce. CTE will analyze the gap in skills between the current workforce and future needs of the workforce and build a roadmap to develop the required skills across impacted departments.

Alongside this project, CTE has also been supporting BC Transit's deployment of six initial battery electric buses (BEBs) funded by a Low No-2021 award (Phase 1). Under this Low-No 2024 project (Phase 2), CTE has been providing project management and technical support to Broome County to achieve a successful BEB deployment by June 2027. This deployment of seven additional BEBs will contribute to BC Transit's goal of transitioning to a zero-emission bus fleet by 2035, in alignment with the Broome County Metropolitan Planning Organization's Long-Range Plan.

CTE maintains close collaboration with project partners including BC Transit, Broome County, the New York Power Authority, Heliox, GILLIG, Guth DeConzo, and Mobility House to ensure the project's deployment plan is appropriate, timely, and contributes to BC Transit's ability to successfully maintain the BEB fleet.

CARB & CEC Glendale Municipal Green Zone Construction Work Crew Project



Overview

Client: The City of Glendale

Project Duration: Aug. 2024 – Feb. 2027

Value

Project Value: $2,146,787

CTE Project Value: $1,073,084

Project Managers

Todd Walton, *Senior Engineering Consultant* (SPM)

Aaron Wright, *Managing Consultant* (PM)

Project Staff

Maddie Henderson, *Engineering Consultant*

Kellsie Rogers, *Associate*

Project Description

The Center for Transportation and the Environment (CTE) is the prime recipient and project manager of a grant to support the deployment and pilot of four types of heavy-duty electric construction vehicles for the City of Glendale. The grant is funded by the California Air Resources Board (CARB) and the California Energy Commission (CEC) and will determine the usability of new and innovative electric vehicle technologies for a construction crew. The City of Glendale will acquire an electric dump truck, Volvo electric mini excavator, Chevrolet electric pick-up truck, and a Volvo electric wheel loader to be deployed as a team on various projects throughout the City of Glendale. There will also be supporting infrastructure for these vehicles, which includes three Level 2 depot chargers and one Level 3 depot charger, and workforce training for fleet operators and technicians. CTE will partner with the Glendale Environmental Coalition to engage communities within the city to raise awareness of project benefits.

The project began with a kickoff between all partners to align goals and timelines. CTE then developed a detailed project management plan and conducted a vehicle and charger requirements analysis to ensure the City's operational needs would be met. Following these assessments, CTE supported vehicle procurement and submitted the first quarterly report. As of July 2025, Glendale has received three of the vehicles and CTE is supporting the release of a request for proposals for charging infrastructure. CTE is finalizing data reporting procedures and developing a validation test to confirm vehicle performance under real-world conditions and meet CARB reporting requirements.

> **The City of Glendale will acquire an electric dump truck, Volvo electric mini excavator, Chevrolet electric pick-up truck, and a Volvo electric wheel loader to be deployed as a team on various projects throughout the City of Glendale.**

Central Ohio Transportation Authority Safety Certification Management



Overview

Client: Central Ohio Transportation Authority

Project Duration: Feb. 2024 – Jul. 2025

Value

Project Value: $114,000

CTE Project Value: $114,000

Project Managers

Erik Bigelow, *Managing Director of Engineering Services* (SPM)

Robert Kasse, *Engineering Services Manager* (PM)

Project Description

The Center for Transportation and the Environment (CTE) is supporting the Central Ohio Transportation Authority (COTA) in their battery electric bus and charging infrastructure Safety and Security Certification, as outlined in Federal Transit Administration Report No. 0252. CTE's tasks include a review of COTA's existing safety program and documentation, certifiable elements and items documentation including a preliminary hazard assessment and threat and vulnerability assessment, design criteria conformance documentation including bus, charger, and facility specifications, review and enhancement of training programs and standard operating procedures, as well as an operational readiness verification prior to the final safety and security certification.

Chicago Transit Authority Low-No 2021 Battery Electric Bus Deployment

Overview

Client: Chicago Transit Authority

Project Duration: Aug. 2023 – Jun. 2029

Value

Project Value: $11,443,125

CTE Project Value: $411,200

Project Managers

Kylie McCord, *Director of Planning & Deployment* (SPM)

Alyssa Fritts, *Managing Consultant* (PM)

Project Staff

Shelby Gamache, *Lead Associate*

Project Description

The Center for Transportation and the Environment (CTE) has partnered with Chicago Transit Authority (CTA) to deploy six 40' battery electric buses (BEBs) replacing six diesel-fueled buses that have been in service for over 17 years. The award also included funding for charging infrastructure in the form of two Heliox/Siemens Flex 180 kW depot chargers and six pantograph chargers. CTA's BEB deployment project will support upgrades to its Southside bus depot and associated bus routes, reducing emissions and improving public health in surrounding areas which have among the highest rates of chronic illness in the city.

CTE is providing project management and technical support to CTA in its "pilot project" as the initial step in transitioning to a zero-emission bus fleet by 2040. This goal is in alignment with the "Charging Forward" comprehensive strategic plan issued by CTA in 2022. Specifically, CTE is assisting CTA with the replacement of conventionally fueled buses with BEBs procured through a request for proposals (RFP). CTE collaborated with CTA to develop bus specifications to inform all future procurements. In 2024, CTA made the decision to pursue a joint procurement with peer agency, Pace Bus. The RFP is expected to be issued in fall 2025.

CTA's project partner, Transit Capital Partners, is leading planning, design, and construction management for the infrastructure buildout. CTE is leading meetings as needed to coordinate with project stakeholders, monitor the timeline, and provide technical support. Facilities construction is scheduled for tentative mobilization in 2027 with an estimated completion date of 2028.

CTE will monitor the bus procurement, contracting, and build progress throughout the project lifecycle. CTA and CTE will conduct a pre-production meeting with the selected bus original equipment manufacturer to review scope, specifications, and associated workplans for the bus build. Once the buses are delivered, CTE will conduct performance validation testing.

6 BEBs:
40' battery electric buses replacing six 17-year-old diesel buses

2 Depot Chargers:
Heliox/Siemens Flex 180 kW

6 Pantograph Chargers:
Installed for on-route or depot fast charging

2040:
CTA's goal for a 100% zero-emission bus fleet

Technology Development | Smart Deployment | Transition Planning | Outreach & Education

CitiBus Low-No 2022 Battery Electric Bus Deployment

Overview

Client: The City of Davenport

Project Duration: Apr. 2023 – Nov. 2026

Value

Project Value: $4,847,991

CTE Project Value: $495,000

Project Managers

Kylie McCord, *Director of Planning & Deployment* (SPM)

Anna Staddon, *Managing Consultant* (PM)

Project Staff

Ethan McNally, *Lead Engineering Associate*

Kellsie Rogers, *Associate*

Project Description

The Center for Transportation and the Environment (CTE) partnered with The City of Davenport (CitiBus) for a successful award under the Federal Transit Administration's 2022 Low or No Emission Vehicle Program (Low-No). CTE is working with CitiBus to deploy four GILLIG battery electric buses to replace aging diesel buses well beyond their useful life in terms of years and mileage. CTE is using its Zero-Emission Smart Deployment Methodology to guide this project, which includes nine primary phases. CTE attended an in-person project kickoff with CitiBus in June 2023 to review the project management plan and schedule. In addition, a data collection and route modeling workshop was held to determine which of CitiBus' existing routes CTE should collect data from to complete the Requirements Analysis task. Finally, CTE collected data from each of CitiBus' routes to be used to model how battery electric buses would perform on those routes. Using the data and information provided by CitiBus, CTE completed route modeling, route feasibility, and rate modeling.

As part of the Bus Procurement and Build phase, CTE coordinated a kickoff with GILLIG to develop bus specifications and pricing. CTE also supported CitiBus with developing a charging specification and other documentation required for procurement. CTE supported Citibus in the development of a scope of work for design services for the charging installation. In June 2025, CTE conducted on-site validation testing of the buses to confirm they meet the requirements of the technical specifications. CTE has continued to support CitiBus during the design and installation of the permanent charging infrastructure, which is expected to be complete in August 2025. Once the four buses enter revenue service in Fall 2025, CTE will collect, analyze, and report on key performance indicators to help track and understand the performance of the electric buses for a period of 12 months. After this data collection period concludes, CTE will issue a final report summarizing project results, findings, and lessons learned.

City of Columbia, Missouri Low-No 2022

Overview

Client: The City of Columbia, Missouri

Project Duration: Oct. 2022 – Dec. 2025

Value

Project Value: $3,435,500

CTE Project Value: $540,500

Project Managers

Kylie McCord, *Director of Planning & Deployment* (SPM)

Maggie Maddrey, *Lead Managing Consultant* (PM)

Project Staff

Christine Ohenzuwa, *Lead Engineering Associate*

Project Description

The Center for Transportation and the Environment (CTE) partnered with the City of Columbia, Missouri (COMO) for a successful award under the Federal Transit Administration's 2022 Low or No Emission Vehicle Program (Low-No). For this project, CTE is assisting COMO with the deployment of six battery electric buses (BEBs)—three of the buses are funded through the Low-No 2022 grant whereas other funding is being used to procure the additional three buses. CTE previously worked with COMO to deploy four RIDE BEBs in 2020.

CTE is acting as project manager for the overall project. As part of the project planning, CTE prepared a workbook detailing the project goals and objectives as well as the approach to deliverable execution and key milestones.

Modeling is an important element of the initial project stages. CTE performed bus and route analysis and charge and utility rate modeling to determine the requirements for the buses to complete COMO service. CTE also provided guidance, oversight, and inspection coordination during the bus build process. The buses were delivered to COMO in Q2 2024. After delivery, CTE traveled to Columbia to conduct validation testing. CTE provided the results of the validation testing to COMO in Q4 2024.

The buses entered into revenue service at the end of Q2 2024. CTE is now collecting, analyzing, and reporting key performance indicators (KPIs) for a one-year period. The purpose of KPI reporting is to understand the overall performance of the BEBs and to determine project benefits such as emissions impacts, fuel consumption reduction, cost savings, and maintenance impacts. CTE is also continuing to update the current KPI dashboard for COMO's existing fleet of four BEBs. After the data collection period is complete, CTE will issue a final report summarizing project results, findings, and lessons learned.

City of Corvallis Battery Electric Bus and Charging Station Project Management



Overview

Client: City of Corvallis Transit

Project Duration: Mar. 2021 – Jun. 2026

Value

Project Value: $317,176

CTE Project Value: $317,176

Project Managers

Todd Walton, *Senior Engineering Consultant* (SPM)

Grace Leslie, *Managing Consultant* (PM)

Project Staff

Jackson Danis, *Engineering Consultant*

Hana Ba-Sabaa, *Lead Engineering Associate*

Project Description

The Center for Transportation and the Environment (CTE) partnered with the City of Corvallis (the City) for a deployment project with a Federal Transit Administration (FTA) grant funded under the Urbanized Area Formula Assistance Program (Section 5307). CTE is working with the City to deploy two 35' GILLIG battery electric buses (BEBs) and charging infrastructure in a long-term effort to transition to a 100% zero-emission fleet. After the bus build was delayed due to a parts shortage, the two buses were delivered to the City in July 2023.

The City decided to purchase three ChargePoint CPE 250 chargers (two of which will utilize a paired configuration) following CTE's presentation and overview of charger options and capabilities. CTE worked with the City to define bus and charging requirements, and to engage Pacific Power, which is the Corvallis utility.

CTE assisted in the development of a request for proposals (RFP) for design and construction management of charging infrastructure to support BEBs. During the evaluations, CTE supported the City with responses to vendor questions and also provided technical support. CTE helped the City review design drawings for the charging infrastructure from Elcon, the A&E firm awarded from the RFP.

CTE and the City worked together to prepare a request for bids (RFB) for construction services in parallel with the submission of the infrastructure design drawings. The City issued the construction services RFB in early October 2022 and awarded a construction contract to Belco in November 2022. Infrastructure construction has begun and the chargers are on-site. However, due to issues obtaining a permit, completion of construction has been delayed and deployment of the buses is on hold. The City selected an engineering firm to assist with the Willamette River Greenway permitting process and after nine months has finally received an approved building permit. The charging infrastructure construction has reconvened and is expected to be completed in June of 2025, upon which CTE will complete route and deployment validation. CTE completed on-site validation testing in February 2024 to confirm the information and specifications provided by GILLIG and to validate BEB operational performance as compared to the models used for operational planning. The City can use this information to inform operational planning for selected bus routes and services. A final report summarizing the project will be submitted to the FTA at the conclusion of the year-long data collection and key performance indicator reporting period.

City of Las Cruces Low-No 2017 Battery Electric Bus Deployment



Overview

Client: Las Cruces RoadRUNNER Transit

Project Duration: Nov. 2019 – Mar. 2026

Value

Project Value: $1,450,000

CTE Project Value: $458,247

Project Managers

Niki Rinaldi El-Abd, *Senior Managing Consultant* (SPM)

Anna Staddon, *Managing Consultant* (PM)

Project Staff

Hana Ba-Sabaa, *Lead Engineering Associate*

Chloe Frank, *Associate*

Project Description

The City of Las Cruces RoadRUNNER Transit (RR) was awarded funding through the Federal Transit Administration's Low or No Emission Program (Low-No) for the procurement of five 35' battery electric buses (BEBs) and supporting charging infrastructure. The agency contracted the Center for Transportation and the Environment (CTE) to provide technical consulting services for the acquisition and deployment of the BEBs and chargers.

CTE performed a preliminary modeling exercise using RR route data and a generic BEB model and determined none of RR's existing blocks would be feasible with a 35' BEB. CTE provided RR with an estimated expected range under different conditions for each route modeled. RR reconfigured the blocks to feasible lengths that were used in later analyses. CTE also helped the City of Las Cruces build a case for an electric vehicle (EV) fleet rate. CTE compared the charging costs associated with the general service rate (RR's current rate) and a proposed EV rate to show the cost savings with an EV rate. The City Attorney of Las Cruces used this analysis to negotiate an EV rate with the utility for RR.

CTE helped RR develop a request for proposals (RFP) for Las Cruces' BEB procurement based on the American Public Transportation Association White Book. CTE worked with the agency to tailor the framework, specifically the general conditions, special provisions, technical specifications, warranty requirements, and quality assurance chapters, to meet the specific requirements of a BEB. CTE helped ensure that the specifications would result in a bus that met or exceeded the agency's expectations for performance and range while assuring RR would be protected if the buses did not meet the agency's needs. CTE also assisted RR in securing the approval of the RFP for release by the City of Las Cruces. CTE supported RR and the City of Las Cruces in the proposal evaluation process; CTE developed scoring aids and prepared a technical evaluation presentation for the city's Selection Advisory Committee. The technical evaluation served to verify the technical proposals put forth by the original equipment manufacturers and to provide an impartial comparison between proposals.

CTE is currently supporting RR through the bus deployment process. The buses entered production in September 2022 and delivery occurred in July 2023. CTE helped facilitate and conduct inspections throughout the build process, which resulted in action being taken by the manufacturer to resolve defects. Although the buses and chargers were delivered in 2023, the charger deployment was delayed by the state inspector until August 2024. Once the buses could charge on-site, CTE visited Las Cruces to conduct validation testing in August 2024. CTE is currently tracking vehicle performance to provide monthly key performance indicator reports to RR. When data collection is complete, CTE will issue a final report summarizing project details.

City of Las Cruces Low-No 2022 Battery Electric Bus Deployment Phase 2

Overview

Client: City of Las Cruces
RoadRUNNER Transit

Project Duration: May 2024 – Sep. 2027

Value

Project Value: $5,721,073

CTE Project Value: $501,247

Project Managers

Niki Rinaldi El-Abd, *Senior Managing Consultant* (SPM)

Anna Staddon, *Managing Consultant* (PM)

Project Staff

Hana Ba-Sabaa, *Lead Engineering Associate*

Chloe Frank, *Associate*

Project Description

The Center for Transportation and the Environment (CTE) is supporting the City of Las Cruces RoadRUNNER Transit's deployment of seven 35' BYD battery electric buses for its 2022 Low-No project. CTE will serve as a technical advisor, project manager, and advocate for RoadRUNNER's interests throughout the project lifecycle.

CTE collected data on RoadRUNNER Transit's routes in order to model bus performance and develop technical specifications for the buses and chargers. CTE used the energy consumption requirements identified from the bus and route analysis to conduct charge and utility modeling, minimizing charging costs and maximizing charging performance for RoadRUNNER Transit.

CTE is providing oversight for multiple partners during this project. Fulton and Kozak is conducting an audit to ensure that the buses meet federal Buy America Requirements. Transworld Associates LLC is providing bus build and quality inspections.

CTE will also support RoadRUNNER Transit's bus and infrastructure deployment, creating a plan to validate the performance of both the buses and chargers. CTE will conduct on-site testing of RoadRUNNER Transit's buses in order to inform the finalization of RoadRUNNER Transit's route schedules and deployment strategy. After deployment, CTE will collect and report on key performance indicators of the electric buses developed in collaboration with RoadRUNNER Transit staff for a period of 12 months. CTE will provide project support for additional months as requested by RoadRUNNER Transit.

7 Zero-Emission Buses:
35' BYD BEBs replacing diesel vehicles

12 Months:
Post-deployment performance monitoring period

City of Lawrence Low-No 2021 Battery-Electric Bus Deployment Project – Phase 2



Overview

Client: City of Lawrence and the University of Kansas

Project Duration: Jan. 2022 – Aug. 2025

Value

Project Value: $2,482,727

CTE Project Value: $240,000

Project Managers

Steve Clermont, *Managing Director of Planning & Deployment* (SPM)

Maggie Maddrey, *Lead Managing Consultant* (PM)

Project Staff

Will Chabot, *Engineering Consultant*

Andersson Niepoky, *Associate*

Project Description

The Center for Transportation and the Environment (CTE) partnered with the City of Lawrence (Lawrence) for a successful award under the Federal Transit Administration's 2021 Low or No Emission Vehicle Program. Under this award, Lawrence Transit has replaced two diesel buses from its fleet with two 40' 686kWh GILLIG battery electric buses (BEBS). The BEBs are eliminating the emissions that would otherwise be generated by diesel buses and be harmful to Lawrence Transit riders, Lawrence residents, and University of Kansas (KU) students and faculty.

This is the second phase of the "Electrify Lawrence" Transit BEB deployment project. The first phase included the procurement and installation of ChargePoint charging equipment and the successful deployment of five GILLIG BEBs that began service at the start of KU's Fall 2022 semester. The goal of this Phase 2 project is to successfully deploy two additional 40' GILLIG BEBs into revenue service and complete infrastructure installation and commissioning of a ChargePoint charger.

CTE maintains close collaboration with project partners including KU, Transdev, GILLIG, and ChargePoint to ensure the project's deployment plan is appropriate, timely, and contributes to Lawrence Transit's ability to successfully maintain the BEB fleet.

Since May 2024, CTE has been reporting on key performance indicators (KPIs) for the two new BEBs running in service. As of July 2025, CTE has completed KPI reporting and is drafting the final report for the project to provide to Lawrence before closing out the project.

"Electrify Lawrence": City of Lawrence Deploys Second Round of Battery Electric Buses

Read the Article

City of Lawrence Low-No 2022 Battery-Electric Bus Deployment Project - Phase 3





Overview

Client: City of Lawrence and the University of Kansas

Project Duration: May 2023 – Oct. 2027

Value

Project Value: $4,444,359

CTE Project Value: $570,000

Project Managers

Steve Clermont, *Managing Director of Planning & Deployment* (SPM)

Maggie Maddrey, *Lead Managing Consultant* (PM)

Project Staff

Will Chabot, *Engineering Consultant*

Andersson Niepoky, *Associate*

Project Description

The Center for Transportation and the Environment (CTE) partnered with the City of Lawrence (Lawrence) for a successful award under the Federal Transit Administration's 2022 Low or No Emission Vehicle Program (Low-No). Under this award, Lawrence Transit will replace four internal combustion engine (ICE) buses from its fleet with four zero-emission vehicles, including two Phoenix battery electric buses (BEBs) and two Optimal electric cutaways. The BEBs will eliminate the emissions that would otherwise be generated by ICE buses and be harmful to Lawrence Transit riders, Lawrence residents, and University of Kansas (KU) students and faculty.

This is the third phase of the "Electrify Lawrence Transit" BEB deployment project. The first phase included the procurement and installation of ChargePoint charging equipment and the successful deployment of five GILLIG BEBs that began service at the start of KU's Fall 2022 semester. The second phase included the procurement and installation of additional ChargePoint charging equipment and the procurement and deployment of two additional 40' GILLIG BEBs, which were placed into service Q2 2024. In the Phase 3 project, CTE is continuing to work directly with Lawrence to manage the BEB deployment project and provide technical support and project management.

The electric Optimal cutaways were delivered to Lawrence in Q1 2025. CTE conducted validation testing for the Optimal cutaways and, as of August 2025, the project team is summarizing the results into a report for Lawrence. CTE will conduct key performance indicator reporting for one year for the Optimal cutaways. As of August 2025, the Phoenix procurement is still in process.

CTE Helps Power Lawrence Transit's Latest Electric Bus Milestone

Read the Article

City of Madison Metro Transit Low-No 2023



Overview

Client: City of Madison Metro Transit

Project Duration: Jul. 2024 – Dec. 2026

Value

Project Value: $47,453,550

CTE Project Value: $369,000

Project Managers

Erik Bigelow, *Managing Director of Engineering Services* (SPM)

Anna Staddon, *Managing Consultant* (PM)

Project Staff

Robert Kasse, *Engineering Services Manager*

Andersson Niepoky, *Associate*

Project Description

The Center for Transportation and the Environment (CTE) partnered with the City of Madison Metro Transit (Metro Transit) for a successful award under the Federal Transit Administration's (FTA) 2023 Low or No Emission Vehicle Program (Low-No) and the 2023 FTA Grants for Buses and Bus Facilities. CTE is working with Metro Transit to deploy 16 new 60' zero-emission battery electric buses (BEBs) to replace 16 existing 40' diesel buses in the Metro Transit fleet that have exceeded their useful life. These new BEBs will operate on all local routes served by Metro Transit. Metro Transit will also construct solar arrays, install additional charging infrastructure, and make other facility modernization improvements at the 1 S. Ingersoll facility to support these new buses.

Metro Transit provides regional transportation across a 72 square-mile urban/suburban area serving a population of 269,840 per the 2020 Census. The agency operates 70 fixed routes with 215 buses. Approximately 57,900 weekday passenger trips are conducted during the school year on average. Removing the sixteen internal combustion engine vehicles from service would reduce tailpipe carbon emissions by 360 metric tons annually and tailpipe particulate matter (PM2.5) emissions by 44,814 g (grams), which has a considerable health impact on the local community.

Project work began in Q3 of 2025. The project scope includes project planning, a requirements analysis (including bus, route, charge, and rate modeling), workforce analysis, technical advisory, performance validation, deployment validation, and key performance indicators. The project will conclude with a final report documenting the project's results, findings, and lessons learned. Since the start of 3Q25, CTE has been working on an on-route charging analysis for the University of Wisconsin (UW). CTE has also hosted the Workforce Development Workshop and is now working on identifying training needs and suitable courses to fill those gaps.

16 New 60' BEBs: Replacing 16 aging 40' diesel buses

360 Metric Tons CO_2: Annual tailpipe carbon emissions eliminated

City of Ocala Low-No 2023 Battery Electric Bus Deployment

Overview

Client: City of Ocala

Project Duration: Jul. 2024 – Aug. 2027

Value

Project Value: $20,208,528

CTE Project Value: $708,000

Project Managers

Todd Walton, *Senior Engineering Consultant* (SPM)

Cynthia Gibson, *Lead Managing Consultant* (PM)

Project Staff

Alexis Hedges, *Engineering Consultant*

Andersson Niepoky, *Associate*

Project Description

The City of Ocala (SunTran), a public transit agency serving North Central Florida's urbanized area in Ocala, Florida, partnered with the Center for Transportation and the Environment (CTE) on a successful award under the Federal Transit Administration's 2023 Low or No Emission Vehicle Program (Low-No). The City of Ocala will deploy five 35' GILLIG battery electric buses (BEBs), 26 Ford electric transit vans, 27 ChargePoint depot chargers, and four Heliox Flex 180kW depot chargers. This project also includes the expansion of Ocala's existing maintenance facility. This is the City of Ocala's first deployment of electric vehicles. The City of Ocala intends to continue their efforts to provide customer-oriented, environmentally friendly, and efficient services to the local communities. This project aims to provide improvement to the City of Ocala's fixed routes that service the downtown and surrounding core areas.

