

Zero-Emission Bus Rollout Plan



Prepared For:



Prepared By:
Jacob King



September 2022

Section A. Transit Agency Information

Mendocino Transit Authority

241 Plant Rd. Ukiah Ca 95482

Air District: Mendocino County AQMD

Total Number of Buses in Annual Maximum Service: 29

Contact Information:

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Executive Director

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Joint Group: Mendocino Transit Authority is not part of a Joint Group.

Section B. Rollout Plan General Information

The Mendocino Transit Authority has a goal to fully transition to zero-emission buses ahead of the 2040 deadline to begin purchasing only zero-emission technologies with few exceptions due to the extended range of certain routes. The agency plans to fully transition to 100% battery-electric buses (BEB) between 2023 and 2035. This transition will not entail early retirement of any vehicles.

Section C. Technology Portfolio

Types of zero-emission bus technologies to be deployed through 2040

The Mendocino Transit Authority will be purchasing a total of eight BEB coaches to replace eight existing diesel coaches. The agency's capital plan focuses on replacing its existing coaches between 2023 and 2035. The agency will also be acquiring eight ChargePoint Express chargers (62.5 kWh) to charge the coaches overnight and during midday layovers. We will also be purchasing ten Chargepoint 6000 (22 kwh) to charge the fleet of cutaway buses.

Section D. Current Bus Fleet Composition and Future Purchase

Existing Bus Fleet

The Mendocino Transit Authority operates nine fixed route services: The local 9 route serves the city of Ukiah from 6am until 6pm weekdays and 7am until 5pm Saturdays. Major stops for the local 9 route include the airport business park, Pear Tree Center, Downtown Ukiah and the Mendocino College. The Route 7 Jitney travels the length of Ukiah on State St and operates four times daily during weekdays. Route 20 serves the city of Willits, Redwood Valley and the city of Ukiah from 6am until 6:30 pm. These three routes use 9 40 foot clean diesel coaches.

The route 65 intercity bus is a service to and from the city of Fort Bragg and the city of Santa Rosa with stops in the city's of Mendocino, Willits, Ukiah and Hopland with connections to Greyhound, Amtrak, Golden Gate Transit, Sonoma County Transit, Santa Rosa City bus and SMART Train. The route runs 6:00am to 6:30pm Monday through Saturday twice daily and 6am to 6:30 once on Sundays. This route uses three freightliner 30 foot diesel cutaway buses.

The 5 route serves the city of Fort Bragg from 7am until 6pm weekdays. The route 60 serves the North Coast of Mendocino on Highway 1 to and from the city of Fort Bragg and serves the city's of Mendocino, Little River, Albion and Navarro River Junction the route runs from 7am until 6 pm. Route 1 serves the city of Willits from 7am until 6 pm. Route 75 serves the South Coast of Mendocino County from the city of Point Arena to the city of Ukiah and back. The route operates from 7:30am until 7:30pm. Route 95 also serves the South Coast of Mendocino County from the city of Point Arena to the city of Santa Rosa and back serving the city's of Fort Ross, Jenner, Bodega Bay, Sebastopol and Santa Rosa. The route operates from 8:00am until 7:00pm. These routes use 26' Ford gas cutaway buses.

The Mendocino Transit Authority currently has a total of seventeen(17) cutaways two of which are full electric. The model years for the seventeen cutaways range from 2011 to 2022 as seen in **Table 1: Individual Bus Information of Current Cutaway Bus Fleet.**

Table 1: Individual Bus Information of Current Cutaway Bus Fleet

Number of Buses	Engine Model Year	Bus Model Year	Fuel type	Bus Type
2	2011	2011	Gasoline	Cutaway
3	2013	2013	Gasoline	Cutaway
1	2015	2015	Gasoline	Cutaway
4	2016	2016	Gasoline	Cutaway
3	2018	2018	Gasoline	Cutaway
2	2019	2019	Gasoline	Cutaway
2	2022	2022	EV	Cutaway

The Mendocino Transit Authority currently has a total of nine coaches and one trolley (Trolley not included in ICT Plan) as seen in Table 2: Individual Bus Information of Current Coach Bus Fleet.

