The City of Las Cruces: FTA Zero-Emission Fleet Transition Plan

(adopted May 20, 2022)

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Introduction

The City of Las Cruces (Las Cruces) developed this Zero-Emission Fleet Transition Plan to meet the requirements of 49 U.S.C. 5339(c)(3)(D) for applicants to the FY2022 Low or No Emission Grant Program (Low-No). This fleet transition plan was developed specifically for this application and includes reference to the project(s) requesting FY22 funding.

The plan is divided into six sections, addressing each of the following elements outlined by Federal Transit Administration (FTA):

1. **Fleet Assessment:** Demonstrate a long-term fleet management plan with a strategy for how the applicant intends to use the current request for resources and future acquisitions.
2. **Funding Needs Assessment:** Address the availability of current and future resources to meet costs for the transition and implementation.
3. **Policy Assessment:** Consider policy and legislation impacting relevant technologies.
4. **Facilities Assessment:** Include an evaluation of existing and future facilities and their relationship to the technology transition.
5. **Partnership Assessment:** Describe the partnership of the applicant with the utility or alternative fuel provider.
6. **Workforce Analysis:** Examine the impact of the transition on the applicant's current workforce by identifying skill gaps, training needs, and retraining needs of the existing workers of the applicant to operate and maintain zero-emission vehicles and related infrastructure and avoid displacement of the existing workforce.

Element 1: Fleet Assessment

Fleet Assessment Overview

The Fleet Assessment determines a projected timeline for replacing existing buses with zero-emission buses (ZEB) that stays consistent with City of Las Cruces' current fleet replacement plan. This assessment also includes a projection of vehicle capital costs over the transition timeline.

Las Cruces' fleet is currently comprised of sixteen (16) 35' GILLIG buses and four (4) Arboc cutaways, all of which provide fixed route services daily to communities in and around Las Cruces, New Mexico. Buses range in age from 2004 to 2018. The average age of our fleet is 12.5 years. The City of Las Cruces operates 10 fixed routes with 12 buses used during peak times. The oldest vehicles in the fleet were purchased in 2004 and have exceeded their useful by several years.

The first step in the Fleet Assessment is determining the schedule for replacing Las Cruces' current fleet with ZEBs. For the purpose of this Low-No application and based on Las Cruces' goals and current fleet replacement plan, Las Cruces developed the following Annual ZEB Purchase Schedule presented below in **Table 1.**

Table 1: Annual ZEB Purchase Schedule

ZEB Transition Timeline			
Year	Total New Buses Scheduled for Purchase	Total ZEBs Scheduled for Purchase	ZEB Percentage
2022	0	0	100%
2023	5	5	100%
2024	7	7	100%
2025	3	0	0%
2026	2	0	0%
2027	0	0	0%
2028	0	0	0%
2029	0	0	0%
2030	0	0	0%
2031	1	1	100%
2032	0	0	100%
2033	2	2	100%
2034	0	0	100%
2035	2	2	100%
2036	2	2	100%
2037	5	5	100%
2038	7	7	100%
2039	1	1	100%
2040	0	0	100%

In this schedule, vehicles are replaced once they have come to the end of their useful life with a battery-electric bus (BEB) up to the given percentage of replacements as determined by the Annual

ZEB Purchase Schedule. This assessment assumes that the fleet will remain the same size throughout the period of transition to a zero-emission fleet.

Based on the Annual ZEB Purchase Schedule, Las Cruces is already in the process of procuring BEBs and will purchase exclusively BEBs from 2031 onward. Las Cruces intends for all remaining procurements to be ZEBs until their fleet is fully transitioned in 2039. Las Cruces' 2022 Low-No project can be seen in the 2024 procurement year.

Key Results

Figure 1 shows Las Cruces' projected purchases by year including the number and type of bus propulsion through 2040. The proposed FY22 Low-No is reflected in **Figure 1,** with Las Cruces procuring 7 BEBs in 2024 year.