CTE is applying its Smart Deployment Methodology to aid the City of Ocala in deploying its first zero-emission vehicles. This project kicked off in August 2024. CTE completed the bus, route, charger, and rate modeling in Q4 of 2024. In Q2 of 2025, CTE began supporting the City of Ocala with BEB bus procurement tasks including reviewing the bus specifications to ensure the buses will satisfy the needs of their service. CTE is aiding the City of Ocala with coordination efforts for workforce development. The City of Ocala is currently working with Kimley-Horn on designing their infrastructure for the charging station and maintenance bays. The project team anticipates delivery of the GILLIG buses in Q3 of 2027. CTE will conduct performance validation and deployment validation once the BEBs are delivered. CTE is currently scheduled to start deployment validation in Q4 of 2026 that will cover a 12 month period.

5 BEBs:
35' GILLIG battery electric buses

26 Ford Electric Transit Vans:
First deployment of EVs for Ocala

27 ChargePoint Depot Chargers:
Supporting fleet operations

4 Heliox Flex 180 kW Depot Chargers:
For high-power charging

Technology Development | Smart Deployment | Transition Planning | Outreach & Education

Connecticut Department of Transportation Low-No 2021 Battery Electric Bus Deployment



Overview

Client: CTtransit Waterbury

Project Duration: Jun. 2023 – Jul. 2026

Value

Project Value: $8,558,860

CTE Project Value: $365,000

Project Managers

Kylie McCord, *Director of Planning & Deployment* (SPM)

Aaron Wright, *Managing Consultant* (PM)

Project Staff

Will Chabot, *Engineering Consultant*

Ethan McNally, *Lead Engineering Associate*

Andersson Niepoky, *Associate*

Project Description

The Center for Transportation and the Environment (CTE) partnered with the State of Connecticut Department of Transportation (CTDOT) for a successful award under the Federal Transit Administration's Low or No Emission Vehicle Program (Low-No). CTE is working with CTDOT and Wendel to deploy 10 battery electric buses (BEBs) in CTtransit Waterbury, a division of CTDOT, that will be a one-for-one replacement of 10 existing 35' CTtransit diesel buses. Additional project scope includes the preparation of facility infrastructure to handle 100% electrification of the transit and paratransit fleet, which includes the installation of 10 DC fast chargers.

Replacing diesel vehicles with BEBs will cut CTtransit's greenhouse gas emissions by an estimated 770 tons and reduce PM10 emissions by 18.4 pounds annually, leading to $40,500 in social cost savings per year, as per Executive Order 13990. This project will also test 35' BEBs with snow chains in Waterbury's hilly terrain.

CTE visited CTDOT's facility in September 2023 to gather data for the requirements analysis and to conduct the project kickoff meeting. In the first Qof 2024, CTE completed the bus and route modeling to guide CTDOT in making operational decisions and planning route deployments. During the second Qof 2024, CTE completed charge and rate modeling. The charge and rate analysis modeled three (3) 180 kW chargers for the initial 10 bus pilot to avoid the need for extensive additional infrastructure, which could have delayed vehicle deployment. The charge and rate modeling analysis informed charger design considerations by examining two scenarios: parallel charging and sequential charging.

Wendel, who is contracted directly with CTDOT, has completed the Phase 1 design and advertised the request for proposals. For Phase 1, construction and the installation of the three (3) chargers is underway. For Phase 2, Wendel is progressing towards the 90% design to support the 100% electrification of Waterbury. The current bus procurement and build activities will be coordinated with the charging infrastructure installation. Once chargers have been installed and buses delivered, grid- and bus-side commissioning activities will be completed. CTE will complete one year of key performance indicator data collection and reporting once buses enter revenue service.

10 BEBs: 35' battery electric buses replacing 10 diesel buses

10 DC Fast Chargers: Planned to support full fleet electrification

3 × 180 kW Chargers: Installed for the initial 10-bus pilot

770 Tons CO_2: Annual greenhouse gas emissions reduced

18.4 Pounds PM10: Particulate emissions reduced annually

$40,500: Estimated annual social cost savings from emissions reductions

Connecticut Department of Transportation Low-No 2023 Battery Electric Bus Deployment

Overview

Client: CTtransit Stamford

Project Duration: Jul. 2024 – Dec. 2027

Value

Project Value: $33,046,400

CTE Project Value: $610,000

Project Managers

Kylie McCord, *Director of Planning & Deployment* (SPM)

Aaron Wright, *Managing Consultant* (PM)

Project Staff

Will Chabot, *Engineering Consultant*

Ethan McNally, *Lead Engineering Associate*

Andersson Niepoky, *Associate*

Project Description

The Center for Transportation and the Environment (CTE) partnered with the State of Connecticut Department of Transportation (CTDOT) for a successful award under the Federal Transit Administration's (FTA) 2023 Low or No Emission Vehicle Program (Low-No) and the 2023 FTA Grants for Buses and Bus Facilities. CTE is working with CTDOT and Wendel to deploy twenty (20) new 40' zero-emission battery electric buses (BEBs) to replace twenty (20) existing 35' diesel & diesel-hybrid buses in the CTtransit fleet that have exceeded their useful life. These new BEBs will operate on all local routes served by the CTtransit Stamford Division. CTDOT will also complete power upgrades, installation of charging infrastructure, and make other facility modernization improvements at the Stamford depot to support twenty (20) new chargers. The project will enable CTDOT to further advance its goals of reducing fleet emissions statewide.

The CTtransit Stamford Division provides bus services in the Greater Stamford area. In FY22, CTtransit Stamford provided nearly 2.37 million trips. At least 16.12% of the Stamford Division's service area is identified as a Historically Disadvantaged Community according to the US Department of Transportation's Transportation Disadvantaged Census Tracts tool. The entire service area is located within an 8-hour ozone non-attainment area and a PM 2.5 attainment/maintenance zone under national ambient air quality standards.

The project kicked off in Q3 of 2024. Since then, CTE has completed the route feasibility and charging analysis and is now focused on the rate analysis and developing the CTDOT key performance indicator reporting dashboard. The results of the charging analysis have led CTDOT to pursue options for on-route charging. CTE is assisting in the evaluation of possible locations. Construction on the Stamford Depot is ongoing with completion expected by the end of 2025.

20 BEBs:
40' battery electric buses replacing 20 diesel & diesel-hybrid buses

20 Chargers:
To be installed at Stamford depot to support new BEBs

Located in Ozone Non-Attainment / PM2.5 Maintenance Zone:
Supports regional air quality improvements

Technology Development | **Smart Deployment** | **Transition Planning** | **Outreach & Education**

DOE Cold-Weather Operation, Observation, and Learning - Electric Vehicles Initiative



Overview

Client: American Lung Association

Project Duration: Feb. 2021 – Sep. 2025

Value

Project Value: $2,096,813

CTE Project Value: $140,509

Project Managers

Erik Bigelow, *Managing Director of Engineering Services* (SPM)

Robert Kasse, *Engineering Services Manager* (PM)

Project Staff

Christine Ohenzuwa, *Lead Engineering Associate*

Project Description

The Center for Transportation and the Environment (CTE) is working in partnership with the American Lung Association on a project funded by the Department of Energy – Vehicle Technologies Office. CTE is supporting the first deployment of unique medium- and heavy-duty battery electric vehicles in the metro area of Minneapolis–Saint Paul. The selected deployments are a battery electric school bus for Eastern Carver County Schools (a school district); a battery electric rear-loader refuse truck for Eureka Recycling (a nonprofit zero-waste organization); and two box trucks for the University of Minnesota facilities department.

The purpose of the project is to share knowledge across the industry about the impacts that cold-weather operations can have on electric vehicle performance, especially for medium and heavy-duty non-transit vehicles. CTE's scope included assisting each fleet operator with vehicle selection while considering each operator's unique required performance specifications. The project is currently underway, and all fleet partners have purchased vehicles. Eastern Carver County has deployed its school bus, Eureka has deployed its recycling truck, and the University of Minnesota has deployed both box trucks. CTE also provided support for Eureka's charging infrastructure installation.

Supply chains, resource allocation, and telematics data availability have presented a unique challenge, as the three fleet operators deployed vehicles on different timelines, but CTE's scope remains consistent. CTE's experience managing and prioritizing varying timelines has been crucial during this project. CTE has also provided support in coordinating high-voltage safety training for the three fleets.

CTE held initial key performance indicator planning discussions with all three fleet operators in advance of data collection for each vehicle to identify reporting goals and requirements. Data reporting was to be conducted for all fleets for at least one calendar year to ensure that data was collected in all four seasons, thus a time extension was required to allow a full year of data for both Eureka and the University of Minnesota.

Diverse Fleet Types:
A school bus, a refuse truck, and box trucks were deployed to capture real-world insights across multiple fleet operations.

Cold-Weather Performance Focus:
These vehicles were tested under harsh winter conditions to understand how extreme temperatures impact battery-electric performance.

One Year of Data Collection:
Comprehensive, season-long monitoring ensures the results reflect year-round operational realities, providing actionable guidance for future fleet electrification.

Fayetteville Area System of Transit Low-No 2021 Battery Electric Bus Deployment





Overview

Client: Fayetteville Area System of Transit

Project Duration: Apr. 2022 – Sept 2026

Value

Project Value: $2,896,500

CTE Project Value: $389,000

Project Managers

Steve Clermont, *Managing Director of Planning & Deployment* (SPM)

Chase Stell, *Managing Consultant* (PM)

Project Staff

Ethan McNally, *Lead Engineering Associate*

Andersson Niepoky, *Associate*

Project Description

The Center for Transportation and the Environment (CTE) partnered with the Fayetteville Area System of Transit (FAST) for a successful award under the Federal Transit Administration's (FTA) Low or No Emission Vehicle Program (Low-No) in 2021. CTE is working with FAST to deploy four battery electric buses (BEBs). Three of the BEBs are being procured using FTA Low-No funds; FAST requested an additional BEB, which is being procured through Volkswagen funds, be pulled into the project scope. This project aims to replace aging diesel buses serving the City of Fayetteville. FAST's goal is to ultimately transition to a 100% zero-emission fleet.

The BEBs are being purchased through a state contract. In the Fall of 2023, the project team opted to procure two GILLIG buses and two New Flyer buses because Proterra announced bankruptcy in August 2023. CTE continues to provide project management support and facilitate weekly status calls.

Since the charging infrastructure scope was also originally awarded to Proterra, FAST also opted to issue a request for qualifications to procure the charging infrastructure. FAST received four proposals and ultimately selected New Flyer as the awardee. New Flyer broke ground for the charger installation in December of 2024. The contractor, Green State Power, worked diligently through March 2025 to complete the installation of three Heliox 180kW chargers. At the end of March 2025, two New Flyer BEBs were delivered, accepted, and commissioned with the chargers. CTE travelled to Fayetteville, NC, in early April for the ribbon cutting ceremony to celebrate the arrival of their first zero-emission buses. In May of 2025, CTE and FAST traveled to Livermore, CA to visit the GILLIG production facility and inspect the buses prior to their delivery. The two GILLIG buses were delivered to Fayetteville in July of 2025. CTE will conduct validation testing on both the New Flyer and GILLIG buses once the issue of telematics has been resolved. After the buses are in revenue service, CTE will report key performance indicators to the City of Fayetteville for a period of one year.

Georgia State University Low-No 2023 Battery Electric Bus Deployment



Overview

Client: Georgia State University

Project Duration: Mar. 2025 – Dec. 2028

Value

Project Value: $30,296,330

CTE Project Value: $668,500

Project Managers

Todd Walton, *Senior Engineering Consultant* (SPM)

Chase Stell, *Managing Consultant* (PM)

Project Staff

Ethan McNally, *Lead Engineering Associate*

Kellsie Rogers, *Associate*

Project Description

The Center for Transportation and the Environment (CTE) partnered with Georgia State University (GSU) for a successful award under the Federal Transit Administration's Low or No Emission Vehicle Program (Low-No). CTE is working with GSU to deploy 18 battery electric buses and associated charging infrastructure, including a depot. GSU plans to be the first university in the southeast to transition to an all-electric, university-owned bus fleet by replacing all diesel buses. CTE is using its Zero-Emission Smart Deployment methodology to guide this project. A project kick-off was conducted with GSU in March of 2025 to discuss facilities, bus procurement, and route modeling. In August 2025, CTE presented finalized route modeling results to GSU to aid in the selection of a bus original equipment manufacturer. Next, CTE will conduct charge and rate modeling to maximize charging capabilities' and reduce costs.

CTE will provide project management support and technical advisory throughout the design, which is being completed by Kimley-Horn, depot construction, and installation of charging infrastructure. CTE will also assist GSU throughout the bus procurement process which involves providing guidance on the state contract purchase, reviewing technical specifications, and overseeing Pre- and Post-Award Buy America Audits and bus inspections. CTE will also create a validation test plan and provide a report once buses arrive and the charging infrastructure is in place. Once the buses are in service, CTE will collect, analyze, and report on key performance indicators to help track and understand the performance of the electric buses for a period of 12 months.

Hawai'i Department of Transportation Low-No Statewide 2018 Zero-Emission Bus Pilot Program



Overview

Client: Hawai'i Department of Transportation

Project Duration: Jun. 2021 – Jan. 2027

Value

Project Value: $6,650,000

CTE Project Value: $900,000

Project Managers

Kylie McCord, *Director of Planning & Deployment* (SPM)

Maggie Maddrey, *Lead Managing Consultant* (PM)

Project Staff

Alexis Hedges, *Engineering Consultant*

Kellsie Rogers, *Associate*

12 BEBs:
35' battery electric buses deployed across Hawaii, Kaua'i, and Maui

1 BEB per County (2018 Grant):
Initial pilot deployment

3 BEBs per County (2021 Grant):
Additional deployment

Project Description

The Center for Transportation and the Environment (CTE) partnered with the Hawai'i Department of Transportation (HDOT) for a successful award under the Federal Transit Administration's 2018 Low or No Emission Vehicle Program (Low-No). HDOT partnered with three counties for this project: Hawaii, Kaua'i, and Maui. The grant provides funding to purchase and deploy one battery electric bus (BEB) and supporting charging infrastructure for each of the three counties. HDOT has also provided funding for a transition plan to be conducted for each county in order to determine how to transition to 100% zero-emission fleets.

In 2021, HDOT was awarded another grant under the Low-No Program, which will provide funding to purchase and deploy an additional three BEBs per county along with the supporting charging infrastructure. The 2018 and 2021 Low-No grants have been combined into one project for a total procurement of twelve BEBs across the three counties. HDOT engaged CTE to manage the 2018 project, which provided funds for CTE to conduct project management for the additional 2021 grant.

CTE completed route, rate, and charge modeling for each county. The results of the modeling were used to inform the bus and charger specifications included in a joint request for proposals (RFP) for all three counties for procurement of 35' BEBs. The RFP was awarded to GILLIG, and all twelve buses will be delivered to the counties by the end of August 2025. The counties are now continuing to work to complete the installation of permanent charging solutions, while utilizing temporary charging solutions in the meantime.

Kansas City Area Transportation Authority Low-No 2021 Electric Bus Program



Overview

Client: Kansas City Area Transportation Authority

Project Duration: Jan. 2019 – Oct. 2025

Value

Project Value: $3,857,019

CTE Project Value: $234,388

Project Managers

Erik Bigelow, *Managing Director of Engineering Services* (SPM)

Robert Kasse, *Engineering Services Manager* (PM)

Project Staff

Carson Downs, *Strategic Software Developer*

Alexis Hedges, *Engineering Consultant*

Project Description

Kansas City Area Transportation Authority (KCATA) partnered with the Center for Transportation and the Environment (CTE) and AECOM on a successful award under the Federal Transit Administration's 2021 Low or No Emission Vehicle Program (Low-No). KCATA deployed three 40' GILLIG battery electric buses (BEBs) with ChargePoint charging equipment. Two of KCATA's BEBs are in a rapid transit service configuration, and one is in a local service configuration. This deployment is the next phase of KCATA's plan to move to a fully zero- emission fleet by 2050. KCATA previously deployed two 40' GILLIG BEBs and charging equipment in 2021.

CTE's responsibilities on this project were to conduct bus, route, charging, and utility rate modeling in order to determine how best to incorporate the new BEBs into KCATA service, to develop bus and charger specifications, and to provide technical advisory support. CTE also performed post-deployment validation testing in order to verify that the delivered BEBs match their expected performance. CTE developed and is now tracking and reporting on key performance indicators.

CTE conducted and delivered the results of its bus and route modeling work in June of 2022. CTE found that under strenuous operating conditions, the new BEBs will be able to complete 46% of the agency's routes with a 480-kWh battery, 70% of routes with a 588-kWh battery, and 91% of routes with a 686-kWh battery. CTE's findings led KCATA to pursue higher-capacity batteries for its BEBs. In August 2022, CTE presented the results of its charging and utility rate modeling. CTE found that KCATA could save as much as 57% on its fuel costs and advised on how to achieve these savings.

CTE delivered bus and charger specifications and requirements to KCATA in November 2022. They will serve as documentation of KCATA's bus and charger preferences and as a means to help ensure that the project's manufacturing partners deliver equipment that meet KCATA's needs. The local service bus was delivered in August 2023 and the two Bus Rapid Transit buses arrived in April 2024.

3 BEBs:
40' GILLIG battery electric buses deployed (2 rapid transit, 1 local service)

CTE's Route Analysis showed larger batteries boost coverage from 46% to 91% of routes, guiding KCATA to select higher-capacity BEBs for reliable service.

Fuel Savings Potential:
Up to 57% via charging and utility rate optimization

Technology Development | Smart Deployment | Transition Planning | Outreach & Education

Madison Metro On-Call Transit Electric Bus Deployment Services



Overview

Client: Madison Metro Transit

Project Duration: Feb. 2022 – Dec. 2025

Value

Project Value: $212,500

CTE Project Value: $212,500

Project Managers

Erik Bigelow, *Managing Director of Engineering Services* (SPM)

Will Handke, *Managing Consultant* (PM)

Project Staff

Robert Kasse, *Engineering Services Manager*

Ethan McNally, *Lead Engineering Associate*

Christine Ohenzuwa, *Lead Engineering Associate*

Project Description

Madison Metro (Metro), a transit agency serving the metropolitan area of Madison, Wisconsin, contracted with the Center for Transportation and the Environment (CTE) to provide support services on an on-call basis for its deployment of sixty-two 60' New Flyer battery electric buses (BEBs) to service Metro's new Bus Rapid Transit (BRT) lines.

The project kicked off in November 2022. Initially, CTE provided technical advice regarding Metro's charger procurement plans. CTE recommended that Metro purchase fewer depot chargers than it originally planned given that its plan already included many on-route chargers. CTE found that reducing the number of depot chargers would reduce costs and streamline the project's scope without interfering with BEB operations. CTE also advised Metro to procure mobile charging units.

In Q4 2022, CTE reviewed Metro's request for proposals for the procurement of its charging infrastructure and shared it with 19 potential vendors. A contract was awarded to New Flyer in March 2023.

From Summer 2023 to late 2024, CTE provided project management and technical advisory services for the deployment of fifteen plug-in and four pantograph chargers from ABB and Heliox, all installed by New Flyer Infrastructure Solutions. CTE's work included schedule and deliverable tracking, meeting documentation, and design and specification reviews. The chargers were commissioned between August and December 2024.

In Summer 2024, CTE initiated performance testing services for Metro. As part of these services, CTE created and executed a plan to evaluate the energy efficiency of Metro's BEBs under heavy passenger load, measure auxiliary system power loads, assess the vehicles' charging performance, and document the buses' performance at low states of charge. CTE delivered a report on its findings in September 2024. Metro's BRT line commenced operations shortly thereafter.

In March 2025, CTE began work to guide Madison through a process that will document and help to develop mitigation strategies for the risks and hazards posed by BEBs and their charging infrastructure. As of July 2025, CTE completed the workshops to help create a Preliminary Hazard Analysis document and provided a first version to Madison for the agency to maintain and to utilize to track the implementation of risk mitigation strategies.

Metro Saint Louis KPI Reporting

Overview

Client: Metropolitan Saint Louis Transit Agency

Project Duration: Aug. 2024 – Jun. 2026

Value

Project Value: $95,000

CTE Project Value: $95,000

Project Managers

Erik Bigelow, *Managing Director of Engineering Services* (SPM)

Grace Leslie, *Managing Consultant* (PM)

Project Staff

Maddie Henderson, *Engineering Consultant*

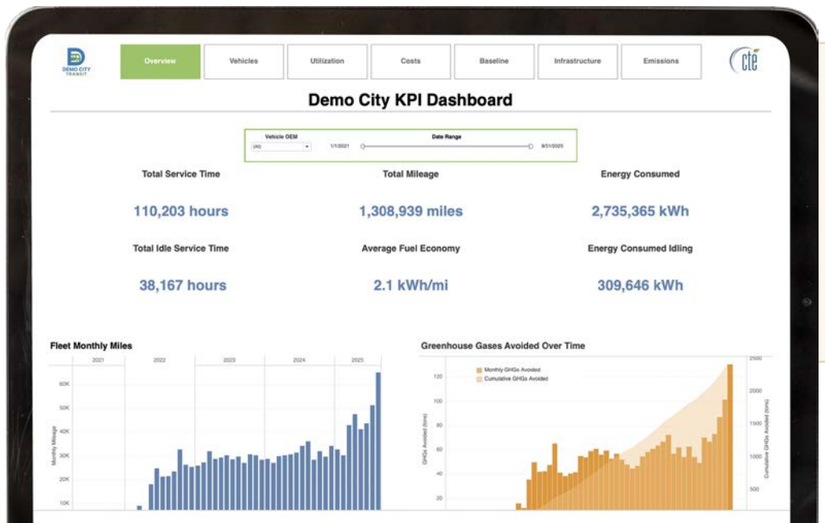
Project Description

The Center for Transportation and the Environment (CTE) is supporting Metropolitan St. Louis Transit Agency (Metro) with deployment validation and key performance indicator (KPI) reporting for six GILLIG battery electric buses (BEBs) procured through Metro's 2022 Low-No project.

Following the launch of revenue service, CTE will conduct a KPI workshop with Metro to identify the performance indicators to be tracked and establish procedures for collecting data. Over the course of twelve months, CTE will collect, analyze, and report on bus and charger performance to help Metro evaluate whether the deployment is achieving its intended outcomes, including reduced emissions, lower fuel and maintenance costs, and potential ridership impacts.

To make the results actionable and accessible, CTE will provide Metro with regular KPI reports and an online dashboard to track progress in real time. The KPI reporting task is expected to be completed over a 16-month period, providing Metro with a detailed understanding of the benefits and challenges associated with integrating BEBs into its fleet.

As of August 2025, CTE is in the process of gaining access to Metro's data in order to begin KPI work.



Data Driven. Future Ready.

CTE's real-time analytics dashboards put fleet operators in the driver's seat, offering insights into energy efficiency, predictive maintenance, and emissions tracking.