Table 2: Individual Bus Information of Current Coach Bus Fleet

Number of Buses	Engine Model Year	Bus Model Year	Fuel Type	Bus Type
8	2013	2013	Diesel	Coach
1	1999	1999	Diesel	Coach
1	2007	2007	Gas	Trolley

Currently Endera Model B3 cutaway buses are being considered as BEB replacements for existing cutaway buses as seen in **Table 2: Future Bus Purchases**. Endera cutaway's are approximately 26 feet long with a seating capacity of 18. The Endera Model B3 cutaway bus has a battery capacity of 150 kWh and an advertised battery consumption rate of 1.6 kWh/mi. It has a 150-mile range per manufacturer claims and is estimated to cost \$245,000.00 (after a state HVIP Program voucher) as shown in **Table 3: Range and Estimated Costs of Future ZEB Purchases**. The Mendocino Transit Authority will not be converting any conventional buses to zero-emission buses as shown in **Table 4: Schedule of Converting Buses to Zero-Emission Buses**.

Gillig BEB are being considered for the replacement of the coaches.

Table 2: Future Bus Purchases (by Delivery Date)

Timeline	Total Number of Buses to Purchase	Number of ZEB Purchases	Percentage of Annual ZEB Purchase	ZEB Bus Type	ZEB Fuel Type	Charging Technology	Number of Conventional Bus Purchase	Percentage of Annual Conventional Bus	Type(s) of Conventional Buses	Fuel Type(s) of Conventional
2022/23	4	4	100%	Cutaway	EV	Plug-in Garage Charging	N/A	N/A	N/A	N/A
2023/24	3	3	100%	Cutaway, Coach	EV	Plug-in Garage Charging	N/A	N/A	N/A	N/A
2024/25	6	6	100%	Cutaway, Coach	EV	Plug-in Garage Charging	N/A	N/A	N/A	N/A
2025/26	8	8	100%	Cutaway, Coach	EV	Plug-in Garage Charging	N/A	N/A	N/A	N/A
2026/27	6	6	100%	Cutaway, Coach	EV	Plug-in Garage Charging	N/A	N/A	N/A	N/A

Table 3: Range and Estimated Costs of Future ZEB Purchases (by Vehicle type)

Timeline	Number of ZEBs	Bus Type(s)	Advertised BEB Range (Miles)	Estimated Cost of Each Bus
2023	1	Cutaway	150	\$245,000
2023	1	Coach	220	\$1,300,000
2025	1	Cutaway	170	\$300,000
2025	1	Coach	250	\$1,400,000

Table 4a: Schedule of Converting Conventional Buses to Zero-Emission Buses

Timeline	Number of Buses	Bus Type	Removed Propulsion System	New Propulsion System
N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A

Performance Analysis

To determine whether the available battery size for the Endera Model B3 would be sufficient to operate Mendocino Transit's existing service, we estimated the vehicle's range using its advertised battery consumption rate per mile as well as a battery consumption rate per mile was estimated to reflect real world conditions. The table below, **Table 5: Estimated Battery Consumption Rates**, summarizes expected battery consumption rates for a new vehicle without battery degradation compared to an older one with degradation. The battery consumption rates in this analysis were informed by operational data for other similar battery-electric models in relation to their advertised performance. Performance data specific to the Endera Model B3 was not available.

Table 5: Estimated Battery Consumption Rates

	Estimated Range in Miles (advertised battery consumption 1.6 kWh/mi)	Estimated Range in Miles (adjusted battery consumption 1.79 kWh/mi)
Reduce capacity: 20% for usability	130 mi	116 mi
Reduce capacity: 20% for usability and 18% for degradation	107 mi	95 mi

Section E. Facilities and Infrastructure Modifications

The Mendocino Transit Authority currently has three transit facilities which house the agency's 18 cutaways and eight coaches. The current plan for installation of the plug-in chargers (Figure 1, 2 and 3) shows where chargers would be installed in bus storage spaces. These charges can be used over both overnight and midday layover charging. Planned facility are detailed in Table 7: Facilities Information and Construction Timeline.