Learn More About CTE's KPI Dashboards

Technology Development | **Smart Deployment** | **Transition Planning** | **Outreach & Education**

Metro Transit Low-No 2021 Battery Electric Bus Deployment



Overview

Client: Metro Transit

Project Duration: Sep. 2024 – Sep. 2025

Value

Project Value: $4,190,839

CTE Project Value: $80,000

Project Managers

Erik Bigelow, *Managing Director of Engineering Services* (SPM)

Robert Kasse, *Engineering Services Manager* (PM)

Project Staff

Christine Ohenzuwa, *Lead Engineering Associate*

Project Description

Metro Transit (Metro) partnered with the Center for Transportation and the Environment (CTE) on a successful award under the Federal Transit Administration's 2021 Low or No Emission Vehicle Program (Low-No). Metro will deploy 40' GILLIG battery electric buses (BEBs). Metro previously deployed 60' New Flyer BEBs and on-route charging equipment.

CTE's responsibilities on this project are to conduct bus, route, charging, and utility rate modeling in order to determine how best to incorporate the new BEBs into Metro service, and to lead a Zero-Emission Bus 101 workshop for Metro staff. CTE has collected GPS data of Metro routes and bus specifications in support of the modeling efforts and the route modeling is underway.

ZEB 101 & ZEB 201 Courses: Presented by CTE's Expert Technical Staff

Explore Course Options

Metropolitan Atlanta Rapid Transit Authority Low-No 2019 Battery Electric Bus Deployment



Overview

Client: Metropolitan Atlanta Rapid Transit Authority

Project Duration: Oct. 2020 – Jun. 2027

Value

Project Value: $8,679,400

CTE Project Value: $420,000

Project Managers

Todd Walton, *Senior Engineering Consultant* (SPM)

Cynthia Gibson, *Lead Managing Consultant* (PM)

Project Staff

Ethan McNally, *Lead Engineering Associate*

Sydney Leimbach, *Membership Manager*

Project Description

The Center for Transportation and the Environment (CTE) partnered with the Metropolitan Atlanta Rapid Transit Authority (MARTA) for a successful award under the 2019 Federal Transit Administration's Low or No Emission Vehicle Program (Low-No). For this project, CTE is managing and providing technical assistance as MARTA deploys six 40' New Flyer battery electric buses (BEBs) with 466 kWh battery packs, seven Siemens 150 kW depot chargers, and one 450 kW on-route pantograph charger.

CTE completed the project planning and initiation, and performed route, charge, and rate modeling for MARTA's 2 and 102 routes to determine the feasibility of the BEBs and charging infrastructure. The results of the modeling were presented to MARTA in November 2020. The objective was to predict bus performance by estimating energy requirements and block achievability for New Flyer BEBs under nominal and strenuous conditions, as well as predict required charging time and energy usage by route and block. CTE found that though depot chargers are recommended for resiliency and service needs, on-route charging would be necessary for the buses to complete service. CTE used this analysis to help MARTA evaluate charging strategies for its vehicles and model electricity costs using Georgia Power rate schedules for the bus depot and on-route charging station. CTE has also supported system safety planning, preliminary hazards analysis, and risk management planning for the project.

After bus delivery in May–July 2021, MARTA began interim operations with all six BEBs rotating into service starting in May 2022. In Q1 of 2025, CTE began supporting the MARTA battery electric bus and charging infrastructure Safety and Security Certification, as outlined in FTA Report No. 0252. Throughout the certification process, CTE will assist MARTA in developing all identified safety documentation, checklists, and reports. CTE is coordinating and managing all necessary meetings, developing required checklists for MARTA to complete, and leading the drafting of all identified reports.

The Candler Park on-route charging station, Laredo, and Hamilton bus garage charger installation and associated construction are scheduled to be completed in Q2 of 2026. CTE is performing general project management and reporting services throughout the project and will provide deployment and performance validation including key performance indicator reporting for one year once the charging infrastructure has been installed. Project completion is expected June 2027.

Metropolitan Saint Louis Transit Agency Low-No 2022 Battery Electric Bus Deployment



Overview

Client: Metro St. Louis

Project Duration: Nov. 2022 – Aug. 2025

Value

Project Value: $5,412,960

CTE Project Value: $98,000

Project Managers

Erik Bigelow, *Managing Director of Engineering Services* (SPM)

Robert Kasse, *Engineering Services Manager* (PM)

Project Description

The Center for Transportation and the Environment (CTE) was tasked with providing technical support to Metro St. Louis throughout the request for proposals (RFP) development and response evaluation process for plug-in depot charging equipment and related infrastructure. CTE coordinated with a subcontractor to provide professional services for developing a conceptual level design and independent cost estimate for adding electric charging equipment to the existing Metro St. Louis DeBaliviere facility.

CTE revised and updated charging system technical specifications in support of the RFP for the battery electric bus charging system at DeBaliviere, coordinated and provided oversight during independent cost estimate development, provided technical support during the RFP issuance and evaluation process for the charging system, and performed a review of the technical scope for the current infrastructure project plan.

Additionally, CTE is providing ongoing technical assistance to Metro St. Louis throughout the infrastructure project execution, including technical reviews of design drawings, guidance on development of the charging system commissioning plan, and technical reviews of proposed design changes to allow for integration with future photovoltaic systems.

Mountain Line Low-No 2022 Battery Electric Bus Deployment



Overview

Client: Missoula Urban Transportation District

Project Duration: Jul. 2024 – Aug. 2029

Value

Project Value: $12,858,533

CTE Project Value: $167,200

Project Managers

Erik Bigelow, *Managing Director of Engineering Services* (SPM)

Chase Stell, *Managing Consultant* (PM)

Project Staff

Niki Rinaldi El-Abd, *Senior Managing Consultant*

Maddie Henderson, *Engineering Consultant*

Carson Downs, *Strategic Software Developer*

Project Description

The Center for Transportation and the Environment (CTE) has performed route, charge, and rate modeling for Missoula Urban Transportation District (MUTD) as part of a charging infrastructure analysis. CTE determined the feasibility of each service block under different ambient conditions for each bus model to help inform bus routing and inform charging infrastructure requirements. The outcomes of these analyses included an understanding of power requirements, charging times, infrastructure requirements, and equipment specifications.

CTE is providing technical advisory in support of a new depot construction project and will conduct a Redundancy, Resilience, and Emergency Response workshop to identify any new risks to MUTD's ability to provide service with a fully zero-emission bus fleet during power outages or other fuel disruptions. This will include a review of the scenarios that MUTD could encounter, such as equipment failures, power outages, extreme cold, and the potential impacts to operation of the battery electric bus fleet.

CTE will support MUTD staff in collecting, analyzing, and reporting on key performance indicators (KPIs) to help track and understand the performance of the electric buses for a period of 12 months. CTE will create an online KPI dashboard for MUTD followed by training of MUTD staff on dashboard maintenance and upkeep, finally handing off the dashboard fully to MUTD to own.

New Orleans Regional Transit Authority Low-No 2023 Battery Electric Bus Deployment

Overview

Client: New Orleans Regional Transit Authority

Project Duration: Oct. 2024 – Apr. 2029

Value

Project Value: $81,682,684

CTE Project Value: $731,000

Project Managers

Todd Walton, *Senior Engineering Consultant* (SPM)

Cynthia Gibson, *Lead Managing Consultant* (PM)

Project Staff

Jackson Danis, *Engineering Consultant*

Kellsie Rogers, *Associate*

Project Description

The Center for Transportation and the Environment (CTE) partnered with New Orleans Regional Transit Authority (NORTA) for a successful award under the Federal Transit Administration's 2023 Low or No Emission Vehicle Program (Low-No). CTE is working with NORTA to deploy 20 battery electric buses to replace aging diesel buses, robust charging infrastructure that incudes depot and on route chargers, a charge management system, a solar canopy, and a battery energy storage system. CTE is using its Zero-Emission Smart Deployment Methodology to guide this project.

CTE led an in-person project kickoff with NORTA in November 2024. Bus and route modeling was initiated during the kick-off. CTE collected data from each of NORTA's routes to be used to model how battery electric buses would perform on these routes. Using the data and information provided by NORTA, CTE completed route modeling, route feasibility, and rate modeling in February 2025. CTE also assisted NORTA with charge management system selection support and will support NORTA with developing a charging specification and other documentation required for procurement in Q3 of 2025.

CTE will support the project team in the development of a scope of work for design services for the charging installation and NORTA will complete the solicitation. CTE will continue to support the project team during the design and installation of the charging infrastructure. CTE will also conduct on-site validation testing of the buses and chargers to confirm they meet the requirements of the technical specifications. Once the buses enter revenue service, CTE will collect, analyze, and report on key performance indicators to help track and understand the performance of the electric buses for a period of 12 months. After this data collection period concludes, CTE will issue a final report summarizing project results, findings, and lessons learned.

North Central Regional Transit District Low-No 2020-2021 Zero-Emission Bus and Cutaway Deployment



Overview

Client: North Central Regional Transit District

Project Duration: May 2021 – Dec. 2026

Value

Project Value: $6,284,505

CTE Project Value: $843,026

Project Managers

Steve Clermont, *Managing Director of Planning & Deployment* (SPM)

Thomas Duke, *Managing Consultant* (PM)

Project Staff

Cristina Berenguer, *Engineering Associate*

Project Description

The Center for Transportation and the Environment (CTE) partnered with the North Central Regional Transit District (NCRTD) for two successful awards under the Federal Transit Administration's (FTA) Low or No Emission Vehicle Program (Low-No). CTE is working with NCRTD to deploy six battery-electric buses (BEBs) and ten electric transit passenger vans supported by charging infrastructure at two depots; in Española and Taos. The goal of this project is to replace NCRTD's aging diesel fleet serving the counties of north-central New Mexico, including Los Alamos, Rio Arriba, Santa Fe, and Taos.

For the BEB procurements, because Proterra filed for Chapter 11 bankruptcy in 2023 and was subsequently acquired by Volvo, previous supply agreements made by Proterra Battery with ElDorado National (ENC) are not bound to be honored by Volvo, affecting ENC's supply of battery packs. As of May 2024, CTE is revisiting NCRTD's requirements analysis due to the challenges the agency has faced with procuring an appropriate BEB with sufficient onboard service energy for its deployments. Based on the results of the analysis, CTE will review potential transit bus procurement options available to NCRTD through the Washington state contract. CTE will then subsequently facilitate vendor procurement discussions and review contractual terms. CTE will further manage an independent BEB inspector during the build process, conduct site visits to vendor facilities, and work with NCRTD to finalize vehicle delivery timelines and operations planning.

CTE is also assisting NCRTD with the procurement of Siemens BEB charging infrastructure at both depots, although the DC fast charging infrastructure installations will be deferred until a BEB original equipment manufacturer has been identified, and interoperability has been proven. CTE will support final contracting negotiations and will manage and provide oversight for a subcontractor to plan, design, construct, install, and commission BEB charging infrastructure and equipment.

For the electric cutaway procurements, NCRTD purchased Ford e-Transit passenger vans (upfitted by Forest River), which will provide on-demand and paratransit support across the agency's service areas. The electric vans will be charged by Ford's Pro AC Charging Stations, which were purchased along with the vehicles. These vehicles qualify as unmodified mass-produced vans and are not required to undergo Altoona testing, and Forest River provided pre-award Buy America certifications for the chassis and the seating equipment, thus meeting the FTA's Low-No grant funding requirements.

The ten electric transit vans entered service in Q3 2024, while the six BEBs are expected to be in service starting 2025. After deployment, CTE will track key performance indicators (KPIs) through vehicle and charger monitoring software and provide monthly KPI reports to NCRTD.

Port Arthur Transit Low-No 2023 Battery Electric Bus Deployment



Overview

Client: Port Arthur Transit

Project Duration: Dec. 2023 – Oct. 2027

Value

Project Value: $5,001,700

CTE Project Value: $199,000

Project Managers

Kylie McCord, *Director of Planning & Deployment* (SPM)

Maggie Maddrey, *Lead Managing Consultant* (PM)

Project Description

The Center for Transportation and the Environment (CTE) partnered with Port Arthur for a successful award under the Federal Transit Administration's (FTA) 2023 Low or No Emission Vehicle Program (Low-No) and Bus & Bus Facilities grant. The grant is for the procurement of four battery electric buses (BEBs), two depot chargers, and one on-route charger. Throughout the project, CTE will provide expert technical advice on zero-emission technologies, providing support as needed by Port Arthur.

CTE provided an overview of BEB and charger offerings on active state contracts for Port Arthur. After review, Port Arthur decided to utilize the Washington state contract to procure GILLIG BEBs and ABB charging infrastructure. As of August 2025, Port Arthur is in the process of contracting with GILLIG. CTE will assist Port Arthur by overseeing procurement and conducting pre- and post-delivery Buy America audits.

CTE conducted route modeling to assist Port Arthur in determining if on-route charging was necessary for the GILLIG BEBs on Port Arthur's routes. The route modeling results helped Port Arthur make the decision to procure the larger battery capacity GILLIG BEB and depot chargers, with no on-route charger. As of August 2025, Port Arthur was awaiting approval from FTA to use grant funds that were originally designated for an on-route charger for the BEBs instead due to higher current BEB costs than what was estimated in the original grant application.

Once the BEBs and infrastructure are in place, CTE will guide vehicle acceptance, testing, and staff training. CTE will monitor performance metrics such as energy efficiency, cost savings, and emissions reductions to validate the deployment's success.

Prince George's County Low-No 2022 Battery Electric Bus Deployment



Overview

Client: Prince George's County Transit Authority

Project Duration: Jun. 2023 – Jun. 2028

Value

Project Value: $25,000,000

CTE Project Value: $503,000

Project Managers

Kylie McCord, *Director of Planning & Deployment* (SPM)

Will Handke, *Managing Consultant* (PM)

Project Staff

Will Chabot, *Engineering Consultant*

Rebecka Moreno, *Lead Engineering Associate*

Kellsie Rogers, *Associate*

Project Description

The Center for Transportation and the Environment (CTE) partnered with Prince George's County (PGC) for a successful award under the Federal Transit Administration's Low or No Emission Vehicle Program. CTE is working with PGC to deploy 20 battery electric buses (BEBs), upgrade the PGC facility's electrical system, implement a microgrid, and install on-route charging.

CTE is providing project management and technical support to PGC to achieve a successful BEB deployment. This deployment of 20 BEBs will inform PGC's future zero-emission bus deployments and advance the agency's goal of operating a bus fleet that is 70% electric by 2035 under its "Proud to Change" Zero Emissions and Sustainable Transportation Program.

In June 2023, CTE held an initial kickoff with PGC staff to discuss project expectations. An on-site project kickoff event will be held when all project partners have been contracted. CTE is aiding the contracting process for the project's microgrid by analyzing the expected power needs of PGC's BEB fleet and translating those needs into specific scope specifications. The microgrid is expected to manage PGC's bus chargers, generate power via on-site solar arrays and compressed natural gas power generators, store power via a battery energy storage system, bolster resiliency, and reduce PGC's utility costs.

As of July 2025, CTE has performed modeling to determine the feasibility of PGC operating BEBs on its routes under various conditions and to develop recommendations for optimal charging scenarios. CTE will next conduct a utility rate analysis, which will provide PGC with estimates for the cost of fueling its BEBs using both the utility grid and a microgrid.

Once the project's buses and infrastructure are deployed, CTE will provide performance validation testing services and key performance indicator monitoring and reporting services.

Salem Area Mass Transit District Zero-Emission Battery Electric Bus and Related Facilities Project



Overview

Client: Salem Area Mass Transit District

Project Duration: Sep. 2020 – Jan. 2026

Value

Project Value: $14,453,580

CTE Project Value: $512,000

Project Managers

Todd Walton, *Senior Engineering Consultant* (SPM)

Cynthia Gibson, *Lead Managing Consultant* (PM)

Project Staff

Jackson Danis, *Engineering Consultant*

Oliver Parker, *Engineering Associate*

Andersson Niepoky, *Associate*

Project Description

The Center for Transportation and the Environment (CTE) partnered with Salem Area Mass Transit District (Cherriots) for a successful award under the Federal Transit Administration's Low or No Emission Vehicle Program in 2020 and 2021. CTE is working with Cherriots to deploy ten battery electric buses (BEBs) with depot and inductive on-route charging in order to transition Route 11 to 100% zero-emission buses. Cherriots' intent is to provide emission-reduction benefits to the Route 11 corridor, which includes critical support services for populations at high risk due to poor air quality.

CTE assisted Cherriots with the procurement of ten 40' battery electric transit buses from GILLIG. In January 2021, CTE completed a requirements analysis involving data collection, block feasibility analyses, charge modeling, and rate modeling to inform technical specifications, operational planning, and preliminary fuel cost estimates for ten GILLIG buses that will operate from the Del Webb Transit Depot Facility and use inductive charging at Keizer Transit Center. In February 2022, CTE completed a second round of requirements analysis for the second five GILLIG buses to inform battery configuration, route planning, and charger setup for the Keizer Transit Center as delayed mitigation planning. Cherriots received the ten GILLIG BEBs in June 2023, and CTE completed performance validation in Q1 of 2024. Charging infrastructure in both locations was completed in May 2024. Due to construction delays at the Del Webb Transit Facility and Keizer Transit Center, revenue service didn't start until September of 2024. CTE began tracking performance data on January 1, 2025 and have provided monthly key performance indicator reports to Cherriots since February 2025. Project completion is planned for January 2026.

Santa Maria Low-No 2022

Overview

Client: Santa Maria Regional Transit

Project Duration: Aug. 2023 – Jun. 2026

Value

Project Value: $7,940,802

CTE Project Value: $320,000

Project Managers

Erik Bigelow, *Managing Director of Engineering Services* (SPM)

Chase Stell, *Managing Consultant* (PM)

Project Staff

Alexis Hedges, *Engineering Consultant*

Hana Ba-Sabaa, *Lead Engineering Associate*

Carson Downs, *Strategic Software Developer*



Project Description

The Center for Transportation and the Environment (CTE) is supporting Santa Maria Regional Transit (SMRT) in the deployment of eight 35' GILLIG battery electric buses (BEBs). CTE has performed route, charger, and utility cost modeling, and will conduct performance validation testing, provide 12 months of key performance indicator reporting, and monitor project risks, requirements, and schedules.

SMRT received funding through the Federal Transit Administration's 2022 Low or No Emissions Vehicle Program (Low-No). CTE has created a project schedule in coordination with the project team based on timelines and details of the charging infrastructure buildout and bus deployment. CTE is providing technical advisory and monitoring project risks, requirements, and scheduling during the initial startup of the project.

Technical advisory tasks to date have included development of BEB fire safety planning documentation and a BEB on-route charging analysis.

Solano County Transit 2023 Low-No Battery Electric Bus Deployment



Overview

Client: Solano County Transit

Project Duration: May 2024 – Sep. 2026

Value

Project Value: $18,421,303

CTE Project Value: $369,000

Project Managers

Niki Rinaldi El-Abd, *Senior Managing Consultant* (SPM)

Anna Staddon, *Managing Consultant* (PM)

Project Staff

Hana Ba-Sabaa, *Lead Engineering Associate*

Ethan Chung, *Associate*

Project Description

The Center for Transportation and the Environment (CTE) partnered with Solano County Transit (SolTrans) for a successful award under the Federal Transit Administration's Low or No Emission Vehicle Program (Low-No). CTE is working with SolTrans to deploy fourteen (14) battery electric buses (BEBs). The award also included funding for supporting charging infrastructure in the form of ten (10) plug-in chargers at the depot and three (3) on-route inductive chargers. This project aims to replace aging diesel-electric hybrid buses serving the southern Solano County cities of Vallejo and Benicia. SolTrans' goal is to transition to a 100% zero-emission fleet. SolTrans has already completed the deployment of five BYD BEBs, which serve their school day routes, and charge infrastructure to support the buses. The agency owns one (1) surface-mounted and two (2) wall-mounted plug-in chargers. Inductive charging infrastructure was also installed, commissioned, and in service at Curtola Park as of 2022.

CTE will support SolTrans with technical advisory services throughout the project to ensure an understanding of the differences in technology and the best practices for deploying and operating zero-emission buses. CTE has completed the bus and route analysis, charging profiles, and rate modeling. The analysis concluded in Bus and Route Analysis and Charge and Rate Modeling presentations that will inform SolTrans' operational decisions. Following the delivery of the buses, CTE validated the performance of the buses against specifications and modeling results. CTE is currently working on preparing the Validation Test Report that will summarize these results. Once the buses are placed in revenue service, CTE will collect operational data to ensure the buses are performing as expected. As a first step, a Key Performance Indicator (KPI) Workshop is scheduled for August 2025 to prepare for this KPI reporting period. As part of KPI reporting, CTE will assess energy savings, cost savings, and emissions reductions resulting from the deployment.

SouthWest Transit Low-No 2022 Battery Electric Bus Deployment



Overview

Client: SouthWest Transit

Project Duration: May 2023 – Dec. 2028

Value

Project Value: $9,563,072

CTE Project Value: $500,000

Project Managers

Erik Bigelow, *Managing Director of Engineering Services* (SPM)

Chase Stell, *Managing Consultant* (PM)

Project Staff

Christine Ohenzuwa, *Lead Engineering Associate*

Carson Downs, *Strategic Software Developer*

SW
SouthWest Transit

Project Description

The Center for Transportation and the Environment (CTE) is supporting SouthWest Transit (SWT) in the deployment of four 45' Motor Coach Industries battery electric coaches and six battery electric cutaways. As part of its Smart Deployment Methodology, CTE is conducting bus, charger, and utility cost modeling, developing bus and charger specifications, and conducting a request for proposals process for cutaways. CTE will also conduct performance validation testing and provide 12 months of key performance indicator reporting.

SWT received funding through the Federal Transit Administration's 2022 Low or No Emissions Vehicle Program (Low-No). CTE has created a project schedule in coordination with the project team based on timelines and details of the charging infrastructure buildout and bus deployment. CTE is monitoring project risks, requirements, and scheduling during the initial startup of the project.

Stockton to Zero Emissions: Electric School Bus Deployment Project



Overview

Client: Stockton Unified School District

Project Duration: Jun. 2020 – Jun. 2025

Value

Project Value: $7,309,777

CTE Project Value: $766,273

Project Managers

Erik Bigelow, *Managing Director of Engineering Services* (SPM)

Chase Stell, *Managing Consultant* (PM)

Project Staff

AJ Artis, *Lead Associate*

Project Description

The Center for Transportation and the Environment (CTE) partnered with Stockton Unified School District (SUSD), Schneider Electric, NV5 (Sage Energy Consulting), The Mobility House, and ViriCiti on the California Air Resources Board's (CARB) Clean Mobility in Schools (CMIS) Grant Program for the Getting Stockton to Zero-Emissions: Clean Air for Our Community project. The project deployed electric school buses, electric lawn and garden equipment, and related charging infrastructure; created a master plan detailing the most effective way to achieve a zero-emission school district; and aims to communicate the project's results to the community and SUSD's students.

CTE provided project management and technical services for SUSD on the vehicle and equipment procurement and deployment, long-term fleet planning, data collection and reporting, and community outreach efforts. CTE was the architect of the long-range zero-emission plan and the community outreach plan. CTE also oversaw all reporting requirements for CARB including quarterly reports, project invoicing, and data collection management. CTE coordinated frequent calls with SUSD, along with monthly coordination calls with project partners and project update calls with CARB.

In addition, CTE performed ongoing Key Performance Indicator reporting for Stockton's current deployment of 11 electric school buses. Data reporting was done in accordance with CARB guidelines, and reports were delivered to SUSD staff to provide insight into trends in vehicle performance. Vehicle performance metrics informed long-range fleet transition planning, as CTE assessed the feasibility of transitioning SUSD's service to a zero-emission fleet. The plan also provided estimates of both capital and operational costs over the transition period.

CTE also worked closely with Stockton staff on the outreach and engagement associated with the project. This included planning and execution of community events, video creation documenting various project aspects, curriculum for students, and projects related to engagement with local partners and stakeholders.

SUSD continued its participation in the CMIS Grant Program by an extension to the grant through an amendment which includes the purchase of four new zero-emission school buses and supporting charging infrastructure. As a part of this grant extension, CTE extended its project management, community outreach, and reporting services until the project concluded on June 30, 2025.

Transfort Deployment of Battery Electric Buses for the City of Fort Collins, Colorado





Overview

Client: City of Fort Collins, Transfort

Project Duration: Feb. 2022 – Dec. 2025

Value

Project Value: $4,103,210

CTE Project Value: $150,000

Project Managers

Kylie McCord, *Director of Planning & Deployment* (SPM)

Aaron Wright, *Managing Consultant* (PM)

Project Staff

Will Chabot, *Engineering Consultant*

Ethan McNally, *Lead Engineering Associate*

Project Description

The Center for Transportation and the Environment (CTE) partnered with the City of Fort Collins for a successful award under the Federal Transit Administration's (FTA) Low or No Emission Vehicle Program. CTE is working with the City of Fort Collins' transit agency, Transfort, to deploy eight GILLIG battery electric buses (BEBs). CTE will provide limited technical consultation on the subjects of bus procurement and infrastructure design and build and will produce a final report to be delivered to the FTA.

Under a separate project, CTE prepared a zero-emission fleet transition plan for Transfort. CTE analyzed the results from route and vehicle modeling done in the second part of the zero-emission fleet transition plan to evaluate different charging scenarios and develop an energy consumption model. Transfort will use this model as a guide for making operational decisions.

The first two BEBs were delivered in April 2024. CTE conducted tests to validate route performance, auxiliary/HVAC load, regenerative braking, charging and battery capacity, and driver efficiency. CTE worked with Transfort during a key performance indicators (KPI) planning workshop to create BEB program objectives, reporting requirements, and establish the data collection process. The BEBs began revenue service at the end of 2024. Following deployment, CTE began collecting and analyzing operational data, which is summarized in quarterly KPI reports and will continue through December 2025.

Union City Transit Low-No 2022 Battery Electric Bus Deployment

Overview

Client: Union City Transit

Project Duration: Sep. 2024 – Jan. 2026

Value

Project Value: $9,442,343

CTE Project Value: $75,000

Project Managers

Kylie McCord, *Director of Planning & Deployment* (SPM)

Will Handke, *Managing Consultant* (PM)

Project Description

The Center for Transportation and the Environment (CTE) partnered with Union City Transit (Union City) on a successful grant application to the Federal Transit Administration's (FTA) 2022 Low or No Emission Vehicle Program (Low-No). Under Union City's Low-No Project, the agency, with CTE's assistance, will deploy fourteen 35' GILLIG battery electric buses (BEBs) and eight 150 kW chargers from ABB. These BEBs will replace existing compressed natural gas (CNG) powered buses that have reached the end of their useful lives. Following this deployment of BEBs, more than 75% of Union City's transit bus fleet will utilize zero-emission battery electric propulsion systems. Union City's goal is to transition to a 100% zero-emission fleet. Union City engaged CTE to provide technical advisory and route, charging, and cost modeling services to support its BEB and charger deployment. Project activities got underway in September 2024.

CTE initially collected GPS data on five of Union City's key routes and processed that data into models of those routes. Using these routes models and models of Union City's future BEBs, CTE analyzed the feasibility of BEBs performing the agency's blocks under various operating conditions. CTE delivered the results of its analysis to Union City in January 2025. CTE found that if Union City's planners optimally assigned blocks to its BEBs, the BEBs could be expected to complete any of the agency's blocks for the lifetime of the vehicles.

CTE followed up its block feasibility analysis with an assessment of the feasibility of Union City's plan to charge its BEBs overnight using ABB's 150 kW sequential chargers. CTE found that the agency's plan was feasible and suggested various strategies to optimize charging operations in order to mitigate potential operational interruptions.

CTE then analyzed Union City's expected costs to charge its BEBs and reviewed approaches to reduce those costs. CTE found that Union City's costs to charge its BEBs will be 21-42% cheaper than fueling its CNG buses, depending on the approach that Union City utilizes.

Throughout Spring 2025, CTE assisted Union City in the execution of its project by reviewing charger installation design documents and by tracking the project's design, scoping, funding, and procurement deliverables and milestones.

University of Georgia Battery Electric Bus Build Support and Inspection Services





Overview

Client: University of Georgia

Project Duration: Jan. 2024 – Jul. 2025

Value

Project Value: $116,000

CTE Project Value: $116,000

Project Managers

Kylie McCord, *Director of Planning & Deployment* (SPM)

Thomas Duke, *Managing Consultant* (PM)

Project Staff

Rebecka Moreno, *Lead Engineering Consultant*

Ethan McNally, *Lead Engineering Associate*

Project Description

The Center for Transportation and the Environment (CTE) supported the University of Georgia (UGA) in the build process for additional New Flyer battery electric buses. CTE monitored and provided feedback as requested by UGA throughout the design, pre-production, build, testing, and acceptance stages. This involvement included reviewing configuration, specifications, acceptance criteria, inspection processes, and the build schedule. CTE also held regular status update meetings with UGA and New Flyer once the build was underway.

CTE also facilitated pre- and post-delivery Buy America audits to ensure the buses met Buy America requirements, as well as pre- and post-delivery inspections, addressing any issues that arose during the build process and after delivery and monitored the resolution of any issues. CTE was available on-call to provide technical guidance throughout the project as well.

Additionally, CTE supported UGA during their “rip-and-replace” of Proterra chargers with Borg-Warner chargers through EO Charging.

University of Michigan Electric Vehicle Bus Consulting



Overview

Client: University of Michigan

Project Duration: May 2023 – Oct. 2027

Value

Project Value: $497,200

CTE Project Value: $497,200

Project Managers

Erik Bigelow, *Managing Director of Engineering Services* (SPM)

Jackson Danis, *Engineering Consultant* (PM)

Project Staff

Oliver Parker, *Engineering Associate*

Project Description

The Center for Transportation and the Environment's (CTE) scope of work for the University of Michigan Electric Vehicle Bus Consulting project included bus modeling, route simulation, charge modeling, rate modeling, and confirmation of the technical specifications for two 60' and six 40' New Flyer buses as well as four Siemens chargers recently acquired by the University of Michigan. CTE was also tasked with validating the performance and operation of the buses and chargers through our performance validation approach. Additionally, CTE developed and reported on key performance indicators (KPI) beginning in September 2023. CTE continues to provide KPI reporting through a dashboard and quarterly presentations.

For the expansion and transition planning, CTE reviewed available battery electric bus (BEB), fuel cell electric bus (FCEB), and renewable diesel technologies to assess applicable bus and paratransit configurations that would be appropriate for the University's service for each of five scenarios: Depot-Charged BEBs, Depot & On-Route-Charged BEBs, FCEBs, mixed fleet of Depot-Charged BEBs and FCEBs, and a renewable diesel fleet. CTE developed approximate fleet cost estimates for each scenario including any necessary footprint expansions or additional fleet needs to operate at current service levels.

CTE also conducted route modeling for the University of Michigan team using bus specification data, Michigan's current service plan, and GPS data collected from an existing diesel bus running blocks on specified routes. The results of the modeling determined that the 40' New Flyer BEBs will be able to complete the majority of Michigan's intended routes for the fall service, while the number of route options for the 60' BEBs is significantly more limited.

CTE further conducted testing to validate the performance of the New Flyer BEBs on Michigan's routes and the charging with Siemens depot chargers. Results of the testing indicated that both the 40' and 60' buses have lower tractive energy consumption than predicted by the modeling results, and the expected service range is longer.

In 2024 CTE finalized an extension with the University of Michigan for three additional years of KPI reporting, through September 2027, which is ongoing. This reporting has shown that the BEBs operated by the University consistently cost less per mile to fuel and maintain than both diesel and diesel-hybrid buses, and that the BEB fleet has reached parity with diesel and diesel-hybrid fleets on a miles-driven per bus per month basis.

Valley Regional Transit Low-No 2022 Battery Electric Bus Deployment



Overview

Client: Valley Regional Transit

Project Duration: Apr. 2023 – Jan. 2027

Value

Project Value: $17,386,450

CTE Project Value: $535,000

Project Managers

Todd Walton, *Senior Engineering Consultant* (SPM)

Cynthia Gibson, *Lead Managing Consultant* (PM)

Project Staff

Jackson Danis, *Engineering Consultant*

Hana Ba-Sabaa, *Lead Engineering Associate*

Project Description

Valley Regional Transit (VRT), a public transit agency serving the metropolitan area of Boise, Idaho, partnered with the Center for Transportation and the Environment (CTE) and Jacobs on a successful award under the Federal Transit Administration's 2022 Low or No Emission Vehicle Program (Low-No). VRT will deploy seven 35' GILLIG battery electric buses (BEBs), four Heliox depot chargers, and eight Heliox overhead chargers.

This deployment is the next phase of VRT's effort to expand its electric bus fleet in order to reduce emissions and improve rider experience. The deployment will occur alongside the redevelopment of State Street, a major transit corridor in Boise, which is funded by a Department of Transportation Rebuilding American Infrastructure with Sustainability and Equity grant. The seven BEBs purchased under this project will join 12 others that are already operated by VRT.

The project was kicked off in early May 2023. Since its kickoff, CTE has completed four major project deliverables. Shortly after the project's launch, CTE created and submitted a Project Workbook, which comprehensively documents the project's key background information, objectives, resources, partners, risks, milestones, and implementation plans. In June and July 2023, CTE delivered three modeling analyses which project the energy efficiencies of future BEBs servicing VRT routes under various operating conditions, anticipate the feasibility of future BEBs completing VRT's blocks under various charging and bus specification scenarios, and estimate the charging costs associated with these scenarios. Since the delivery of these analyses, CTE has continued to provide additional modeling services and insights to VRT in response to specific ad hoc requests. CTE completed a review of the battery electric bus specifications ahead of VRT finalizing the BEB contract.

BEB delivery is expected in October 2025. Once the project's BEBs and chargers have been deployed, CTE will perform validation testing to verify that the real-world performance of the delivered assets matches their expected performance. Once the project's buses and chargers are in service, CTE will collect, analyze, and provide reporting to VRT on key performance indicators for 12 months.

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FEATURED PROJECTS



CEC NorCAL Drayage Zero-Emission Regional and Drayage Operations with Fuel Cell Electric Trucks



Champaign-Urbana Mass Transit District Fuel Cell Electric Bus Deployment Support

Butte County Zero-Emission Public Transit Hydrogen Fueling

Overview

Client: Butte Country Association of Governments

Project Duration: Aug. 2024 – Jun. 2026

Value

Project Value: $223,850

CTE Project Value: $223,850

Project Managers

Niki Rinaldi El-Abd, *Senior Managing Consultant* (SPM)

Chase Stell, *Managing Consultant* (PM)

Project Staff

Ethan McNally, *Lead Engineering Associate*

Chloe Frank, *Associate*



Project Description

The Center for Transportation and the Environment (CTE) is supporting the Butte County Association of Governments (BCAG) with a variety of crucial hydrogen projects including fuel cell electric bus (FCEB) and route analysis, hydrogen fuel station and fuel cost modeling, fueling infrastructure procurement, and workforce development. CTE previously partnered with BCAG to develop a Zero-Emission Bus (ZEB) Fleet Transition Plan in 2022.

Over the course this project, CTE has worked to ensure that BCAG's planned site can accommodate new hydrogen fueling infrastructure key to BCAG's acquisition of FCEBs by providing a sketch of depot facilities, developing a phasing plan for construction and fleet expansion, and supporting pre-permitting activities.

CTE also conducted data collection and bus and route modeling using BCAG's existing fleet and the New Flyer FCEB in order to evaluate fueling requirements, inform vehicle technical specifications, and validate performance assumptions made in BCAG's existing transition plan. CTE also used data collected during the bus and route analysis to perform fuel cost modeling for the station. CTE will use this data to inform fueling station requirements for the depot, supporting BCAG in procuring a new hydrogen fueling station.

In order to ensure that BCAG's transit workforce is well-equipped to operate and maintain a zero-emission fleet, CTE analyzed gaps between BCAG's current and future skill needs. CTE also developed a roadmap for BCAG to provide its workforce with essential training across impacted departments, ensuring that BCAG's current workforce will not be displaced by a transition to ZEBs in accordance with FTA guidance.

CEC NorCAL Drayage Zero-Emission Regional and Drayage Operations with Fuel Cell Electric Trucks



Overview

Client: California Air Resources Board & California Energy Commission

Project Duration: Jun. 2021 – Mar. 2026

Value

Project Value: $54,608,673

CTE Project Value: $21,878,132

Project Managers

Jaimie Levin, *Director of West Coast Operations* (SPM)

Niki Rinaldi El-Abd, *Senior Managing Consultant* (SPM)

Project Staff

Julia Schultz, *Engineering Consultant*

Hana Ba-Sabaa, *Lead Engineering Associate*

Chloe Frank, *Associate*

Project Description

The Center for Transportation and the Environment (CTE) is the prime recipient and project manager of a grant to support the deployment of 30 Hyundai XCIENT Class 8 hydrogen fuel cell electric trucks (FCETs) in Northern California. The grant is partially funded by California Climate Investments and was awarded by the California Air Resources Board (CARB) and the California Energy Commission (CEC) Clean Transportation Program. Funding from CARB supported vehicle financing while funding from CEC supported the infrastructure and maintenance facilities. The project is also funded by $7 million in cost-share funding provided by the Alameda County Transportation Commission and the Bay Area Air District.

The vehicles were designed and manufactured by Hyundai Motor Company. Glovis America operates the FCETs around the Port of Oakland with a heavy-duty hydrogen fueling station built and operated by FirstElement Fuel (FEF) located at the East Bay Municipal Utility District facility in Oakland. The station can support up to 200 trucks and back-to-back fueling with fuel provided by Air Liquide. With engineering and design support from the Fiedler Group, Papé Trucks upgraded its existing maintenance facility with hydrogen detection and ventilation equipment to safely service the FCETs. West Oakland Environmental Indicators Project assisted the project team with community outreach efforts and communications with port officials, local agencies, and Oakland neighborhood groups. The University of California, Berkeley, assisted the project team with data collection and outreach.

CTE is serving as the project manager, managing the flow of funds and all communications with project team members, and leading the development of key project deliverables. CTE led the team in drafting a vehicle production plan describing the vehicle delivery timeline and plans for obtaining required certifications. CTE led a maintenance facility assessment to determine the upgrades for maintaining hydrogen-fueled vehicles at Papé Trucks and also led the team in drafting a community outreach plan detailing procedures for engaging the local community, including residents of West Oakland and local truck drivers that operate in and around the Port.

Glovis has deployed all 30 trucks, fueled by FEF at the heavy-duty truck station. The light-duty station was opened to the public in July 2024 and the heavy-duty fueling station was opened for 24/7 operation on August 30, 2024. CTE will continue to act as project manager for the remainder of the project and will support data reporting efforts during this period. CTE provided a final report to CARB and CEC in June 2025.

The Center for Transportation and the Environment Launches NorCAL ZERO Project

Read the Article

Champaign-Urbana Mass Transit District Fuel Cell Electric Bus Deployment Support



Overview

Client: Champaign-Urbana Mass Transit District

Project Duration: Dec. 2022 – Jun. 2026

Value

Project Value: $478,672

CTE Project Value: $403,672

Project Managers

Alison Smyth, *Senior Engineering Consultant* (SPM)

Grace Leslie, *Managing Consultant* (PM)

Project Staff

Hana Ba-Sabaa, *Lead Engineering Associate*

Project Description

The Center for Transportation and the Environment (CTE) is working with the Champaign-Urbana Mass Transit District (MTD) to support the deployment of ten 40’ fuel cell electric buses (FCEBs) and provide ongoing data reporting and operational support for both the new 40’ and existing 60’ FCEBs. CTE and Transworld Associates (TWA) assisted with the procurement and production of the 40’ buses, including quality assurance and inspection services throughout the build process. CTE also coordinated with New Flyer and station provider Trillium to estimate fleet fuel usage, confirm fueling time requirements, and ensure the station control strategy could accommodate the expanded fleet.

To support operations, CTE prepares monthly key performance indicator (KPI) reports tracking bus and hydrogen station performance, as well as environmental impact. These insights are visualized through a custom dashboard that compiles MTD’s data streams into an accessible, fleet-level performance summary.

In the second phase of the project, CTE is assisting MTD with planning a hydrogen station expansion to support delivered liquid hydrogen in addition to on-site production. This work includes evaluating current station performance, modeling future fuel demand, assessing infrastructure and throughput needs, and developing high-level site layout concepts. CTE will also provide technical input for future grant applications and assist in the development of procurement documents for station equipment and hydrogen fuel supply, serving as a technical advisor throughout the request for proposals process.

10 FCEBs:
40’ fuel cell electric buses deployed

Custom Dashboard Visualization:
Converts complex operational data into accessible fleet-level performance summaries

Department of Energy Regional Clean Hydrogen Hubs

Overview

Client: Alliance for Renewable Clean Hydrogen Energy Systems

Project Duration: Jul. 2024 – Dec. 2033

Value

Project Value: $12,600,000,000

CTE Project Value: $13,067,140

Project Managers

Jaimie Levin, *Director of West Coast Operations (*SPM)

Niki Rinaldi El-Abd, *Senior Managing Consultant* (SPM)

Saphonia Foster, *Managing Consultant* (PM)

Project Staff

Ethan Chung, *Associate*

Project Description

In this project, the Center for Transportation and the Environment (CTE) has partnered with the Alliance for Renewable Clean Hydrogen Energy Systems (ARCHES) for a successful award under the Department of Energy's Regional Clean Hydrogen Hubs (H2 Hubs). CTE will leverage its Zero-Emission Smart Deployment Methodology to provide tailored project support for the procurement of over 1,000 fuel cell electric buses (FCEBs) and supporting infrastructure across 12 California transit agencies: Alameda-Contra Costa Transit District, Foothill, Fresno Area Express, Gold Coast Transit District, Livermore Amador Valley Transit Authority, North County Transit District, Omnitrans, Riverside Transit Agency, San Mateo County Transit District, San Joaquin Regional Transit District, Santa Cruz Metro, and SunLine. The ARCHES H2 Hub project aims to reduce costs for fuel cell electric vehicles, hydrogen, and supporting infrastructure, bridging the gap needed for hydrogen market expansion. A key driver of market expansion will be the ARCHES Marketplace, which will leverage large-volume procurements from multiple producers to strengthen supplier resilience, lower hydrogen costs, and centralize the procurement process for offtakers, supported by the state government.

Currently, CTE is providing guidance to transit agencies navigating the National Environmental Policy Act process, with the goal of securing categorical exclusions for bus and station procurements. In parallel, Lawrence Berkeley National Laboratory, with support from CTE, is conducting a systemwide ARCHES analysis to quantify program-related emission reductions and assess their impacts on air quality and public health.

The transit agencies plan to implement an incremental deployment strategy for FCEBs from 2024 to 2032, with an estimated need for 32,360 metric tons of hydrogen per day by 2032. CTE will work closely with the transit agencies to develop a practical implementation plan, addressing ARCHES funding commitments and any necessary adjustments to the original proposal.

To support this transition to zero-emission technologies, CTE will support workforce training programs to equip staff with the skills required for safe and efficient operations. CTE will also regularly monitor and report on pre-deployment activities to promote transparency and continuous improvement.

In the post-deployment phase, CTE will assess the hydrogen fueling infrastructure for FCEBs using key performance indicators that focus on reliability, efficiency, and user satisfaction. CTE will run a comprehensive cost analysis comparing capital and operational expenses between FCEBs, traditional diesel buses, and battery electric buses.

CTE to Lead 1,000-Bus Initiative as DOE Signs $12.6 Billion Agreement for California's Regional Clean Hydrogen Hub Project

Read the Article

Gold Coast Low-No 2022 Fuel Cell Electric Bus Deployment



Overview

Client: Gold Coast Transit District

Project Duration: Jan. 2023 – Apr. 2027

Value

Project Value: $12,117,144

CTE Project Value: $564,000

Project Managers

Todd Walton, *Senior Engineering Consultant* (SPM)

Chase Stell, *Managing Consultant* (PM)

Project Staff

Andersson Niepoky, *Associate*

Project Description

The Center for Transportation and the Environment (CTE) partnered with Gold Coast Transit District (GCTD) for a successful award under the Federal Transit Administration's 2022 Low or No Emission Vehicle Program (Low-No). CTE is working with GCTD to deploy five 40' New Flyer hydrogen fuel cell electric buses (FCEBs), a hydrogen fueling station that will be able to support 50 buses, and maintenance facility upgrades to add hydrogen detection and alarming capabilities. The five New Flyer FCEBs in this project will replace GCTD's aging compressed natural gas (CNG) buses that are at or near the end of their useful lives. By replacing aging fleet vehicles with the New Flyer FCEBs, GCTD will improve both route efficiency and provide direct air quality benefits to the surrounding community. CTE will provide technical project management and support. CTE will support GCTD in issuing a request for proposals (RFP) for the hydrogen fueling infrastructure and an RFP for the facility upgrades.

The goal of this project is to directly mitigate climate change impacts and to benefit GCTD's community by replacing GHG-emitting CNG buses with zero-emission FCEBs. This project supports the City of Oxnard's Climate Action & Adaptation Plan. GCTD complies with and is committed to meeting all requirements of California's Innovative Clean Transit Regulation, which requires transit agencies in California to fully transition their fleets to zero-emission vehicles by 2040. This project also allows GCTD to easily expand its fleet of zero-emission buses since the hydrogen fueling station will support up to 50 buses.

CTE and GCTD began bus procurement and infrastructure activities in June of 2023. GCTD will acquire the New Flyer FCEBs off the California State contract. New Flyer provided a FCEB proposal and technical specifications. CTE and GCTD collaborated on the development of an infrastructure RFP, which was published in May 2024. After evaluating multiple proposals, GCTD selected Clean Energy to be its hydrogen station provider. GCTD issued a notice to proceed to Clean Energy in June 2025 which allowed Clean Energy to immediately proceed with design and engineering. Bus line entry has since been delayed to July of 2026 due to infrastructure build delays. CTE and GCTD are also partnering on a facilities upgrade scope of work to accommodate its upcoming FCEBs. This request for qualifications is scheduled to be advertised in 3Q25

The project is anticipated to be completed in the second quarter of 2027. The current project timeline includes eight phases: Project Planning and Initiation; Bus Procurement and Build; Infrastructure Procurement, Design and Build; Bus and Infrastructure Deployment; Deployment Validation and Key Performance Indicators; Project Close-Out; and Project Management, Administration, Reporting, and Control.

Greater Lafayette Public Transportation Low-No 2023 Fuel Cell Electric Bus Deployment



Overview

Client: Greater Lafayette Public Transportation Corporation

Project Duration: Aug. 2023 – Apr. 2027

Value

Project Value: $8,869,834

CTE Project Value: $745,000

Project Managers

Kylie McCord, *Director of Planning & Deployment* (SPM)

Will Handke, *Managing Consultant* (PM)

Project Staff

Alison Smyth, *Senior Engineering Consultant*

Shelby Gamache, *Lead Associate*

Project Description

The Greater Lafayette Public Transportation Corporation (CityBus) provides bus transit services in Tippecanoe County, Indiana. CityBus contracted with the Center for Transportation and the Environment (CTE) to provide project management, technical advisory, deployment support, and performance validation services for its procurement of four 40' New Flyer hydrogen fuel cell electric buses (FCEBs) and a hydrogen fueling station. CTE's hiring followed a successful application to the Federal Transit Administration's 2023 Low or No Emission grant program, which CTE supported. This deployment of FCEBs will be CityBus's and Indiana's first.

The project kicked off in November 2023. Initially, CTE assessed the feasibility of 40' New Flyer FCEBs completing CityBus's blocks. After collecting and analyzing data on CityBus's routes, CTE delivered its performance modeling results in March 2024.

Concurrently, CTE supported CityBus to site, scope, and assess the capabilities of a hydrogen station offered by an infrastructure partner. After several months of effort, CityBus decided to instead pursue a competitive solicitation for a hydrogen station for its future FCEBs.