Figure 1: Current Plan for Installation of Charing Equipment Ukiah



Figure 2: Current Plan for Installation of Charing Equipment Willits



Figure 3: Current Plan for Installation of Charging Equipment Fort Bragg

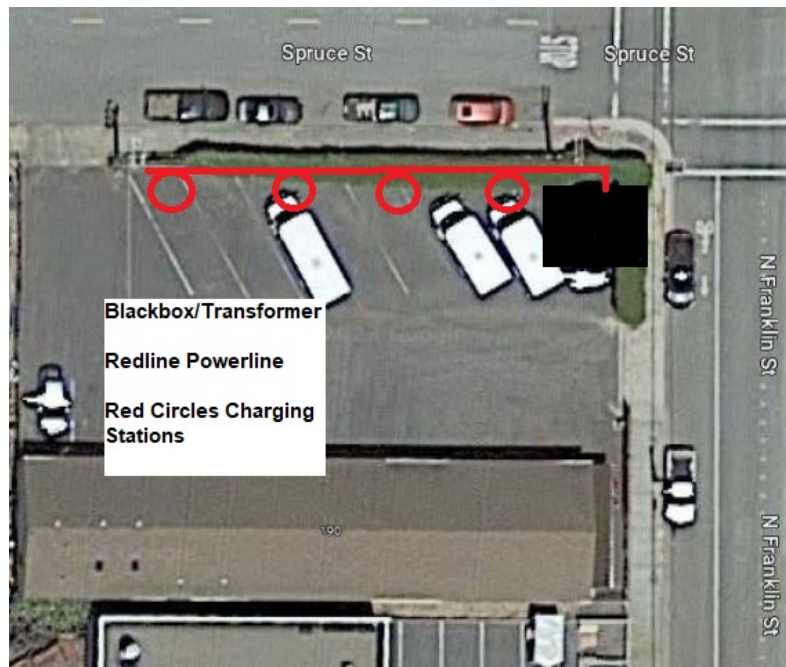


Table 7: Facilities Information and Construction Timeline

Facility Name	Address	Main Function	Types of Infrastructure	Service Capacity	Needs Upgrades (Y/N)	Estimated Construction Timeline	Electric Utility Company
MendocinoTransit Authority Ukiah Location	241 Plant Road Ukiah, CA 95482	Storage and charging for both cutaway's and coaches	8 plug-in depot chargers will be installed	8 coaches and 18 cutaway's before and after installation of charging stations	YES	2024	PG&E
MendocinoTransit Authority Willits Location	380 E. Commercial St. Willits, CA 95490	Storage and charging for both cutaway's and coaches	1 plug-in depot chargers will be installed	1 coach and 2 cutaway's before and after installation of charging stations	YES	2024	PG&E
MendocinoTransit Authority Fort Bragg Location	190 E. Spruce St. Fort Bragg, CA 95437	Storage and charging for both cutaway's and coaches	4 plug-in depot chargers will be installed	1 coach and 3 cutaway's before and after installation of charging stations	YES	2024	PG&E