CTE supported this new strategy by developing key materials for the procurement process, including a scope of work, technical requirements, price proposal form, and evaluation criteria. Additionally, CTE estimated hydrogen fuel costs and usage for multiple station scenarios using a custom-built tool. Ultimately, CityBus contracted with DLZ and IVYS Energy Solutions in April 2025.

As of July 2025, CTE is assisting CityBus with its bus specification process, helping to coordinate station design and site preparation activities, monitoring the permitting process for the station, tracking the procurement of the station's key equipment components, aiding the procurement of a fuel supply for the station, and estimating the future fuel costs of CityBus's FCEBs.

Once CityBus's hydrogen station and buses are deployed in Q1 2026, CTE will help to validate the performance of these critical assets.

Indiana's First Hydrogen Fuel Cell Buses:
Four 40' New Flyer FCEBs to be deployed by CityBus.

Greater Lafayette Public Transportation Commission Low-No 2024 Fuel Cell Electric Bus Deployment

Overview

Client: Greater Lafayette Public Transportation Corporation

Project Duration: Dec. 2024 - Jul. 2028

Value

Project Value: $12,250,960

CTE Project Value: $492,000

Project Managers

Kylie McCord, *Director of Planning & Deployment* (SPM)

Will Handke, *Managing Consultant* (PM)

Project Staff

Alison Smyth, *Senior Engineering Consultant*

Shelby Gamache, *Lead Associate*

Project Description

The Greater Lafayette Public Transportation Corporation (CityBus) provides bus transit services in Tippecanoe County, Indiana. With the Center for Transportation and the Environment's (CTE) assistance, CityBus won an award from the Federal Transit Administration's 2024 Low and No Emission Vehicle Grant Program. CityBus then contracted with CTE to provide project management, technical advisory, deployment support, and performance validation services for its procurement of four additional 40' New Flyer hydrogen fuel cell electric buses (FCEBs), the installation of a hydrogen fueling station, and the upgrading of its maintenance facilities to enable indoor FCEB maintenance.

The project got underway in December 2024. Initially, CTE developed a comprehensive scope of work for a procurement document that would be used to secure an engineering firm to provide CityBus with services to assess the pathways to upgrading the agency's maintenance facility to allow for the code-compliant indoor maintenance of FCEBs.

Following the finalization of this document, CTE helped CityBus to execute the procurement process for the engineering firm. During this process, CTE reviewed proposal documents and provided assessments of how well the documents met the procurement's evaluation criteria. CTE will soon aid CityBus to conduct interviews with three proposers.

Additionally, CTE worked to contract the services of the Hydrogen Safety Panel, a group of experts specializing in hydrogen station design and safety, to review the designs of CityBus's future station.

Lastly, CTE provided ongoing project management services to ensure that the project's bus procurement and hydrogen station design, construction and installation tasks remained on track.

Four additional 40' New Flyer hydrogen FCEBs will expand CityBus's existing fleet of four.

Hydrogen fueling station installation plus maintenance facility upgrades for code-compliant indoor FCEB work.

Technology Development | Smart Deployment | Transition Planning | Outreach & Education

Montgomery County Low-No 2022 Fuel Cell Electric Bus Deployment

Overview

Client: Montgomery County, Maryland

Project Duration: Nov. 2024 – Sep. 2028

Value

Project Value: $14,955,139

CTE Project Value: $482,000

Project Managers

Kylie McCord, *Director of Planning & Deployment* (SPM)

Maggie Maddrey, *Lead Managing Consultant* (PM)

Project Staff

Alison Smyth, *Senior Engineering Consultant*

Alexis Hedges, *Engineering Consultant*

Kellsie Rogers, *Associate*

Project Description

The Center for Transportation and the Environment (CTE) partnered with Montgomery County Department of Transportation (MCDOT) for a successful award under the Federal Transit Administration's 2022 Low or No Emission Vehicle Program (Low-No). MCDOT manages the county's primary public transportation system, named Ride On. CTE is working with Montgomery County to deploy thirteen 60' fuel cell electric buses (FCEBs) that will replace diesel-fueled buses, as well as a hydrogen fuel cell electrolyzer facility and fueling station in collaboration with Love's Alternative Energy. CTE will use its Smart Deployment Methodology to guide the project through eight unique phases.

CTE is providing project planning and management, bus modeling, route simulation and analysis, and technical advisory and support throughout the design/build of both the hydrogen fueling station and the facility modifications to support hydrogen fueling.

CTE will also assist throughout the FCEB procurement, design, and manufacturing, providing guidance and oversight as needed. Once the FCEBs are deployed, CTE will collect operational data to help the County better understand the performance of the buses.

As of July 2025, CTE has completed route modeling, and the project team is awaiting contract execution between Montgomery County and Love's for the design and construction of the hydrogen fueling station. Additionally, the pre-production meeting with New Flyer took place in July 2025 and buses are slated to start production January 2026.

Thirteen 60' Hydrogen FCEBs:
Replacing diesel buses in Montgomery County's Ride On fleet.

Hydrogen Electrolyzer & Fueling Station:
Developed in collaboration with CTE Member Love's Alternative Energy.

San Mateo County Transit District Fuel Cell Electric Bus and Infrastructure Feasibility Analysis



Overview

Client: San Mateo County Transit District

Project Duration: Apr. 2022 – Sep. 2025

Value

Project Value: $600,000

CTE Project Value: $583,586

Project Managers

Jaimie Levin, *Director of West Coast Operations (*SPM)

Will Handke, *Managing Consultant* (PM)

Project Staff

Alison Smyth, *Senior Engineering Consultant*

Shelby Gamache, *Lead Associate*

Project Description

The San Mateo County Transit District (SamTrans) contracted the Center for Transportation and the Environment (CTE) in April 2022 to evaluate the feasibility of deploying 10 hydrogen fuel cell electric buses (FCEBs). After CTE reported its findings to SamTrans in July 2022, the agency had CTE explore the feasibility of converting SamTrans' entire North Base fleet to FCEBs. To complete this, CTE did the following tasks:

- Site visits to assess locations for the placement of interim and permanent fueling stations and to determine facility upgrades required to safely maintain and operate FCEBs.
- Tests of FCEBs on SamTrans routes to determine the fuel efficiency of future FCEBs.
- A market survey of hydrogen fueling station and fuel suppliers.
- Route feasibility and fuel needs analyses for multiple potential FCEB fleet size scenarios.
- A lifecycle cost and requirements analysis of a transition to an all-FCEB North Base fleet.

CTE delivered a report regarding its full-fleet transition feasibility analysis in March 2023. Based on these findings, SamTrans chose to fully convert its North Base fleet to FCEB technology.

CTE also reviewed designs for upgrading North Base facilities for FCEB compatibility and supported the procurement of an interim fueling solution from Plug Power for SamTrans' first 10 FCEBs.

SamTrans issued new work directives to CTE to provide deployment support for the agency's interim hydrogen fueling solution, to conduct analyses on the performance of SamTrans' new FCEBs, and to help SamTrans complete a competitive procurement of a permanent hydrogen station.

As of July 2025, SamTrans' interim hydrogen fueling station has been commissioned and its 10 FCEBs have entered revenue service. CTE is conducting ongoing performance analyses of SamTrans interim station and initial FCEB fleet and aiding SamTrans to optimize their performance.

With CTE's assistance, the agency completed a request for proposals for a permanent hydrogen station to support 150+ FCEBs. SamTrans ultimately selected Love's Alternative Energy to design, build, and maintain a future station. SamTrans will begin to receive an additional 108 FCEBs starting in late 2025. CTE will continue to provide SamTrans with hydrogen station and bus procurement, contracting, design, and deployment support services.

Santa Clara VTA Fuel Cell Electric Bus and Hydrogen Fueling Station Deployment Planning Support Task Order 1



Overview

Client: Santa Clara Valley Transportation Authority

Project Duration: Jul. 2024 – Jun. 2026

Value

Project Value: $342,000

CTE Project Value: $342,000

Project Managers

Niki Rinaldi El-Abd, *Senior Managing Consultant* (SPM)

Aaron Wright, *Managing Consultant* (PM)

Project Staff

Julia Schultz, *Engineering Consultant*

Chloe Frank, *Associate*

Valley Transportation Authority

Solutions that move you

Project Description

The Center for Transportation and the Environment (CTE) is supporting the Santa Clara Valley Transportation Authority (VTA) with a variety of crucial hydrogen projects including maintenance facility upgrades, fuel cell electric bus (FCEB) and route analysis, hydrogen fuel station and fuel cost modeling, and hydrogen infrastructure procurement.

CTE conducted site visits at the Cerone, Chaboya, and North Division facilities to evaluate current infrastructure and recommend architectural, structural, electrical, and mechanical upgrades to vehicle maintenance buildings. In partnership with VTA staff, CTE worked to identify potential sites for a new hydrogen fueling station and provided conceptual sketches of proposed hydrogen fueling infrastructure at the Cerone depot in support of permitting and planning.

CTE coordinated a pre-application meeting with the City of San Jose, the local authority having jurisdiction for the Cerone site, and provided a Site Investigation Report for the planned addition of a small-scale hydrogen fueling station at Cerone.

CTE has provided VTA with an overview of small-scale fueling station options and assessed the feasibility of deploying FCEBs on several VTA blocks based on predicted FCEB mileage and fuel efficiency. CTE also performed a screening level analysis of VTA's service to identify blocks that would be ideal for FCEB pilot deployment and to estimate fuel demand. CTE is currently supporting VTA to develop a hydrogen fuel station specification and solicitation for a small-scale fueling station at Cerone. Additionally, CTE is supporting VTA with maintenance bay upgrades and facilitating meetings with key stakeholders and decision makers.

Santa Cruz Metropolitan Transit District Low-No 2023 Fuel Cell Electric Bus Deployment

Overview

Client: Santa Cruz Metropolitan Transit District

Project Duration: Dec. 2023 – Jul. 2027

Value

Project Value: $24,072,000

CTE Project Value: $686,340

Project Managers

Steve Clermont, *Managing Director of Planning & Deployment* (SPM)

Will Handke, *Managing Consultant* (PM)

Project Staff

Alison Smyth, *Senior Engineering Consultant*

Andersson Niepoky, *Associate*

Project Description

The Center for Transportation and the Environment (CTE) partnered with the Santa Cruz Metropolitan Transit District (METRO) under the Federal Transit Administration's 2023 Buses and Bus Facilities Grant Program. CTE is working with METRO to deploy 53 fuel cell electric buses (FCEBs) from New Flyer, an interim hydrogen refueling station (HRS) and a permanent HRS.

By the time CTE's contract with METRO was in place, METRO was already under contract with New Flyer for the procurement of forty-four 40' and nine 60' FCEBs. The buses were scheduled to arrive well before the deployment of an HRS. CTE has urgently worked with METRO to mitigate the challenges of receiving buses before being able to fuel them.

CTE assisted METRO with two competitive procurement processes for the project's interim and permanent hydrogen refueling stations. To support them, CTE performed FCEB performance modeling to determine hydrogen fuel throughput needs, crafted detailed scopes of work and technical requirements, reviewed proposals, participated in proposer interviews, and clarified technical matters. METRO completed both procurements and executed contracts in December 2024 and February 2025 with Plug Power and Messer, respectively.

In June 2025, METRO commissioned its interim hydrogen refueling station. Shortly thereafter, CTE led a comprehensive fueling performance validation test on the system and found it compliant with METRO's requirements.

As of August 2025, CTE is providing oversight and technical advice for the design process for METRO's permanent refueling station, which is due to be commissioned in May 2026.

Next, CTE will evaluate the performance of METRO's 40' FCEBs via a rigorous validation test. After the FCEBs are placed into service, CTE will analyze their key performance indicators for the first year of their deployment. When METRO's permanent hydrogen station is installed and the agency's 60' FCEBs arrive, CTE will provide performance validation services for them as well.

53 Hydrogen FCEBs:
Forty-four 40' and nine 60' New Flyer buses.

First Large-Scale FCEB Deployment in Santa Cruz:
Transitioning from diesel to zero-emission.

Two Hydrogen Refueling Stations (HRS):
Interim Plug Power HRS commissioned June 2025; permanent Messer HRS due May 2026.

Smart Deployment: Mixed Fuel

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FEATURED PROJECTS



EPA Clean Ports Zero-Emission Technology Deployment - Port of Oakland



Delaware Transit Corporation Deployment of Battery Electric Buses

ABQ RIDE Low-No 2023 Battery Electric Bus Deployment



Overview

Client: ABQ Ride

Project Duration: Aug. 2024 – Nov. 2028

Value

Project Value: $21,170,200

CTE Project Value: $616,000

Project Managers

Kylie McCord, *Director of Planning & Deployment* (SPM)

Anna Staddon, *Managing Consultant* (PM)

Project Staff

Alexis Hedges, *Engineering Consultant*

Kellsie Rogers, *Associate*

Project Description

The Center for Transportation and the Environment (CTE) partnered with ABQ RIDE of Albuquerque for a successful award under the Federal Transit Administration's (FTA) 2023 Low or No Emission Vehicle Program (Low-No). CTE is working with ABQ RIDE to deploy 20 battery electric buses (BEBS) (or hydrogen fuel cell – decision pending). In 2019, CTE aided with the deployment of five BEBs to replace aging diesel buses, along with five charging stations. The objective of this project is to replace aging diesel buses serving the City of Albuquerque, with the goal of a 100% zero-emission fleet by 2040. CTE is using its Zero-Emission Smart Deployment Methodology to guide this project, which includes nine primary phases. CTE kicked off the project in October of 2024. Following the kick-off, CTE used data from the 2019 Low-No project bus and route analysis along with updated data following a redesign of ABQ RIDE routes in the city and presented preliminary route modeling results in November 2024. CTE will complete charge and rate modeling along with a final route modeling presentation once ABQ reaches a decision regarding the makeup of the fleet, which is expected be made in August 2025.

CTE will continue to support ABQ RIDE during the design and installation of the charging infrastructure and will conduct on-site validation testing of the buses and chargers to confirm they meet the requirements of the technical specifications. Once the 20 buses enter revenue service, CTE will collect, analyze, and report on key performance indicators to help track and understand the performance of the electric buses for a period of 12 months. After this data collection period concludes, CTE will issue a final report summarizing project results, findings, and lessons learned.

Read CTE's Guidebook for Deploying Zero-Emission Transit Buses

View the Resource

Central Midlands Regional Transit Authority Low-No 2021 Zero-Emission Bus Project



Overview

Client: The Central Midlands Regional Transit Authority (The COMET)

Project Duration: Nov. 2021 – Jun. 2026

Value

Project Value: $4,974,549

CTE Project Value: $439,800

Project Managers

Todd Walton, *Senior Engineering Consultant* (SPM)

Chase Stell, *Managing Consultant* (PM)

Project Staff

Rebecka Moreno, *Lead Engineering Associate*

Project Description

The Center for Transportation and the Environment (CTE) partnered with The Central Midlands Regional Transit Authority (The COMET) for a successful award under the Federal Transit Administration's Low or No Emission Vehicle Program (Low-No). CTE is working with The COMET to deploy two New Flyer Xcelsior CHARGE (XE35) battery electric buses and two New Flyer 40' Xcelsior (XHE40) fuel cell buses, along with the necessary charging equipment and hydrogen refueling infrastructure.

These buses replaced four 2016 Starcraft Allstar cutaway buses that reached the end of their useful life in 2023. The COMET is investing in both battery electric and fuel cell electric technologies and will deploy them on routes that fully utilize the advantages of each technology. By deploying these buses, not only will The COMET reduce local emissions, but it will also be able to establish the skills and familiarity necessary to expand its zero-emission fleet and continue to work toward Columbia's goal of improved air quality.

CTE is currently providing project management oversight during the deployment of the hydrogen refueling infrastructure and New Flyer buses. CTE facilitates weekly meetings with the project team (The COMET, New Flyer, Linde, Fluitron, and MSI construction) as needed and manages the project planning activities including subcontractor agreement executions. The infrastructure and buses were deployed in May 2025. CTE is in the process of conducting one year of KPI reporting while the buses are in revenue service.

Community Transit Zero-Emissions Pilot Project



Overview

Client: Community Transit

Project Duration: Jan. 2023 – Oct. 2025

Value

Project Value: $453,073

CTE Project Value: $453,073

Project Managers

Kylie McCord, *Director of Planning & Deployment* (SPM)

Maggie Maddrey, *Lead Managing Consultant* (PM)

Project Staff

Will Chabot, *Engineering Consultant*

Christine Ohenzuwa, *Lead Engineering Associate*

Rebecka Moreno, *Lead Engineering Associate*

Project Description

The Center for Transportation and the Environment (CTE) has partnered with Community Transit (CT) in Everett, Washington on a variety of zero-emission related activities spread across four separate task orders (TO).

TO1(on-going): CTE is assisting in planning, deploying, and managing a performance-monitoring and validation program for the agency's zero-emission bus (ZEB) pilot program. In Phase 1 of the project, CTE worked with CT to develop and implement a test plan to evaluate the performance of one leased Build Your Dreams 40' battery electric bus (BEB) for an estimated eight months. In Phase 2 of the project, CTE developed an updated validation test plan to implement on CT's newly purchased GILLIG 40' BEB and New Flyer 40' fuel cell electric bus (FCEB). Phase 2 will continue the performance evaluation methods and procedures of Phase 1 while adding validation metrics for fuel cell technology to support the transition to the next phase of the agency's ZEB pilot program and, ultimately, their technology selection/fleet ratio. As of August 2025, CTE is expanding on the list of key performance indicators of interest to CT by explaining what the metrics are, why they are important, the data inputs required to create the metric, and how to obtain each of those inputs.

TO2 (complete): CTE provided consulting services for the procurement of a mobile hydrogen refueling solution to support the agency's pilot New Flyer FCEB deployment. To understand CT's fueling requirements, CTE evaluated the required energy of planned testing service for the pilot FCEB, including test duty cycles, service routing, and passenger and auxiliary loading requirements. CTE performed a hydrogen fueling station analysis using the agency's operational parameters, as well as learnings from other hydrogen infrastructure projects. CTE developed an estimate for infrastructure requirements, mobility, and footprint of a hydrogen refueling solution, based on the average fill per day that CT can expect once the pilot bus is deployed in testing. These requirements fed a technical specifications document suiting the deployment of a single pilot FCEB.

CTE facilitated a hydrogen workshop with Community Transit's Executive Leadership Team to provide the group with an understanding of the practical aspects of FCEBs and associated hydrogen infrastructure for future ZEB deployments to inform CT's future zero-emission technology deployment decisions.

TO3 (complete): CTE developed a ZEB transition plan to supplement CT's FY24 Low or No Emission Vehicle and Bus and Bus Facilities funding applications. The plan detailed the size of the fleet and optimal fleet mix, capital needed to fund vehicle procurements and facilities projects, available funding sources, and the estimated cost of the transition and operations costs, as well as touched on the benefits of the transition, reviewed potential funding opportunities and workforce development requirements, and outlined a proposed timeline for the transition.

TO4 (complete): CTE updated the original transition plan developed under TO3 with the information in CT's latest Transit Development Plan fleet procurement schedule, as well as with guidance from CT's Executive Leadership Team on propulsion types and regulatory changes. CTE provided CT with an updated report.

Technology Development | **Smart Deployment** | **Transition Planning** | **Outreach & Education**

County of Hawai'i Zero-Emission Bus Transition Implementation & Master Plan

Overview

Client: County of Hawai'i Mass Transit Agency

Project Duration: May 2023 – Oct. 2027

Value

Project Value: $394,500

CTE Project Value: $389,500

Project Managers

Kylie McCord, *Director of Planning & Deployment* (SPM)

Maggie Maddrey, *Lead Managing Consultant* (PM)

Project Staff

Alexis Hedges, *Engineering Consultant*

Kellsie Rogers, *Associate*

Project Description

The Center for Transportation and the Environment (CTE) has been contracted by the County of Hawai'i Mass Transit Agency (MTA) to support several different tasks related to their Zero-Emission Bus (ZEB) Program. CTE is revising the ZEB Transition Plan developed for the Hawai'i Department of Transportation under a separate contract and a ZEB plan prepared for County of Hawai'i in 2018. This work will culminate in the creation of a ZEB Transition Implementation and Master Plan document which will include a charge and hydrogen optimization study, project definitions for each element required to achieve MTA's ZEB objectives, and a funding and staffing assessment to locate sources of capital and operating funds and to identify skills and staffing resources needed to support MTA's ZEB objectives.

CTE also was tasked with providing project implementation and advisory oversight in support of the deployment of hybrid fuel cell shuttle buses including coordination with MTA, Hawai'i Natural Energy Institute (HNEI), and US Hybrid. CTE conducted a review of MTA's contracts related to the US Hybrid buses and provided a summary of work completed to date, as well as outstanding work and considerations/next steps. As of early 2025, US Hybrid is no longer supporting upgrade or maintenance of the fuel cell shuttle buses and HNEI has limited funding to produce hydrogen from the electrolyzer at the Natural Energy Laboratory of Hawai'i (NELHA) property in Kona. As a result, the shuttle buses are no longer in operation and will not operate for the foreseeable future.

Finally, CTE was tasked with evaluation of the feasibility of deploying battery electric buses (BEBs) and infrastructure provided by Sustainability Partners, a public benefit company offering infrastructure as a service. CTE provided technical data on BEB operations to support the development of multiple rounds of proposals provided by Sustainability Partners and provided review of the proposals at the request of MTA. The County is currently in negotiations with Sustainability Partners, who may provide buses, chargers, and energy under an innovative transit services contract through the State of Hawai'i. If this work is contracted, CTE will support MTA and provide oversight of the project throughout all phases of the contract, acting as MTA's "Owner Representative," including during the post-contracting phase and post-deployment phase. CTE will continue to act as Owner's Representative for MTA and review operational data from the deployment of the buses and installation of the infrastructure for one year after deployment.

CTE will continue to provide support to MTA on the aforementioned tasks as well as any other tasks that may arise related to ZEB technology and operations.

Technology Development | **Smart Deployment** | **Transition Planning** | **Outreach & Education**

EPA Clean Ports Zero-Emission Technology Deployment - Port of Oakland



Overview

Client: Port of Oakland

Project Duration: Jan. 2025 – Dec. 2028

Value

Project Value: $460,151,113

CTE Project Value: $6,220,858

Project Managers

Erik Bigelow, *Managing Director of Engineering Services* (SPM)

Gary Hsueh, *Managing Consultant* (PM)

Project Staff

Robert Kasse, *Engineering Services Manager*

Liz Morrison, *Managing Consultant*

Nancy Brown, *Procurement Specialist*

Molly Jenkins, *Associate*

Melinda Plath, *Associate*

Project Description

The Center for Transportation and the Environment (CTE) is partnering with the Port of Oakland to procure and deploy zero-emission equipment and infrastructure with the goal of effectively improving air quality and reducing pollution at the port. Over the span of the four-year grant period, CTE's role in these efforts includes project management and technical assistance to project partners. Funding secured from the EPA will help the Port and its partners to purchase 475 drayage trucks and 188 pieces of cargo handling equipment, including yard tractors, container top handlers, forklifts, reach stackers, and a railcar mover (totaling 663 zero-emission vehicles). CTE's mission in supporting the Port and 13 industry partners is the timely procurement and deployment of the vehicles and supporting infrastructure while meeting all applicable requirements.

CTE will also support the Port's community engagement efforts, serving as subject matter experts and providing technical information to supplement outreach. In addition to these duties, CTE will coordinate the production of required project reports and data collection in coordination with the Port and its partners.

663 Zero-Emission Vehicles:
475 drayage trucks + 188 cargo handling units (yard tractors, forklifts, container top handlers, reach stackers, and a railcar mover).

Technology Development | Smart Deployment | Transition Planning | Outreach & Education

Delaware Transit Corporation Deployment of Battery Electric Buses



Overview

Client: Delaware Transit Corporation

Project Duration: Jun. 2016 – Sep. 2027

Value

Project Value: $22,507,990

CTE Project Value: $2,020,500

Project Managers

Steve Clermont, *Managing Director of Planning & Deployment* (SPM)

Maggie Maddrey, *Lead Managing Consultant* (PM)

Project Staff

Kellsie Rogers, *Associate*

Project Description

The Center for Transportation and the Environment (CTE) has successfully partnered with the Delaware Transit Corporation (DTC) on five Federal Transit Administration Low or No Emission Vehicle Program (Low-No) and Bus & Bus Facilities grants for FY2016, FY2017, FY2019, FY2021, and FY2022. In total, DTC has deployed 20 Proterra 35', two Proterra 40' Catalyst E2, and four GILLIG 40' battery electric buses (BEBs) in Dover, Rehoboth, and Wilmington, DE through the FY2016, FY2017, FY2019, and FY2021 grants. With the FY2022 grant, DTC is planning on deploying an additional two GILLIG BEBs in Sussex County through a state contract, as well as six New Flyer fuel cell electric buses and a hydrogen fueling station in New Castle County.

The deployment of the first six Proterra 35' Catalyst E2 BEBs and six depot chargers has been completed (FY2016 grant). Delaware still plans to install one on-route charger servicing Dover for this grant; the construction for the pantograph is currently set to be complete by December 2026. DTC completed deployment of the next eight Proterra 35' Catalyst E2 BEBs serving Wilmington and two Proterra 40' Catalyst E2 BEBs serving Rehoboth in April 2020 (FY2017 grant). Pantograph charging infrastructure at Lewes Park and Ride was commissioned and in service as of March 2022. Through the 2019 grant, DTC deployed four GILLIG BEBS in Wilmington in early 2022. CTE completed onsite validation testing of the Proterra 40' BEBs, the GILLIG BEBs, and the pantograph charger in September 2022. Through DTC's 2021 Low-No Award, DTC procured six Proterra 35' BEBs, which were delivered in March 2023. The design of the three depot chargers and three on-route pantograph chargers for this project is currently underway. All pantographs are set to be installed by October 2027. CTE traveled to Delaware to conduct validation testing on the buses in February 2024 and summarized the results in a report for DTC.

The FY2022 grant was officially kicked off in June 2023. An initial request for proposals for the hydrogen refueling station was released in October 2024 and a request for information was released for information about local hydrogen supply in March 2025. The Project Team is currently reevaluating the approach to procurement and awaiting leadership decision to proceed with procurement of hydrogen fueling infrastructure and buses.

Five Federal Grants Awarded:
FY2016, FY2017, FY2019, FY2021, and FY2022

28 Battery-Electric Buses Deployed:
20 Proterra 35', two Proterra 40', and four GILLIG 40' BEBs

Future Deployment Planned:
Two additional GILLIG BEBs + six New Flyer fuel cell buses + hydrogen fueling station

Rochester Rapid Transit Minnesota Architectural and Engineering Design

Overview

Client: City of Rochester, MN

Project Duration: Mar. 2020 – Feb. 2025

Value

Project Value: $143,370,000

CTE Project Value: $79,419

Project Managers

Erik Bigelow, *Managing Director of Engineering Services* (SPM)

Robert Kasse, *Engineering Services Manager* (PM)

Project Staff

Maddie Henderson, *Engineering Consultant*

Project Description

The City of Rochester is implementing a high-frequency, three-mile bus rapid transit (BRT) line, Link BRT, connecting downtown Rochester to the Mayo Clinic's West Lot to improve public transit access in the area. The project has secured Federal Administration Small Starts funding, and the project team expects service to begin in 2026.

As a subcontractor to SRF Consulting Group, the Center for Transportation and the Environment (CTE) was a part of the Issue Resolution Team, a group of experts and technical advisors supporting the project. Through thorough analysis and on-site data gathering, CTE and SRF worked together to create a more realistic operating scenario at the early stages of planning. CTE's route and charge modeling helped the project team explore options, determine assumptions, and optimize electric bus operations.

CTE guided the analysis of energy consumption and charging options for electrifying the fleet, as well as provided financial analysis support for the electric bus and charging infrastructure. One of CTE's key deliverables was a memorandum detailing the recommended number of chargers, the type of bus batteries required, and other considerations for charging and electric bus operation based on the planned BRT route. This included the effect of larger battery sizes and the use of an auxiliary diesel heater, as well as developing specifications for on-route charging equipment.

First BRT line in Rochester:
Three-mile, high-frequency corridor with service starting in 2026

Federal Small Starts Funding Secured:
Supporting implementation of electric bus rapid transit

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FEATURED PROJECTS

MONTEBELLO

City of Montebello Zero-Emission Bus Facilities and Fleet Transition Plan



Georgia Institute of Technology Transit Study and Consulting Services

Atlanta Transit Link Authority General Planning and Technical Services Consulting

Overview

Client: Atlanta-Region Transit Link Authority

Project Duration: Jul. 2022 – Sep. 2025

Value

Project Value: $1,111,930

CTE Project Value: $541,300

Project Managers

Todd Walton, *Senior Engineering Consultant* (SPM)

Cynthia Gibson, *Lead Managing Consultant* (PM)

Project Staff

Alison Smyth, *Senior Engineering Consultant*

Jackson Danis, *Engineering Consultant*

Ethan McNally, *Lead Engineering Associate*

Chloe Frank, *Associate*

Project Description

The Center for Transportation and the Environment (CTE) partnered with Atlanta-Region Transit Link Authority (ATL), the professional services firm, Arcadis IBI Group, and engineering and consulting firm, TruePani Inc., to develop transition plans for six transit agencies in the region who are partners with ATL (Ride Gwinnett, Cherokee Area Transportation System (CATS), COBB, Xpress, Henry County, and Connect Douglas). The purpose of the project is to compare how battery electric buses (BEBs) and fuel cell electric buses (FCEBs) perform as replacements for diesel vehicles by analyzing the agencies' budgets, fleets, routes, depots, operating policies, and existing charging infrastructure.

Following the project kick-off, CTE drafted a technology assessment report. The report is based on CTE's Zero-Emission Bus (ZEB) 101 Course and gives ATL an overview of currently available and emerging zero-emission technologies.

During Q2 of 2023, CTE performed Service Assessments to show ATL's participating transit operators what efficiencies, energy consumptions, and ranges are estimated if using ZEBs on operators' existing routes and blocks. In Q3 of 2023, CTE, Arcadis IBI, and TruePani worked on drafting the transition plan for Ride Gwinnett that includes service, fleet, fuel, maintenance, facility, and total cost of ownership assessments.

CTE and Arcadis IBI drafted and submitted finalized ZEB Transition Plans to CATS, COBB, Xpress, Henry County, and Connect Douglas between September and November 2023.

In Q3 of 2024, CTE and Arcadis began work to inform ATL of available options for FCEBs offered within the United States and internationally. In December 2024, CTE and Arcadis presented ATL with available FCEB options, corresponding original equipment manufacturers, and agency references pertaining to procurement and performance for FCEBs and related infrastructure. In Q1 of 2025, CTE continued work to inform ATL on the feasibility of operating FCEBs for the Xpress operation. In Q2 of 2025, CTE drafted a Hydrogen Fuel Cell Bus Pilot Blueprint that is to be added to the final report that will be submitted in Q3 of 2025.

C. H. Robinson Foundation Zero-Emission Vehicle Transition Plan



Overview

Client: Recology San Francisco

Project Duration: Nov. 2024 – Aug. 2025

Value

Project Value: $60,000

CTE Project Value: $60,000

Project Managers

Steve Clermont, *Managing Director of Planning & Deployment* (SPM)

Anna Staddon, *Managing Consultant* (PM)

Project Staff

Maddie Henderson, *Engineering Consultant*

Alexis Hedges, *Engineering Consultant*

Kellsie Rogers, *Associate*

Project Description

The Center for Transportation and the Environment (CTE) was awarded a C.H. Robinson Foundation Strategic Industry Grant in 2024 to complete a zero-emission vehicle (ZEV) transition plan. CTE designed and released an expression of interest (EOI) in December 2024 to identify companies eligible to receive the ZEV Transition Plan that aligned with C.H. Robinson Foundation's mission to positively impact people, communities, industries, and the planet. CTE evaluated the EOI responses and selected Recology to receive the complimentary ZEV Transition Plan. Recology is a waste management company based out of San Francisco, CA that seeks to eliminate waste by developing and discovering sustainable resource recovery practices. CTE will utilize its Zero-Emission Fleet Transition Planning Methodology to provide a roadmap for the phased replacement of Recology's fleet with ZEVs, including timeline and order of magnitude cost estimates.

CTE's methodology begins with collecting data to complete a requirements analysis, a market assessment to provide an overview of commercially available ZEVs, and service, fleet, fuel, maintenance, facilities and total cost of ownership assessments. CTE will provide a final ZEV transition plan presentation that details the findings from the analyses and recommendations developed throughout the project that will serve as an actionable guide to support Recology's transition to a 100% zero-emission fleet. CTE and Recology held a formal project kickoff in April 2025 and CTE gave the requirements analysis and market assessment presentations in July 2025. The remaining assessments are underway, and presentations will be held throughout August 2025.

CTE and C.H. Robinson Foundation Grant Support Recology's Zero-Emission Fleet Transition Planning

Read the Press Release

Chemung County Transition Planning Project



Overview

Client: County of Chemung, NY

Project Duration: Nov. 2023 – Sep. 2025

Value

Project Value: $93,000

CTE Project Value: $93,000

Project Managers

Kylie McCord, *Director of Planning & Deployment* (SPM)

Gracie Leslie, *Managing Consultant* (PM)

Project Staff

Alexis Hedges, *Engineering Consultant*

Kellsie Rogers, *Associate*

Project Description

The Center for Transportation and the Environment (CTE) is a subcontractor to Wendel, a leading architecture, engineering, energy efficiency, and construction management firm, known for its experience with over 150 public transportation facility projects nationwide over the past 12 years. In this collaboration, CTE supported Wendel in delivering zero-emission transition planning services to the County of Chemung, New York, specifically for its transit system, CTRAN. CTE utilized its Zero-Emission Fleet Transition Planning Methodology to support CTRAN in evaluating the impacts, including infrastructure needs of transitioning to alternative fueling technologies such as battery electric and hydrogen fuel cell.

The County of Chemung aims to enhance the energy efficiency of its Transit Maintenance and Storage Facility to reduce its carbon footprint and operating costs. The County intends to utilize the New York State Energy Research and Development Authority's (NYSERDA) FlexTech Program to identify and evaluate feasible energy efficiency measures and investigate clean energy technologies at its facilities. This American Society of Heating, Refrigerating, and Air-Conditioning Engineers Level 2 Study will provide the County with estimated potential costs, savings, and incentives that the County can use in planning future capital improvements and energy efficiency measures to reduce energy, operating costs, and greenhouse gases at their facility. The results of the energy study will provide consideration for further investment decisions.

Wendel Energy Services conducted an Energy Study through NYSERDA's FlexTech Program for the County of Chemung and CTE supported this analysis by leading the evaluation of the County's Zero-Emission Transition Plan, providing bus and charger technical analysis and project management services. CTE's Zero-Emission Bus Transition Planning Methodology served as the basis for achieving the objectives of the County's Zero-Emission Transition Plan. CTE supported the County in the decision-making process as the County evaluated the different options for transitioning to a zero-emission fleet. CTE's methodology considers transit service requirements, fleet procurement timelines, infrastructure assessments, and vehicle and facilities capital costs, as well as fuel and maintenance cost impacts.

City of Glendale 2023 Transition Plan Update



Overview

Client: City of Glendale

Project Duration: Apr. 2024 – Feb. 2025

Value

Project Value: $102,000

CTE Project Value: $102,000

Project Managers

Todd Walton, *Senior Engineering Consultant* (SPM)

Aaron Wright, *Managing Consultant* (PM)

Project Staff

Maddie Henderson, *Engineering Consultant*

Grace Leslie, *Managing Consultant*

Project Description

In 2023 the Center for Transportation and the Environment (CTE) completed an effort on behalf of the City of Glendale to study the feasibility, expected greenhouse gas reductions, and anticipated high-level cost for transition of all gasoline, diesel, and compressed natural gas non-bus fleets to zero-emission vehicles. The study identified the costs, performance issues, risks, and recommended procurement timeline regarding transitioning to the City of Glendale's long-term goal of operating a fully zero-emission fleet. CTE collected, reviewed, and evaluated data on the city fleet's operations.

In 2024, the City of Glendale engaged CTE for a follow-on effort to update the study. The updated plan incorporated several key elements, including a review of newly available electric vehicle models, an analysis of actual vehicle use patterns to refine optimized charging infrastructure recommendations, and revised scenario modeling to reflect current technologies and costs. CTE also prepared a comprehensive final report that integrated the full transition plan and reflected Glendale's evolving fleet needs.

In January 2025, CTE presented the results and recommendations to the Glendale City Council, highlighting the optimized charging strategies, updated vehicle replacement schedules, and financial considerations. The team then addressed Council feedback and incorporated requested revisions into the final report.



Commercial Vehicle Pro Podcast: CTE's Scalable Approach to Zero-Emission Deployment

Read the Transcript | Watch the Video

City of Montebello Zero-Emission Bus Facilities and Fleet Transition Plan

Overview

Client: Montebello Bus Lines

Project Duration: Oct. 2024 – Apr. 2027

Value

Project Value: $949,021

CTE Project Value: $949,021

Project Managers

Todd Walton, *Senior Engineering Consultant* (SPM)

Cynthia Gibson, *Lead Managing Consultant* (PM)

Project Staff

Alison Smyth, *Senior Engineering Consultant*

Rebecka Moreno, *Lead Engineering Associate*

Eleanore Sammeth, *Lead Associate*

Project Description

The Center for Transportation and the Environment (CTE) is providing project management and technical consulting services to Montebello Bus Lines (MBL) as they transition to fuel cell electric buses (FCEBs). MBL has procured three FCEBs that will be delivered in late 2025. To prepare for deployment of these buses, CTE is conducting an in-depth assessment of MBL's facilities and operations and providing recommendations on the best types of equipment, technology, and programs. CTE is also providing recommendations and guidance for activities specific to hydrogen fuel storage, monitoring, dispensing, fire suppression, and infrastructure modifications to existing facilities to accommodate for daily fueling and maintenance.

As of June 2025, CTE has conducted the project kickoff and began performing an analysis that considers MBL's operations and expected performance of FCEBs to determine projected hydrogen consumption. The results from the analysis, along with a review of the layout, logistics, vehicle flows, and schedule of activities at the Montebello bus lot will inform the specifications included in the request for proposal documents for the temporary and permanent fueling stations. CTE is developing scopes of work and performance specifications in support of MBL's procurement department for the design and build of the permanent hydrogen fueling station and also the design of required maintenance facility upgrades to accommodate FCEBs. CTE and the MBL communications team are also collaborating to perform community outreach to educate the primary stakeholders on hydrogen technology and its benefits. CTE is planning to conduct performance validation in Q4 of 2025 and will begin deployment validation in early 2026.

3 New Flyer 40' Fuel Cell Electric Buses:
Delivery expected late 2025

Hydrogen Fueling Infrastructure:
Temporary station plus permanent facility design and build

Maintenance Facility Upgrades:
Fire suppression, fueling safety, and FCEB service modifications

Community Outreach:
Educating stakeholders on hydrogen technology and benefits

Technology Development | **Smart Deployment** | **Transition Planning** | **Outreach & Education**

City of Santa Rosa Electric Vehicle Fleet Infrastructure Master Plan

Overview

Client: City of Santa Rosa

Project Duration: Apr. 2024 – Dec. 2025

Value

Project Value: $144,439

CTE Project Value: $144,439

Project Managers

Todd Walton, *Senior Engineering Consultant* (SPM)

Aaron Wright, *Managing Consultant* (PM)

Project Staff

Maddie Henderson, *Engineering Consultant*

Project Description

In 2023, the Center for Transportation and the Environment (CTE) partnered with NV5 to develop a plan for transitioning the City of Santa Rosa's (the City) fleet to zero-emission vehicles and installing required charging infrastructure. CTE led the vehicle evaluation and market review and provided input to NV5's infrastructure analysis. Tasks included a market analysis, vehicle suitability assessment, service assessment, fleet assessment, and a fuel assessment. Outputs from these analyses were shared with NV5 to inform the infrastructure assessment and plans.

CTE completed the market analysis and feasibility assessment. The market analysis informed the assignment of suitability scores for each vehicle type, while the feasibility assessment provided insight into how the City operated its fleet. Based on these findings, CTE identified the optimal number and type of chargers required and developed a procurement timeline to guide the transition. CTE also conducted a capital cost assessment comparing electric vehicle procurement to a baseline scenario. After the core of the project was completed, CTE provided technical assistance as requested through the end of the contract.







Delaware Transit Corporation Fleet Transition Feasibility Assessment

Overview

Client: Delaware Transit Corporation

Project Duration: May 2022 – Oct. 2025

Value

Project Value: $226,196

CTE Project Value: $226,196

Project Managers

Steve Clermont, *Managing Director of Planning & Deployment* (SPM)

Maggie Maddrey, *Lead Managing Consultant* (PM)

Project Staff

Rebecka Moreno, *Lead Engineering Associate*

Kellsie Rogers, *Associate*

Project Description

The Center for Transportation and the Environment (CTE) is leading an effort for the Delaware Transit Corporation (DTC) to develop a full fleet transition plan to assist in transitioning the entire DTC fleet to 100% zero-emission technology by 2040. The plan is in alignment with DTC's Climate Action Plan to reduce greenhouse gas emissions and increase Delaware's resilience to climate change. Overall project goals are to assess the feasibility of the transition and to analyze technology options, transition timelines, and relevant costs.

CTE has adapted its zero-emission bus (ZEB) transition planning methodology to meet DTC's specific needs. The transition planning methodology progresses through a series of assessments to form a cohesive analysis of DTC's ZEB transition options. The ZEB transition plan is based on DTC's current fleet replacement schedule and will be a "living" document that the agency can continue to update as the technology supporting ZEBs and charging equipment continues to improve over time. Due to DTC's desire for a mixed ZEB fleet, having both battery electric buses (BEBs) and fuel cell electric buses (FCEBs), CTE is focusing on two main ZEB transition scenarios: a BEB majority mixed fleet and a FCEB majority mixed fleet.

CTE completed the service, fleet, and fuel assessments for DTC in 2022. In November 2022, DTC notified CTE of the agency's plan to undergo a strategic change in future fleet projections, requiring CTE to redo the previous three assessments with updated procurement details before moving forward with the rest of the transition plan. By December 2023, CTE had updated the service, fleet, maintenance, and fuel assessments with the new fleet data, and had completed the initial analysis results for the facilities assessment. Additionally, CTE completed the Resilience, Redundancy, and Response assessment in April 2024. A draft report was provided to DTC in July 2024 for feedback. In September 2024 CTE submitted an updated service application to Delmarva (DTC's utility) and feedback was used to update the transition plan in November 2024. As of August 2025, CTE is awaiting formal feedback from DTC in order to finalize the report and close out the project.

Full Fleet Transition Plan:
Guiding DTC to 100% zero-emission technology by 2040

Two Fleet Scenarios:
BEB-majority and FCEB-majority transition pathways

Comprehensive Assessments:
Service, fleet, fuel, maintenance, facilities, and resilience

Living Document:
Adaptable to evolving technology and updated fleet needs

Technology Development | Smart Deployment | Transition Planning | Outreach & Education

Georgia Institute of Technology Transit Study and Consulting Services





Overview

Client: Georgia Institute of Technology

Project Duration: Apr. 2024 – Aug. 2025

Value

Project Value: $327,172

CTE Project Value: $114,130

Project Managers

Kylie McCord, *Director of Planning & Deployment* (SPM)

Thomas Duke, *Managing Consultant* (PM)

Project Staff

Rebecka Moreno, *Lead Engineering Associate*

Ethan McNally, *Lead Engineering Associate*

Project Description

During a period of change on campus at the Georgia Institute of Technology (Georgia Tech), with major walkability and micromobility improvements coming to high-traffic areas in the core of campus, Georgia Tech contracted CTE to develop a Comprehensive Transit Master Plan. The Transit Master Plan will serve as a guide for decision-making over the next decade and will be integrated with Georgia Tech's Campus Comprehensive Plan and Climate Action Plan. The plan addresses new transportation and parking solutions that integrate into the urban campus environment while emphasizing the need for a flexible, adaptable framework that can evolve as campus needs change. It addresses the links between different transportation modes, including the addition or conversion of zero-emission battery electric vehicles.

CTE contracted with Nelson\Nygaard (NN) to create a comprehensive State of the System report based on collected data and feedback from a survey sent to all users of the Georgia Tech transit system. NN and CTE also facilitated listening sessions with students and staff to inform the report. The State of the System report was used as the basis to develop alternatives to the existing transportation system, including revisions to the transit routes and the on-demand services, as well as options for expanding microtransit and micromobility. A key component of the plan also included identifying gaps in infrastructure needed for transportation electrification, assessing the impact on the power grid, and locating appropriate charging facility sites. CTE contracted Wendel to perform the infrastructure evaluation and develop conceptual approaches for charging of fleet vehicles.

CTE developed a Zero-Emission Bus Transition Plan for Georgia Tech designed to address the specific requirements of Georgia Tech's fleet, considering range and performance constraints due to local conditions and duty cycles, estimated capital investment requirements and impacts to operating costs, and provided alternatives for consideration.

Imperial County Municipal Transition Plan

Overview

Client: Imperial County, CA

Project Duration: Aug. 2024 – May 2025

Value

Project Value: $100,200

CTE Project Value: $100,200

Project Managers

Todd Walton, *Senior Engineering Consultant* (SPM)

Aaron Wright, *Managing Consultant* (PM)

Project Staff

Maddie Henderson, *Engineering Consultant*

Eleanore Sammeth, *Lead Associate*

Project Description

CTE partnered with SiteLOGIQ to develop a comprehensive Zero-Emission Vehicle Transition Plan to guide Imperial County, California, in its shift to a fully electric fleet. The project has been completed as of May 2025.

CTE began by conducting a detailed market analysis and service assessment, collecting data on the County's existing fleet, including vehicle types, service patterns, and fuel usage. This baseline informed the feasibility and suitability of replacing each vehicle with a zero-emission alternative.

The team evaluated commercially available battery electric and fuel cell electric vehicles by assessing each option's range, cost, and charging needs in the context of Imperial County's terrain, traffic conditions, and climate. CTE assigned feasibility and suitability scores to each vehicle type to guide transition decisions.

Based on these findings, CTE developed a phased fleet replacement schedule aligned with market readiness and vehicle replacement cycles while supporting the County's electrification goals.

In parallel, CTE conducted a fuel and facilities assessment to evaluate infrastructure needs and ensure the County could support operations with reliable charging solutions. This included long-term projections of energy demand and siting considerations.

To address financial planning CTE completed a total cost of ownership analysis, which compared capital, fuel, and maintenance costs between the existing and proposed fleets. The team also identified relevant funding sources to support both vehicle acquisition and infrastructure buildout.

All findings were integrated into a final Zero-Emission Transition Plan that provides Imperial County with a clear, actionable roadmap to achieve a fully zero-emission fleet. The plan balances operational needs, sustainability, and long-term cost effectiveness.

Intercity Transit Zero-Emission Analysis



Overview

Client: Intercity Transit

Project Duration: Oct. 2022 – Jul. 2027

Value

Project Value: $915,054

CTE Project Value: $722,813

Project Managers

Kylie McCord, *Director of Planning & Deployment* (SPM)

Maggie Maddrey, *Lead Managing Consultant* (PM)

Project Staff

Alison Smyth, *Senior Engineering Consultant*

Andersson Niepoky, *Associate*

Project Description

The Center for Transportation and the Environment (CTE) partnered with Intercity Transit (Intercity) to complete a zero-emission vehicle analysis. CTE subcontracted with Nelson Nygaard and Hatch LTK for assistance in completing the study. The goal of the analysis was to identify commercially available zero-emission technologies that have been successfully deployed in transit service and to recommend the best solution and strategies for Intercity in completing its transition to a zero-emission fleet. The project team also identified capital projects and infrastructure needs required to support Intercity's eventual transition to a 100% zero-emission fleet.