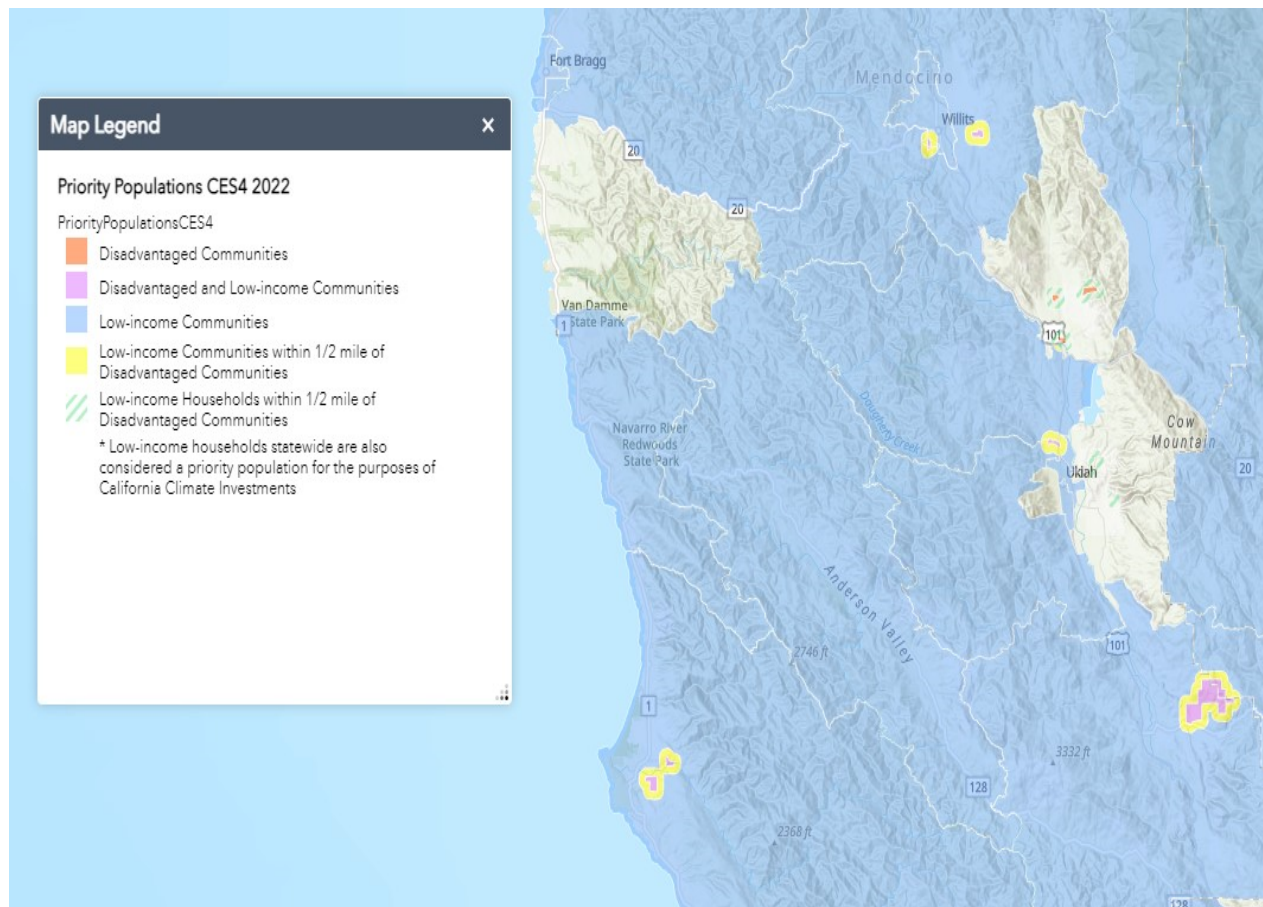
Bus operations and maintenance is currently performed in-house at our Ukiah facility. It is anticipated that this will continue to be the case following transition to BEBs.

Section F. Service in Disadvantaged Communities

According to the California Office of Environmental Health Hazard Assessment (OEHHA), disadvantaged communities are defined as the top 25% in terms of scoring in the CalEnviroScreen. CalEnviroScreen is a tool that identifies communities that are most vulnerable to pollution by using environmental, health, and socioeconomic data to produce a score for every census tract within the state of California.

According to the Priority Populations CES4 2022, there are no disadvantaged communities within the county of Mendocino, as shown in **Figure 2: County of Mendocino Disadvantaged Communities Map**.

Figure 2: Mendocino County Disadvantaged Communities Map



Section G. Workforce Training

The Mendocino Transit Authority plans to take advantage of training from the bus manufacturers and station suppliers, including maintenance and operations training, station operations, first responder training, and other trainings that the technology providers may offer. OEM training provides critical information on operations and maintenance aspects specific to the equipment model procured. Additionally, many procurement contracts include train-the-trainer courses through which small numbers of agency staff are trained and subsequently train agency colleagues. This method provides a cost-efficient opportunity to provide widespread agency training on new equipment and technologies.