As the analysis was completed, the project team compiled a final report to recommend technology solution(s) for a zero-emission fleet transition and outline a plan for the transition. The report detailed the size of the fleet and optimal fleet mix, capital needed to fund the project, the estimated cost of the transition and recurring costs, benefits of the transition including detailed evaluation of emission benefits, potential risks and challenges, and a proposed timeline for the transition. CTE conducted a full day workshop with the Intercity Transit Board of Directors and the local electrical utility (Puget Sound Energy) to review the state of the zero-emission technology industry and the results of the analysis. CTE has prepared and provided Intercity with a Zero-Emission Transition Plan that meets federal requirements.

Following completion of the analysis mentioned above, Intercity extended the contract with CTE in order for CTE to assist the agency with the deployment of five fuel cell electric buses (FCEBs) and the associated fueling infrastructure that Intercity received funding for through two state of Washington grants. CTE is now using its Smart Deployment Methodology to guide Intercity as the agency deploys its first zero-emission buses and fueling infrastructure. Intercity's New Flyer FCEBs are slated to be delivered by the end of August 2025. Intercity Transit is currently exploring temporary hydrogen refueling solutions to support their FCEB fleet during the interim between bus delivery and permanent infrastructure completion. Intercity's permanent fueling solution, provided by Hyfluence, is expected to be completed by the end of 2026.

Lawrence Transit Zero-Emission Transition Plan

Overview

Client: City of Lawrence

Project Duration: Feb. 2024 – Jul. 2025

Value

Project Value: $150,000

CTE Project Value: $100,000

Project Managers

Steve Clermont, *Managing Director of Planning & Deployment* (SPM)

Maggie Maddrey, *Lead Managing Consultant* (PM)

Project Staff

Jackson Danis, *Engineering Consultant*

Rebecka Moreno, *Lead Engineering Associate*

Project Description

The Center for Transportation and the Environment (CTE) successfully won the City of Lawrence's (the City) solicitation to conduct a zero-emission transition analysis for Lawrence Transit's fixed-route and paratransit fleets. CTE is leading the evaluation of the City's Zero-Emission Transition Plan, providing bus and charger technical analysis and project management services. CTE has partnered with NV5, who will provide engineering services for charging infrastructure, energy storage, and solar photovoltaic systems. This is not the first time CTE has worked with the City; CTE is also currently providing project management and technical advisory, utilizing CTE's Smart Deployment methodology, for the City's three battery electric bus deployment projects.

CTE's Zero-Emission Bus Transition Planning Methodology will serve as the basis to achieve the objectives of the City's Zero-Emission Transition Plan. CTE's standard Methodology will be tailored to align with the City's specific needs and will support the City in the decision-making process as it evaluates the different options for transitioning to a zero-emission fleet by 2035. CTE's methodology considers transit service requirements, fleet procurement timelines, infrastructure assessments, vehicle and facilities capital costs, as well as fuel and maintenance cost impacts.

This project wrapped up in July 2025, following the submittal of a final report that summarized the assumptions, methodology, and results of the Service, Fleet, Fuel, Maintenance, Facility, and Total Cost of Ownership Assessments for the City's fixed route and demand response fleet.

National Renewable Energy Laboratory Clean Bus Planning - Berkshire Regional Transit Authority

Overview

Client: National Renewable Energy Laboratory

Project Duration: Oct. 2024 – Jun. 2025

Value

Project Value: $90,014

CTE Project Value: $90,014

Project Managers

Todd Walton, *Senior Engineering Consultant* (SPM)

Aaron Wright, *Managing Consultant* (PM)

Project Staff

Grace Leslie, *Managing Consultant*

Rebecka Moreno, *Lead Engineering Associate*

Project Description

This project is funded by the Joint Office of Energy and Transportation (Joint Office) through the Clean Bus Planning Awards Program. The Joint Office provides free technical assistance on planning and implementation of zero-emission charging and fueling infrastructure as well as for zero-emission transit and school buses. The National Renewable Energy Laboratory (NREL) administers the program. NREL engaged the Center for Transportation and the Environment (CTE) to develop a comprehensive plan to transition Berkshire Regional Transit Authority (BRTA) full fixed-route system of buses to zero-emission buses (ZEBs) with the goal to reach 50% clean energy by 2030 and 100% clean energy by 2040 in compliance with the Massachusetts Clean Energy and Climate Plan for 2025 and 2030. The results of the study will inform BRTA of the estimated costs, benefits, constraints, and risks of the transition to a zero-emission fleet and will guide future planning and decision-making.

The primary goals of this project were to assess the feasibility of transitioning the entirety of BRTA's fixed-route fleet to 100% zero-emission technology and to understand technology options, transition timelines, and relevant costs. Within the scope of the plan, CTE estimated capital and operational costs, planned project phases and timelines, and determined infrastructure requirements necessary to adopt ZEB fleet vehicles. After discussions with BRTA's project team, CTE assumed a goal of 50% electric by 2030 and 100% ZEB by 2040.

Tailored to meet the unique needs of BRTA, the plan aims to reduce barriers to deployment and provide clear guidance for decision-makers. Following the completion of the plan, CTE held a virtual meeting with BRTA staff to review the findings and discuss electrification opportunities.

ZEB Transition Plan:
Roadmap for full fixed-route fleet electrification

Fleet Electrification Goals:
50% electric by 2030, 100% by 2040

Technology Development | Smart Deployment | Transition Planning | Outreach & Education

National Renewable Energy Laboratory Clean Bus Planning - Chattanooga Area Regional Transportation Authority

Overview

Client: Chattanooga Area Regional Transportation Authority

Project Duration: Dec. 2024 – Aug. 2025

Value

Project Value: $74,920

CTE Project Value: $74,920

Project Managers

Todd Walton, *Senior Engineering Consultant* (SPM)

Aaron Wright, *Managing Consultant* (PM)

Project Staff

Rebecka Moreno, *Lead Engineering Associate*

Grace Leslie, *Managing Consultant*

Project Description

CTE supported the Chattanooga Area Regional Transportation Authority (CARTA) in developing a Zero-Emission Fleet Transition Plan through the Clean Bus Planning Awards Program. Building on a previous transition plan and Low or No Emission Grant (Low-No) application that focused on CARTA's electric shuttle operations, CTE expanded the scope of this effort to include the full fleet, which consisted of approximately 107 vehicles, 26 of which were electric at the time.

The updated plan incorporated a revised assessment of the shuttle service and introduced a comprehensive analysis of the large bus fleet, including block and route feasibility for electrification and an infrastructure needs assessment for the larger bus depot.

CTE evaluated vehicle options, including smaller-form original equipment manufacturers, to accommodate CARTA's operational preferences and anticipated growth of the shuttle fleet. The team conducted a baseline fleet assessment, a vehicle electrification feasibility study, and an analysis of charging infrastructure, including optimization strategies for both existing and potential future assets, such as CARTA's on-route inductive charging system. The final transition plan included a detailed procurement and staging schedule, cost modeling, emissions impact analysis, and workforce planning tailored to CARTA's operational context.

CTE held regular coordination meetings with CARTA and the National Renewable Energy Laboratory (NREL), and submitted monthly progress reports. Upon completing the plan, CTE conducted a virtual briefing to present the findings and support CARTA's strategic decision-making for advancing zero-emission deployment.

CTE finalized the transition plan report for CARTA with three scenarios: baseline, depot, and on-route charging. Additionally, CTE extracted the on-route charging scenario compared to the baseline scenario for CARTA to use with its Fiscal Year 2025 Low-No application.

National Renewable Energy Laboratory Clean Bus Planning - City of Mankato, MN

Overview

Client: National Renewable Energy Laboratory

Project Duration: Oct. 2024 – Jun. 2025

Value

Project Value: $90,014

CTE Project Value: $90,014

Project Managers

Todd Walton, *Senior Engineering Consultant* (SPM)

Aaron Wright, *Managing Consultant* (PM)

Project Staff

Rebecka Moreno, *Lead Engineering Associate*

Grace Leslie, *Managing Consultant*

Project Description

This project is funded by the Joint Office of Energy and Transportation (Joint Office) through the Clean Bus Planning Awards Program. The Joint Office provides free technical assistance on planning and implementation of zero-emission charging and fueling infrastructure as well as for zero-emission transit and school buses. The National Renewable Energy Laboratory (NREL) administers the program. NREL engaged the Center for Transportation and the Environment (CTE) to develop a comprehensive plan to transition City of Mankato Transit System (Mankato) full fixed-route system of buses to zero-emission buses (ZEBs). The results of the study will inform Mankato of the estimated costs, benefits, constraints, and risks of the transition to a zero-emission fleet and will guide future planning and decision-making.

The primary goals of this project were to assess the feasibility of transitioning the entirety of Mankato's fixed-route fleet to 100% zero-emission technology and to understand technology options, transition timelines, and relevant costs. Within the scope of the plan, CTE estimated capital and operational costs, planned project phases and timelines, and determined infrastructure requirements necessary to adopt ZEB fleet vehicles. After discussions with Mankato's project team, CTE assumed a loose target of 100% ZEBs by 2040.

Tailored to meet the unique needs of Mankato, the plan aims to reduce barriers to deployment and provide clear guidance for decision-makers. Following the completion of the plan, CTE held a virtual meeting with Mankato staff to review the findings and discuss electrification opportunities.

National Renewable Energy Laboratory Technical Assistance - Mountain Line Transit

Overview

Client: National Renewable Energy Laboratory

Project Duration: Oct. 2024 – Apr. 2025

Value

Project Value: $40,458

CTE Project Value: $40,458

Project Managers

Todd Walton, *Senior Engineering Consultant* (SPM)

Aaron Wright, *Managing Consultant* (PM)

Project Staff

Rebecka Moreno, *Lead Engineering Associate*

Grace Leslie, *Managing Consultant*

Project Description

This project is funded by the Joint Office of Energy and Transportation through the Clean Bus Planning Awards Program, which offers free technical assistance for planning and implementing zero-emission charging and fueling infrastructure, as well as zero-emission transit and school buses. Administered by the National Renewable Energy Laboratory (NREL), the program engaged the Center for Transportation and the Environment (CTE) to update key components of Mountain Line Transit's (Mountain Line) Zero-Emission Bus (ZEB) implementation plan originally completed by CTE in 2020. The update was necessary due to Mountain Line's modifications to the battery electric bus implementation schedule.

The primary goals of this project were to assess the feasibility of transitioning the entirety of Mountain Line's fixed-route fleet to 100% zero-emission technology and to understand technology options, transition timelines, and relevant costs. Mountain Line facilities are space constrained, but the agency is interested in scenario requirements to still reach 100% zero-emission. Within the scope of the plan, CTE estimated capital and operational costs, planned project phases and timelines, and determined infrastructure requirements necessary to adopt ZEB fleet vehicles.

Tailored to meet the unique needs of Mountain Line, the plan aims to reduce barriers to deployment and provide clear guidance for decision-makers. Following the completion of the plan, CTE held a virtual meeting with Mountain Line staff to review the findings and discuss electrification opportunities.

National Renewable Energy Laboratory Technical Assistance for Sustainable On-Road Transportation - Rock Region Metro

Overview

Client: National Renewable Energy Laboratory

Project Duration: Aug. 2024 – Apr. 2025

Value

Project Value: $101,602

CTE Project Value: $101,602

Project Managers

Todd Walton, *Senior Engineering Consultant* (SPM)

Aaron Wright, *Managing Consultant* (PM)

Project Staff

Grace Leslie, *Managing Consultant*

Rebecka Moreno, *Lead Engineering Associate*

Project Description

Supporting the Mayor of Little Rock's 50% clean energy by 2030 goal, the Center for Transportation and the Environment (CTE) provided a comprehensive Zero-Emission Fleet Transition Plan for Rock Region Metro in North Little Rock, AR.

This project was funded by the Joint Office of Energy and Transportation (Joint Office) through the Clean Bus Planning Award Program. The Joint Office provides technical assistance for planning and implementation of zero-emission charging and fueling infrastructure as well as for zero-emission transit and school buses. The National Renewable Energy Laboratory (NREL) administers the program.

CTE's transition plan for Rock Region Metro included service, fleet, fuel, facility, maintenance, and total cost of ownership analyses, as well as a stakeholder analysis and workforce needs analysis.

New Jersey Transit Zero-Emission Bus Task Order

Overview

Client: New Jersey Transit

Project Duration: Aug. 2024 – Dec. 2025

Value

Project Value: $80,000

CTE Project Value: $80,000

Project Managers

Steve Clermont, *Managing Director of Planning & Deployment* (SPM)

Anna Staddon, *Managing Consultant* (PM)

Project Staff

Kellsie Rogers, *Associate*

Project Description

The Center for Transportation and the Environment (CTE) is a subcontractor to Jacobs, a global engineering and consulting firm, who is a subcontractor to Rutgers University: Center for Advanced Infrastructure and Transportation. All parties are supporting NJ Transit in the process of implementing a zero-emission bus system and adopting emerging technologies to improve surface transportation efficiency, safety, and mobility. NJ Transit is the nation's third-largest provider of bus, commuter rail, and light rail public transit with a service area covering 5,325 square miles across New Jersey and portions of New York and Pennsylvania. NJ Transit supports nearly 270 million passenger trips annually in and around the region and operates a fleet of 2,221 buses on 253 bus routes.

The project is made up of multiple research related tasks and aims to provide long-term research, technical support, and workforce development assistance to NJ Transit for continually improving its operational safety, efficiency, sustainability, and resiliency. CTE will support Jacobs in the completion of portions of the scope of work including battery electric bus (BEB) research, the evaluation of double articulated bus specifications and deployment strategies, and hydrogen bus strategy research. Hydrogen bus strategy work includes assisting with strategy research on hydrogen supply, facility design, specification adaption, and pilot project planning.

In January 2025, CTE produced a memo as part of the hydrogen bus research task, titled, "Hydrogen Fueling Approaches: Lessons Learned from Fuel Cell Electric Bus Deployments." The report provided an overview of hydrogen station options, considerations for hydrogen procurement, on-site hydrogen generation, and overall lessons learned from previous fuel cell electric bus deployment projects. CTE supported the evaluation of responses from the expression of interest released by NJ Transit which was for services related to BEB charging equipment, infrastructure, microgrids and accessories. CTE submitted a summary report in May 2025. CTE is currently assisting Jacobs with elements of the double articulated bus scope.

NYSERDA Capital Region Board of Cooperative Educational Services - Bus Electrification Impact Study

Overview

Client: Capital Region Board of Cooperative Educational Services

Project Duration: Mar. 2025 – Oct. 2025

Value

Project Value: $72,984

CTE Project Value: $39,805

Project Managers

Todd Walton, *Senior Engineering Consultant* (SPM)

Aaron Wright, *Managing Consultant* (PM)

Project Staff

Maddie Henderson, *Engineering Consultant*

Cristina Berenguer, *Engineering Associate*

Project Description

Capital Region Board of Cooperative Educational Services (BOCES) is preparing for the state-mandated transition to a zero-emission school bus fleet by 2035. After being awarded a contract through a collaborative request for proposals submission by Wendel and the Center for Transportation and the Environment (CTE), this project, funded by the New York State Energy Research and Development Authority's (NYSERDA) FlexTech Assistance Program, will provide the technical foundation for school districts supported by BOCES—including Bethlehem Central School District and other local districts—to assess the infrastructure, operational, and financial impacts of transitioning to electric buses.

Wendel and CTE conducted a kickoff for the project with a collaborative meeting involving BOCES, participating school districts, and NYSERDA. The team aligned on goals, assumptions, data confirmation, deliverables, and schedules to ensure all stakeholders had a clear understanding of what the transition planning process will entail.

Future tasks in the project include an assessment of current conditions, evaluating both transportation routes and facility infrastructure to understand energy demands and site readiness for electric buses and chargers. Using this information, the team will develop a tailored transition plan that envisions a fully electrified system. The plan will lay out how to achieve that vision over time, including phased infrastructure deployment, vehicle procurement, workforce training, and cost projections.

In the final phase, the findings from the infrastructure and fleet analysis will be combined into a comprehensive report. This document will guide Capital Region BOCES - Bethlehem as it prepares for infrastructure upgrades and long-term investment decisions, ensuring a smooth and successful transition to zero-emission school transportation.

NYSERDA Capital Region Board of Cooperative Educational Services - Electric School Bus

Overview

Client: Capital Region Board of Cooperative Educational Services

Project Duration: Jan. 2025 – Dec. 2025

Value

Project Value: $72,984

CTE Project Value: $39,805

Project Managers

Todd Walton, *Senior Engineering Consultant* (SPM)

Aaron Wright, *Managing Consultant* (PM)

Project Staff

Maddie Henderson, *Engineering Consultant*

Cristina Berenguer, *Engineering Associate*

Project Description

Capital Region Board of Cooperative Educational Services (BOCES) is preparing for the state-mandated transition to a zero-emission school bus fleet by 2035. After being awarded a contract through a collaborative request for proposals submission by Wendel and the Center for Transportation and the Environment (CTE), this project, funded by the New York State Energy Research and Development Authority's (NYSERDA) FlexTech Assistance Program, will provide the technical foundation for school districts supported by BOCES—including Guilderland and other local districts—to assess the infrastructure, operational, and financial impacts of transitioning to electric buses.

Wendel and CTE kicked off the project with a collaborative meeting involving BOCES, the participating school district of Guilderland, and NYSERDA. The team aligned on goals, assumptions, data, deliverables, and schedules to ensure all stakeholders understood what the transition planning process will entail.

Upcoming tasks include assessing current routes and facility infrastructure to evaluate energy needs and site readiness for electric buses and chargers. Based on this, the team will develop a phased transition plan outlining infrastructure deployment, vehicle procurement, workforce training, and cost projections. The final report will combine all findings to guide Capital Region BOCES – Guilderland in planning upgrades and long-term investments for a successful transition to zero-emission school transportation.

Technology Development | **Smart Deployment** | **Transition Planning** | **Outreach & Education**

Port of Long Beach Zero Emissions Infrastructure Master Plan Pier A



Overview

Client: Port of Long Beach

Project Duration: Oct. 2023 – May 2025

Value

Project Value: $86,632

CTE Project Value: $86,632

Project Managers

Erik Bigelow, *Managing Director of Engineering Services* (SPM)

Alison Smyth, *Senior Engineering Consultant* (PM)

Project Description

The Center for Transportation and the Environment (CTE) partnered as a subcontractor to Jacobs to develop a zero-emission infrastructure transition plan for the Port of Long Beach's Pier A facility. CTE's role in this project is to evaluate hydrogen-powered equipment and infrastructure options.

One focus of this project has been evaluating the possibility of deploying a top handler with liquid hydrogen storage onboard the vehicle and supporting infrastructure. This has involved in-depth discussions with potential vendors and evaluating National Fire Protection Association codes to ensure compliance with regulations and to identify any areas where compliance may be difficult.

CTE provided narrative input to the transition plan in Q4 of 2024.

Port of LONG BEACH
THE PORT OF CHOICE

Riverside County Transportation Commission 2023 On-Call TO1 Long Term Implementation Strategy Report Update



Overview

Client: Riverside County Transportation Commission

Project Duration: Jun. 2024 – Jun. 2025

Value

Project Value: $80,000

CTE Project Value: $80,000

Project Managers

Niki Rinaldi El-Abd, *Senior Managing Consultant* (SPM)

Thomas Duke, *Managing Consultant* (PM)

Project Staff

Hana Ba-Sabaa, *Lead Engineering Associate*

Ethan Chung, *Associate*

Project Description

The Center for Transportation and the Environment (CTE) supported the Riverside County Transportation Commission (RCTC) in updating the Riverside County Zero-Emission Bus (ZEB) Implementation Plan. Project 685 was an update to RCTC's County Wide Implementation Plan that CTE helped develop with IBI Group in January 2024. CTE provided on-call technical assistance to review, revise, and update the financial and operational components of the plan, adjusting plans to match evolving capital and operating data from each transit operator's Short-Range Transit Plan (SRTP). CTE coordinated directly with agencies to clarify data inputs and validate assumptions.

CTE updated capital and operating cost projections to incorporate changes in fleet composition, infrastructure requirements, and zero-emission technology advancements. This included providing year-by-year updates on the number of vehicles by fuel type and length, annual bus procurement needs, updated vehicle purchase costs, and revised infrastructure cost estimates for equipment such as chargers and energy storage systems. On the operating side, CTE projected maintenance costs and fuel consumption, while also updating fuel cost estimates by type and vehicle size.

CTE also revised emissions projections to reflect anticipated greenhouse gas reductions and updated estimates of criteria air pollutants including CO, NOx, PM10, PM2.5, VOCs, and SOx.

CTE delivered updated timelines for infrastructure construction and bus deployment to align with ZEB regulation deadlines, a revised phasing plan that accounted for updated SRTP data and cost assumptions, and a technical review of prior energy storage and solar recommendations to assess their applicability given revised procurement schedules. CTE also prepared an updated Emissions Considerations Report and documented key takeaways from meetings with transit operators held during the data collection and verification process.

South Carolina Ports Authority Fleet Decarbonization Assessment



Overview

Client: South Carolina Ports Authority

Project Duration: Jan. 2024 – Apr. 2025

Value

Project Value: $200,000

CTE Project Value: $200,000

Project Managers

Steve Clermont, *Managing Director of Planning & Deployment* (SPM)

Project Staff

Maddie Henderson, *Engineering Consultant*

Project Description

The Center for Transportation and the Environment (CTE) developed a plan for the South Carolina Ports Authority (SCPA) to transition their heavy-, medium-, and light-duty fleet vehicles and container handling equipment (CHE) to low- or no-emission alternatives. This study assessed the feasibility, high-level costs, and expected greenhouse gas reductions of transitioning approximately 500 on- and off-road vehicles to hybrid, battery electric, and hydrogen fuel cell models over a 25-year period.

CTE investigated the current and future operations at the six terminals owned and operated by SCPA to determine performance requirements of alternative equipment and infrastructure, as well as conducted a market assessment to evaluate current and potential future zero-emission CHE options. The final deliverables to SCPA were a fleet decarbonization report and a cost-benefit model. This project supports SCPA's long-term zero-emission transition planning as well as the development of requirements to solicit proposals from original equipment manufacturers or engineering firms to execute the transition.

CTE assessed multiple aspects of the Ports' operations to determine a feasible transition strategy. First, the operational and energy needs of each equipment or vehicle type at each terminal were determined. The off-road equipment included full and empty container handlers, rubber tire gantries, yard trucks, and forklifts. Then, CTE found suitable vehicles to meet SCPA's needs in a market analysis. CTE analyzed the daily fuel consumption to project annual fueling costs and potential savings as well as determine any fueling infrastructure requirements. Finally, CTE assessed the current facilities across the nine terminals to determine feasible alternative fueling solutions.

500 Vehicles:
Heavy-, medium-, and light-duty fleet and container handling equipment

Transition Options:
Hybrid, battery electric, and hydrogen fuel cell

Infrastructure Planning:
Fueling solutions across six terminals

Technology Development | Smart Deployment | Transition Planning | Outreach & Education

Spokane Zero-Emission Fleet Support & Consultation Services



Overview

Client: Spokane Transit Authority

Project Duration: Feb. 2024 – Jun. 2028

Value

Project Value: $123,000

CTE Project Value: $123,000

Project Managers

Kylie McCord, *Director of Planning & Deployment* (SPM)

Maggie Maddrey, *Lead Managing Consultant* (PM)

Project Staff

Maddie Henderson, *Engineering Consultant*

Andersson Niepoky, *Associate*

Project Description

The Center for Transportation and the Environment (CTE) continued its long-standing relationship with the Spokane Transit Authority (STA) through an additional contract to generally support STA's zero-emission vehicle journey. The contract provides four task orders (three so far) to accommodate ongoing and evolving needs from STA. In general, CTE will provide analysis and research on zero-emission propulsion systems, including vehicle and battery performance, and the infrastructure required to support these systems.

For the Spokane Zero-Emission Fleet Support & Consultation Services Task Order 1 (Board Workshop), CTE prepared for and facilitated an in-person planning workshop with the STA Board of Directors as well as other STA leadership, providing the Board an understanding of the current state of the zero-emission bus industry, as well as providing details of the evaluation work that has been completed to date and is planned in the future for STA.

For the Spokane Zero-Emission Fleet Support & Consultation Services Task Order 2 – On Call Technical Support, CTE will complete additional analysis and evaluation at the direction of STA.

For the Spokane Zero-Emission Fleet Support & Consultation Services Task Order 3 – Zero-Emission Non-Bus Fleet Evaluation, CTE completed an evaluation of STA's non-bus fleets, including their Paratransit, Rideshare, and Non-Revenue fleets, to determine feasibility, suitability, and potential costs in accordance with their zero-emission transition target year of 2045. As of July 2025, CTE has completed the evaluation and has shared the results with STA's leadership via a final presentation and a written final report. The results of this analysis will inform STA's Facilities Master Plan and define their infrastructure and vehicle procurement needs in order to accomplish their zero-emission transition goals.

World Resources Institute Fleet Electrification Roadmap

Overview

Client: World Resources Institute

Project Duration: Dec. 2024 – Sep. 2025

Value

Project Value: $40,547

CTE Project Value: $40,547

Project Managers

Todd Walton, *Senior Engineering Consultant* (SPM)

Aaron Wright, *Managing Consultant* (PM)

Project Staff

Grace Leslie, *Managing Consultant*

Project Description

The Center for Transportation and the Environment (CTE) is collaborating with the World Resources Institute (WRI) to develop a comprehensive roadmap for full school bus fleet electrification. This public-facing document will outline a nationwide, ecosystem-level approach, identifying key levers necessary to drive widespread adoption of electric school buses (ESBs) while embedding equity across all action items.

This project is part of WRI's ESB Initiative and was informed by the 2024 School Bus Electrification Summit, which convened private and public industry leaders engaged in the transition to ESBs. Discussions at the summit provided a foundational understanding of the complex ecosystem surrounding school bus fleet electrification and highlighted a variety of challenges and potential solutions.

Following the summit, CTE engaged with representatives from all stakeholder groups and conducted a series of in-depth interviews to gain further insights into the practical, financial, technical, and operational barriers to full fleet electrification. These conversations also helped identify innovative solutions and emerging best practices. Interviewees included representatives from school districts, school bus contractors and dealers, bus, battery, and charger original equipment manufacturers, public entities, teachers and students, public and private financing institutions, advocacy organizations, journalists, charge management companies, engineering firms, utilities, and others.

CTE synthesized insights from the summit discussions and stakeholder interviews to develop the ESB roadmap while leveraging its technical expertise and extensive industry experience to ensure the guidance is both practical and actionable. By integrating stakeholder perspectives with its hands-on experience in electric bus deployment, CTE is shaping recommendations that are grounded in data-driven analysis, industry best practices, and a deep understanding of the logistical challenges school districts and fleet operators face.

The roadmap is set to be published in Q4 2025.

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FEATURED PROJECTS



One-on-One Transit 2025



Zero Emission Bus Resource Alliance (ZEBRA) Program Support Services 2025

American Public Transportation Association Transit Bus Battery Standards

Overview

Client: American Public Transportation Association (APTA)

Project Duration: Aug. 2023 – Dec. 2025

Value

Project Value: $13,000

CTE Project Value: $13,000

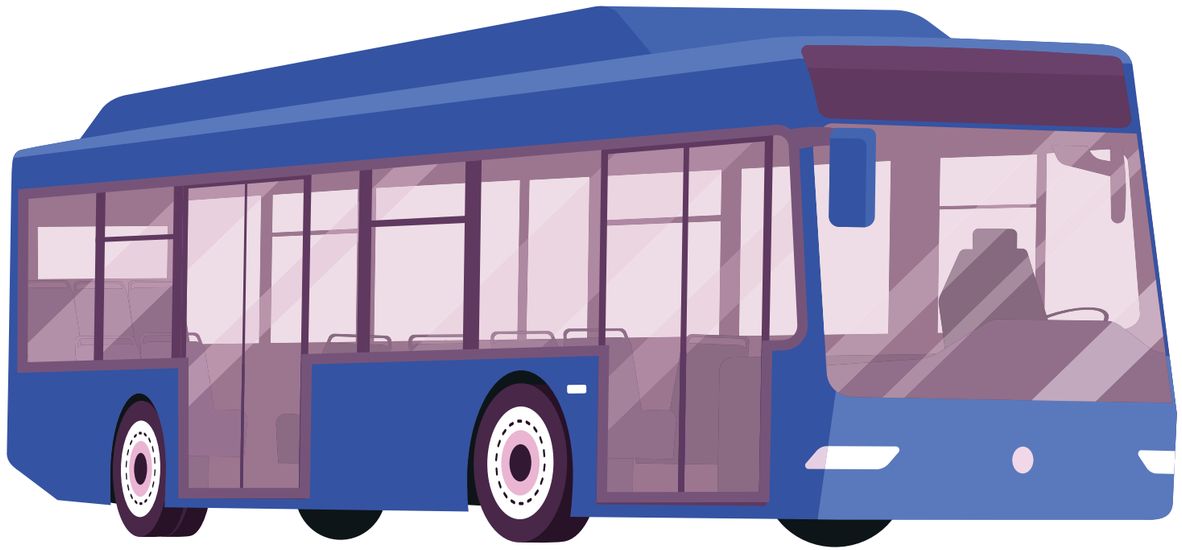
Project Managers

Erik Bigelow, *Managing Director of Engineering Services* (SPM)

Robert Kasse, *Engineering Services Manager* (PM)

Project Description

The Center for Transportation and the Environment (CTE) is providing technical support to the American Public Transportation Association (APTA) as part of an assessment of proposed electric bus battery codes and standards related to battery safety to determine which standards should be recommended for incorporation into the APTA Standard Bus Procurement Guidelines. CTE is currently assisting the APTA Zero-Emission Bus and Alternative Fuel Bus Safety Technical Advisory Group in finalizing the standard recommendations.



California Air Resources Board Zero-Emission Bus Scale-up Effect Analysis

Overview

Client: California Air Resources Board

Project Duration: Jun. 2025 – Apr. 2028

Value

Project Value: $499,900

CTE Project Value: $499,900

Project Managers

Niki Rinaldi El-Abd, *Senior Managing Consultant* (SPM)

Maggie Maddrey, *Lead Managing Consultant* (PM)

Anna Staddon, *Managing Consultant* (PM)

Project Staff

Wendy Morgan, *Director of Grants*

Chloe Frank, *Associate*

Project Description

The Center for Transportation and the Environment (CTE) is partnering with the California Air Resources Board (CARB) to assess agency and industry readiness to implement the Innovative Clean Transit regulation's requirement to make 100% of new bus purchases zero emission beginning in 2029. CTE is evaluating market readiness, infrastructure adequacy, and identifying challenges and solutions for a 100% zero-emission transit system in California. CTE has subcontracted with ARUP for assistance in completing the detailed electrical infrastructure readiness portion of the analysis.

CTE will analyze incremental cost trends and cost containment mechanisms for zero-emission buses (ZEBs), infrastructure, and relevant areas; ZEB production capacity and long-range bus availability; low-carbon hydrogen supply, hydrogen cost, and hydrogen fueling infrastructure; ZEB performance; and workforce training. ARUP will lead the analysis of electrical infrastructure readiness.

In support of this analysis, CTE will evaluate publicly available data, collect additional data via surveys, and conduct interviews with both ZEB manufacturers and transit agencies. At the conclusion of the analysis, CTE will develop a Final Report to be published by CARB. The findings will help CARB, transit agencies, and other stakeholders gain a better understanding of zero-emission technologies, the status of infrastructure deployment, and the challenges and solutions necessary for a 100% zero-emission transit system for the whole state of California.

California Multiple Award Schedules Statewide Hydrogen Fueling Infrastructure Framework

Overview

Client: Caltrans

Project Duration: Jun. 2024 – Apr. 2026

Value

Project Value: $461,231

CTE Project Value: $414,965

Project Managers

Niki Rinaldi El-Abd, *Senior Managing Consultant* (SPM)

Grace Leslie, *Managing Consultant* (PM)

Project Staff

Jaimie Levin, *Director of West Coast Operations*

Eleanore Sammeth, *Lead Associate*

Project Description

The Center for Transportation and the Environment (CTE), along with its subcontractors Fiedler Group and GreenInfo Network, are coordinating with Caltrans, the California Air Resources Board, and GO-Biz to develop a statewide framework and toolkit for hydrogen infrastructure in California. Tasks include development of the initial framework, stakeholder engagement, drafting a final report, and developing the toolkit.

In Phase 1, CTE will develop the initial framework through three parts. In the first part, CTE will identify local hydrogen hubs and corridors to establish a baseline for hydrogen development in the state. The use cases are focused on transit but will gather information from other applications including trucking, intercity buses, rail, and maritime. CTE will coordinate with other hydrogen efforts in California, such as the Department of Energy Hydrogen Hub, and ARCHES. Part two will assess hydrogen fueling demand and potential overlap around the state. GreenInfo Network will use the data from phase one to generate maps of existing, planned, and future hydrogen fueling and demand. In part three, CTE will identify barriers and develop solutions for fuel cell technology adoption.

In Phase 2, CTE will present Task 1 findings to a list of stakeholders for input. The results of Tasks 1 and 2 will be outlined in the final report.

In Phase 3 CTE will work with Fiedler Group to develop a toolkit that will aid agencies in adopting fuel cell and hydrogen technologies. Information will include best practices, safety considerations, how-to guides, and draft hydrogen station layouts.

California Transit Training Consortium Management Services



Overview

Client: California Transit Training Consortium

Project Duration: Nov. 2023 – Jun. 2026

Value

Project Value: $887,000

CTE Project Value: $827,500

Project Managers

Steve Clermont, *Managing Director of Planning & Deployment* (SPM)

Project Staff

AJ Artis, *Lead Associate*

Melinda Plath, *Associate*

Project Description

The California Transit Training Consortium (CTTC) is a non-profit provider of technical training for the public transit industry in California. CTTC is a member-based organization that brings together transit agencies, community colleges, universities, and private partners to develop and deliver training courses for transit agency staff. The Center for Transportation and the Environment (CTE) works on behalf of the organization to administer the work of CTTC.

CTE works with each of CTTC's committees and the CTTC board to achieve CTTC's operational and strategic goals. Under the guidance of the Education Services Committee, CTE administers CTTC's training program, currently a 16-course catalog with an assortment of self-paced, online virtual instructor-led, and in-person instructor-led courses. CTE also works with this committee to set the annual course calendar, contract course instruction, host course registration, update course materials, and develop new courses.

Additionally, CTE works with the Membership and Marketing Committee to keep CTTC members engaged and effectively market CTTC's services. As CTTC recently expanded to be a fully statewide organization, this committee's efforts have focused on growing awareness and membership in Northern California.

Under the guidance of the Finance Committee, CTE worked to develop an annual budget, identify additional revenue streams, maintain the financial statements, oversee the contracted bookkeeper, and manage accounts receivable and payable processes. This committee is responsible for maintaining the yearly budget, ensuring cashflow and expenses remain aligned with the projected values.

CTTC's Grants Committee collaborated with CTE to develop Low or No Emission Vehicle Program workforce development support services for members pursuing funding for zero-emission buses. These support services included the delivery of training courses, the development of new zero-emission courses, and building apprenticeship programs.

Lastly, CTE works with the Executive Committee to keep CTTC's strategic plan on track and ensure the effective and efficient running of the organization.

Hydrogen Fuel Cell Bus Council - CTE Administrative Support

Overview

Client: Hydrogen Fuel Cell Bus Council

Project Duration: Oct. 2024 – Aug. 2026

Value

Project Value: $140,000

CTE Project Value: $140,000

Project Managers

Kylie McCord, *Director of Planning & Deployment* (SPM)

Shelby Gamache, *Lead Associate* (PM)

Project Description

The Hydrogen Fuel Cell Bus Council (HFCBC) is a non-profit, member-based industry association comprised of 29 public transit agencies, original equipment manufacturers, hydrogen fuel suppliers, and other interested parties. The HFCBC works to educate the federal government about the hydrogen fuel cell bus economy and its applications within the public transit sector.

The HFCBC's mission is to educate Congress, the Executive Branch, and federal agencies about the benefits, applications, and market needs of hydrogen fuel cell buses and related infrastructure in the public transit sector. The HFCBC aims to enhance the visibility of hydrogen fuel cell buses and ensure the market for these vehicles is supported by beneficial legislation and sensible regulations.

To achieve these goals, the HFCBC provides a variety of services to its members, including engagement with federal agencies, legislative advocacy, coordination of meetings and presentations, development of educational materials, and the publication of a quarterly member newsletter. The Council also hosts an annual Advocacy Day in Washington, D.C., where members have the opportunity to make their voices heard on Capitol Hill during scheduled meetings with key congressional staff.

A Board of Directors governs the HFCBC and has contracted with Cardinal Infrastructure, an external federal advisory group, to provide professional lobbying and government affairs services, and with the Center for Transportation and the Environment (CTE) to provide technical expertise, member management services, and organizational operations support.

CTE is responsible for managing the day-to-day activities of the HFCBC, including financial administration, membership outreach and meetings, coordinating policy development efforts, providing support to the Board of Directors, and creating marketing and communications materials. This is the second consecutive year that the HFCBC has contracted CTE to provide these services.

Visit the HFCBC Website

International Grant Writing Services

Overview

Client: International Trucks and IC Bus

Project Duration: Feb. 2024 – Feb. 2026

Value

Project Value: $500,000

CTE Project Value: $500,000

Project Managers

Kylie McCord, *Director of Planning & Deployment* (SPM)

Morgan Cox, *Grants Manager* (PM)

Project Description

The Center for Transportation and the Environment (CTE) entered a strategic partnership with International, a leading manufacturer of commercial vehicles, to bolster their endeavors toward sustainable transportation solutions. Tasked with a pivotal role, CTE has been entrusted by International to spearhead efforts in assisting their extensive dealer network in securing crucial grant funding for the adoption of zero-emission vehicles. This includes both International truck and International bus vehicles.

Drawing upon their expertise in the realm of transportation and environmental innovation, CTE is diligently working alongside International's dealer network to navigate the intricate landscape of grant applications. Leveraging their deep understanding of funding mechanisms and regulatory frameworks, CTE is crafting strategies tailored to each dealer's unique circumstances, optimizing their chances of securing the necessary resources for the transition to zero-emission vehicles.

CTE supports dealers in identifying grants for their customers, determining eligibility, and guiding them from the initial identification of opportunities through the development and submission of applications. CTE works through the entire grant writing process with International customers, providing a comprehensive presentation of identified grant opportunities, developing templates and tracking materials, drafting sections of the application based on customer input, reviewing the final application before submission, and offering submission support.

In addition to one-on-one assistance, CTE provides educational support to dealers through Town Hall Meetings hosted by International. These sessions offer step-by-step overviews of the grant support process and showcase real-time examples of open funding opportunities available to customers. This approach helps demystify the grant process and empowers dealers with the knowledge and tools they need to support their customers effectively.

One-on-One Transit 2025

Overview

Project Duration: June 16 – 18, 2025

Value

Project Value: $312,500

CTE Project Value: $312,500

Project Managers

Kate Mason, *Director of Communications* (SPM)

Justin Cates, *Events Manager* (PM)

Project Staff

Shawna Jones, *Senior Graphic Designer*

Project Description

The Center for Transportation and the Environment (CTE) hosted its annual One-on-One Transit event in Binghamton, New York, convening 24 sponsor-suppliers and 37 transit fleets to accelerate the adoption of zero-emission technologies. The event's signature format of structured one-on-one meetings allowed transit agencies to connect directly with manufacturers and solution providers to discuss fleet electrification strategies, funding opportunities, and project development.

BAE Systems, serving as the anchor sponsor, welcomed attendees to its Endicott, NY facility for an exclusive behind-the-scenes tour. Participants explored BAE's full lifecycle of innovation—from product development and testing to production and aftermarket services—highlighting the company's leadership in electric drive and power management technologies deployed in thousands of buses worldwide.

By combining targeted networking with an immersive industry experience, One-on-One Transit in Binghamton provided a powerful platform for fleets and suppliers to exchange knowledge, strengthen partnerships, and drive forward the transition to clean transportation.







Southern California Edison Zero-Emission Electric School Bus Webinar

Overview

Client: Southern California Edison

Project Duration: Apr. 2025 – Nov. 2025

Value

Project Value: $35,000

CTE Project Value: $35,000

Project Managers

Steve Clermont, *Managing Director of Planning & Deployment* (SPM)

Grace Leslie, *Managing Consultant* (PM)

Project Description

The Center for Transportation and the Environment (CTE) is collaborating with Southern California Edison (SCE) to develop high level transition plans for school bus fleet electrification. SCE is enhancing its 2025 outreach strategy to accelerate the adoption of electric vehicle solutions among municipalities, school districts, and transit agencies, with the goal of maximizing participation in the Charge Ready Transport program before it concludes in 2026. To support this effort, CTE will design and facilitate a remote workshop series for school districts, guiding them through the development of customized Electric School Bus (ESB) Transition Plans.

The project will begin with a webinar introducing key elements of ESB transition planning, such as fleet requirements, infrastructure needs, and financing options, along with a data collection template for participating districts. CTE will then provide office hours to assist with template completion, process the submitted data, and generate tailored transition plans. Each district will receive its results through an individual virtual workshop, where CTE and SCE will present detailed analyses covering route feasibility, fleet replacement schedules and costs, infrastructure requirements, energy needs, and long-term investment planning specific to their fleets.

Through this structured process, SCE and CTE will equip school districts with practical tools and guidance to successfully plan and implement electric school buses.

Register for Upcoming Webinars and Watch Past Recordings

View All Webinars

Stryten Energy Project Management Office Consulting



Overview

Client: Stryten Energy

Project Duration: Dec. 2023 – Aug. 2025

Value

Project Value: $40,800

CTE Project Value: $40,800

Project Managers

Erik Bigelow, *Managing Director of Engineering Services* (SPM)

Thomas Duke, *Managing Consultant* (PM)

Project Staff

Robert Kasse, *Engineering Services Manager*

Project Description

The Center for Transportation and the Environment (CTE) supports Stryten Energy in its strategic pursuit of funds and grant opportunities from federal, state, and local governments. CTE screened new funding opportunities and presented them to Stryten's management on a weekly basis. As promising funding opportunities appeared, the project team maintained and organized next steps and action items on funding opportunities approved for work by Stryten.

CTE coordinated with internal Stryten personnel, as well as Stryten subcontractors, to support grant proposal writing and, when necessary, sourced and engaged additional subject matter experts for additional analysis and writing support. CTE also managed technical proposal projects and performed grant proposal writing to assist with Stryten's expanding portfolio activities in the non-lithium battery space.

Throughout the life of the project, CTE assisted in numerous concept papers, including the MAKE IT Prize Facilities Track, Smart Manufacturing Technologies for Material and Process Innovation, and the US Department of Energy's Office of Electricity Fiscal Year 2024 Vehicle Technologies Office Batteries Funding Opportunity Announcement, and worked closely with project partners including Georgia Institute of Technology and the National Renewable Energy Lab.

CTE also assisted in writing and preparing presentations for potential vanadium redox flow battery microgrid demonstration projects for US Department of Defense applications.

TVIDC Biannual Stakeholder Focus Group Meetings

Overview

Client: Federal Transit Administration

Project Duration: Jul. 2024 – May 2027

Value

Project Value: $498,580

CTE Project Value: $489,580

Project Managers

Erik Bigelow, *Managing Director of Engineering Services* (SPM)

Jackson Danis, *Engineering Consultant* (PM)

Project Staff

Emily Mercer, *Senior Salesforce Administrator*

Eleanore Sammeth, *Lead Associate*

Project Description

The Federal Transit Administration (FTA) selected CTE as one of two national nonprofits to manage its Transit Vehicle Innovation Deployment Centers (TVIDC) program. FTA created the program to support multiple transit bus research and innovation objectives, including assessing industry research, testing, and data collection needs to accelerate zero-emission bus (ZEB) adoption. The program scope also includes multiple engineering research objectives and industry outreach on behalf of FTA to support ZEB education and adoption.

As part of the ongoing development and review of research proposals, CTE convenes a focus group of transit industry stakeholders to provide feedback on potential projects and identify key barriers to adoption of ZEBs that could be addressed under the TVIDC program. The first of these focus groups was held in August of 2024 in Philadelphia.

CTE, CALSTART, and directed research centers under the Low and No Emission Vehicle Component Assessment Program (LowNo CAP) each presented on current research topics ranging from a novel hydrogen fuel cell propulsion system to battery degradation and state of health to cybersecurity to performance-based specifications. Following that, CTE led discussions on over a dozen potential future research topics and solicited more ideas from attendees. In March of 2025, CALSTART hosted another focus group in State College, PA at the Altoona Bus Research and Testing Center which was attended by CTE and other aforementioned industry stakeholders. Findings from these focus groups were synthesized into reports for FTA and will be used to develop future TVIDC projects.

CTE recently held its second focus group in September 2025 in Boston, MA.

Zero Emission Bus Resource Alliance (ZEBRA) Program Support Services 2025





Overview

Client: Zero-Emission Bus Resource Alliance

Project Duration: Jan. 2025 – Dec. 2025

Value

Project Value: $315,000

CTE Project Value: $315,000

Project Managers

Dan Raudebaugh, *Executive Director* (SPM)

Alyssa Fritts, *Managing Consultant* (PM)

Project Staff

Will Chabot, *Engineering Consultant*

Oliver Parker, *Engineering Associate*

Melinda Plath, *Associate*

Project Description

The Zero Emission Bus Resource Alliance (ZEBRA) is a member-based professional association of over 80 transit agencies in the United States and Canada that are operating or procuring zero-emission buses (ZEBs). ZEBRA's mission is to advance transit agencies' capacity for ZEB adoption through information exchange, training programs, shared research, and public education. ZEBRA hosts quarterly web meetings, in-person roundtables, and an online member portal with a resource library, discussion forum, meeting archive, and bus performance dashboard.

ZEBRA meetings are designed to connect member agencies to state-of-the-art ZEB practices and reflect ZEB interests as a collective voice. ZEBRA's membership is comprised of transit agencies that have collectively deployed more than 1,200 ZEBs, with over 400 additional vehicles coming soon. Through membership, performance data, deployments, and advocacy, ZEBRA leads transit agencies to advance their capacity for ZEB adoption.

ZEBRA has contracted with the Center for Transportation and the Environment (CTE) since 2018. CTE works on behalf of ZEBRA's membership to provide the group with technical insights, organizational management, and consultation based on CTE's extensive industry experience. CTE's scope includes managing the day-to-day activities of ZEBRA, such as its ZEB performance dashboard, marketing and communications materials, financial administration, membership on-boarding and meetings, and committee administration.

For 2025, CTE will organize and facilitate two in-person roundtables in partnership with member agencies. A zero-emission innovations-focused roundtable was hosted in Missoula, MT in May 2025, followed by a workforce development and hydrogen-focused roundtable in Everett, WA in September 2025. ZEBRA's 2025 project budget includes an in-kind contribution of $55,000 from CTE as a commitment to the importance of ZEBRA's work in the industry.

Visit the ZEBRA Website