Section H. Potential Funding Sources

Existing Funding

PG&E Fleet Program

EV Fleet Program offers dedicated electrical infrastructure design and construction services, significant cost offsets and additional EV charger rebates for eligible equipment

California Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP)

The Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP) supports deployment of zero-emission and near-zero-emission technologies by facilitating point-of-purchase price reductions. The program is administered by CALSTART behalf of California Air Resources Board (CARB).

Low Carbon Fuel Standard (LCFS)

The LCFS program is administered by CARB to help mitigate greenhouse gas emissions. The program focuses on reducing GHG emissions and other toxic air pollutants by improving vehicle technology and supports reducing fuel consumptions while promoting transportation mobility options.

LCTOP

The LCTOP was created to provide operating and capital assistance for transit agencies to reduce greenhouse gas emission and improve mobility, with a priority on serving disadvantaged communities. Approved projects in LCTOP will support new or expanded bus or rail services, expand intermodal transit facilities, and may include equipment acquisition, fueling, maintenance and other costs to operate those services or facilities, with each project reducing greenhouse gas emissions. For agencies whose service area includes disadvantaged communities, at least 50 percent of the total moneys received shall be expended on projects that will benefit disadvantaged communities.

FTA 5339 (State)

Provides funding to states and transit agencies through a statutory formula to replace, rehabilitate and purchase buses and related equipment and to construct bus-related facilities. In addition to the formula allocation, the Grants for Buses and Bus Facilities program.

VW Environmental Mitigation Trust

The purpose of the VW Environmental Mitigation Trust is to fully mitigate the excess NOX emissions caused by VW's actions. In California, that amounts to 10,000 tons of NOX that must be reduced. Implementing California's Beneficiary Mitigation Plan will fully mitigate the excess NOX and additionally commits to long-term air quality and climate goals by investing in zero-emission technologies. Funding for projects identified in the Plan began in fall 2019 and is ongoing.

Other Potential Funding Sources

Low or No Emission (Low-No) Grant Program

The Low or No Emission competitive Federal Transit Authority (FTA) grant program supports funding to state and local governments for the purchase or lease of zero-emission and low-emission transit buses.

California Energy Commission Clean Transportation Program

Formerly known as the Alternative and Renewable Fuel and Vehicle Technology Program, this program invests up to \$100 million annually in projects that support adoption of cleaner transportation powered by alternative and renewable fuels. Funding areas include electric vehicles and charging infrastructure, including for public transit buses.

Transit and Intercity Rail Capital Program (TIRCP)

The Transit and Intercity Rail Capital Program (TIRCP) was created to provide grants from the Greenhouse Gas Reduction Fund (GGRF) to help fund capital improvements to modernize California's intercity rail, bus, ferry, and rail transit systems.

Table 9 details the costs associated with MTA's Fleet Replacement Plan.

Table 9: MTA's Transit Fleet Replacement

Project Expenditures	FY2022	FY2023	FY2024	FY2025	FY2026	FY2027	Total
ZEB Transit Bus	1,100,000	1,310,000	3,865,000	4,510,000	\$1,196,384	3,200,000	\$15,181,384

Hydrogen Fuel Cell

Mendocino Transit Authority is exploring Hydrogen Fuel Cell technology for Vehicles and Fueling infrastructure. At the time of this plan some of the distances of routes exceed BEB OEM Range and Hydrogen Fuel Cell technology might be a practical application. Further research is needed on the evolving technology.



MTA's 2022 Diamond Lightning eMotors BEB

Section I. Start-Up and Scale-Up Challenges

Resiliency Considerations

Electric buses require charging infrastructure to recharge their batteries. During a PSPS or wildfire charging infrastructure may be unavailable or unreliable. Therefore, it is important to have backup charging infrastructure or alternative power sources available, such as generators or solar battery back-up storage.

Cost Considerations

Battery electric buses (BEBs) offer numerous advantages over traditional diesel-powered buses, including reduced emissions, lower operating costs, and quieter operation. However, there are also several cost considerations associated with BEBs that need to be taken into account:

Upfront Costs: The upfront cost of BEBs is generally higher than that of diesel-powered buses. This is due in part to the cost of the battery technology, which can account for a significant portion of the total cost of the bus. **Charging Infrastructure:** BEBs require charging infrastructure, which can be expensive to install and maintain. The cost of charging infrastructure will depend on the type of charging system used, the number of charging stations required, and the power requirements of the buses. **Battery Replacement:** BEBs have a limited lifespan for their batteries, typically around 5-10 years. The cost of battery replacement can be significant and will depend on the size and type of battery used. **Maintenance Costs:** BEBs have fewer moving parts than diesel-powered buses, which can result in lower maintenance costs over the lifetime of the bus. However, the cost of maintenance for BEBs may be higher in the short term, particularly for specialized equipment such as the battery management system. **Training and recruitment of technicians** is also an added cost. **Operating Costs:** BEBs have lower operating costs than diesel-powered buses, primarily due to the lower cost of electricity compared to diesel fuel. However, the operating costs of BEBs may be affected by factors such as battery degradation and the cost of electricity.

Technological Maturity and Uncertainty

Electric buses are a relatively new technology compared to traditional gas or diesel-powered buses, and as with any emerging technology, there is a level of technological maturity and uncertainty associated with their adoption.

Appendix A
Resolution Approving
Zero Emission Bus Rollout Plan



RESOLUTION OF THE BOARD OF DIRECTORS OF THE
Mendocino Transit Authority
APPROVING THE ZERO-EMISSION BUS ROLLOUT PLAN

WHEREAS, California Code of Regulations Title 13, Division 3, Chapter 1, Article 4.3, Part 2023.1(d) Zero Emissions Bus Rollout Plan Requirements requires that a transit agency Zero-Emission Bus Rollout Plan must be approved by its governing Board; and

WHEREAS, Zero-Emission Bus Rollout Plan sets forth the MTA's plan which meets the following requirements:

- A goal of full transition to zero-emission buses by 2040 with careful planning that avoids early retirement of conventional internal combustion engine buses;
- Identification of the types of zero-emission bus technologies MTA is planning to deploy;
- A schedule for zero-emission and conventional internal combustion engine bus purchases and lease options;
- A schedule for conversion of conventional internal combustion engine buses to zero-emission technologies;
- A schedule for construction of facilities and infrastructure modifications or upgrades, including charging, fueling, and maintenance facilities, to deploy and maintain zero-emission buses;
- Explanation of how MTA plans to deploy zero-emission buses in Disadvantaged Communities;
- A training plan and schedule for zero-emission bus operators and maintenance and repair staff; and
- Identification of potential funding sources.

NOW, THEREFORE, BE IT RESOLVED that the Board of Directors of the Mendocino Transit Authority hereby approves the Mendocino Transit Authority's Zero-Emission Bus Rollout Plan as set forth in full.

BE IT FURTHER RESOLVED that insofar as the provisions of any Ordinance, Resolution, document, or previous action of the Board and/or the Executive Director, prior to the date of this Resolution, are inconsistent with the provisions of this Resolution or any policy adopted by this Resolution, this Resolution and the Board Policies adopted herein shall control.

PASSED, APPROVED AND ADOPTED by Director Sher and seconded by Director Gjerde at the regular meeting of the Board of Directors of the Mendocino Transit Authority this 28th day of June 2023 by the following roll call vote:

AYES: Tarbell - Albin-Smith, Sher and Chair Rodriguez

NOES:

ABSENT: Richard and Boyle

ABSTAIN:

BOARD CHAIR Signature

CERTIFICATION

I, Sara Marques, duly appointed and qualified, Clerk of the Board of the Mendocino Transit Authority, do hereby certify that the above is a true and correct copy of a resolution passed and approved by the Board of Directors of the Mendocino Transit Authority adopted at a legally convened meeting of the Board of Directors of the Mendocino Transit Authority held on the June 28, 2023.

CLERK OF THE BOARD Signature