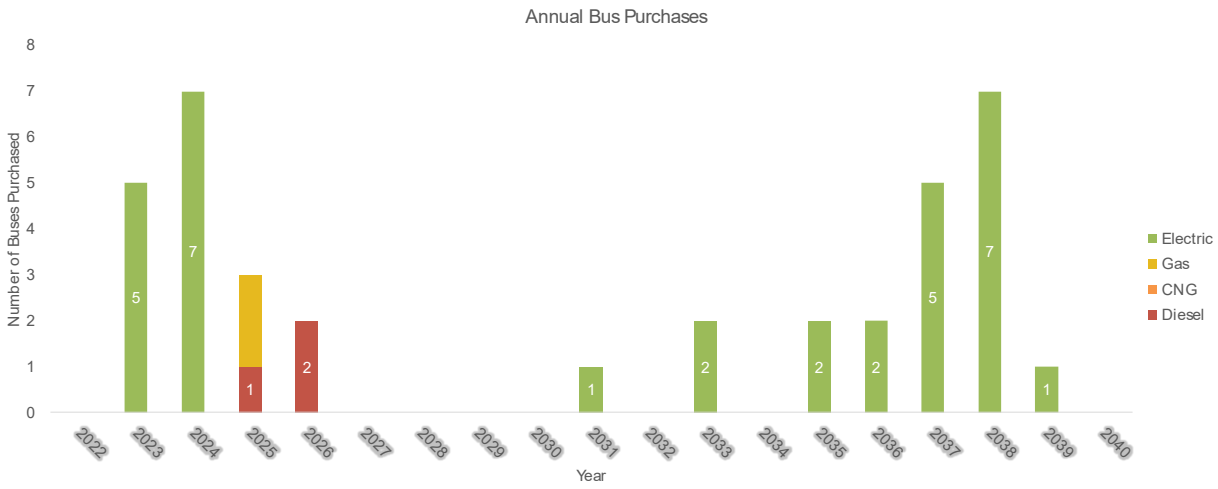

Figure 1 – Projected Bus Purchases

Figure 2 depicts Las Cruces' proposed annual fleet composition through 2040 as it phases out previous vehicle propulsion technologies for ZEBs. By 2039, the Las Cruces fleet is 100% ZEBs.

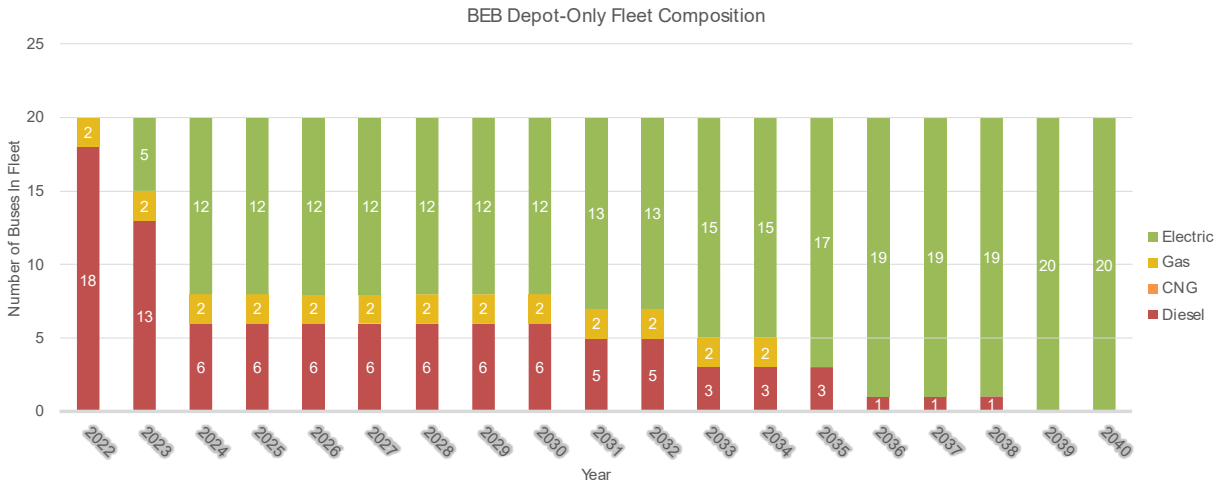

Figure 2 – Annual Fleet Composition

Cost Assumptions

Key assumptions for vehicle costs for the Zero-Emission Fleet Transition Plan are as follows:

- Vehicle costs are based on the Las Cruces' most recent procurement price for internal combustion engine (ICE) vehicle propulsion technologies and industry averages for zero-emission technologies;
- Vehicle costs are inclusive of estimates for configurable options and taxes;
- Vehicle cost includes estimate for extended battery warranty, allowing for a mid-life battery replacement;
- Vehicle costs do not include inflation.

Figure 3 shows the annual capital costs for vehicles purchased in a given year through 2040. The estimated total cost for vehicles over the designated transition period is $26.6 million. Costs are incurred from the annual ZEB purchases laid out in the fleet replacement plan.

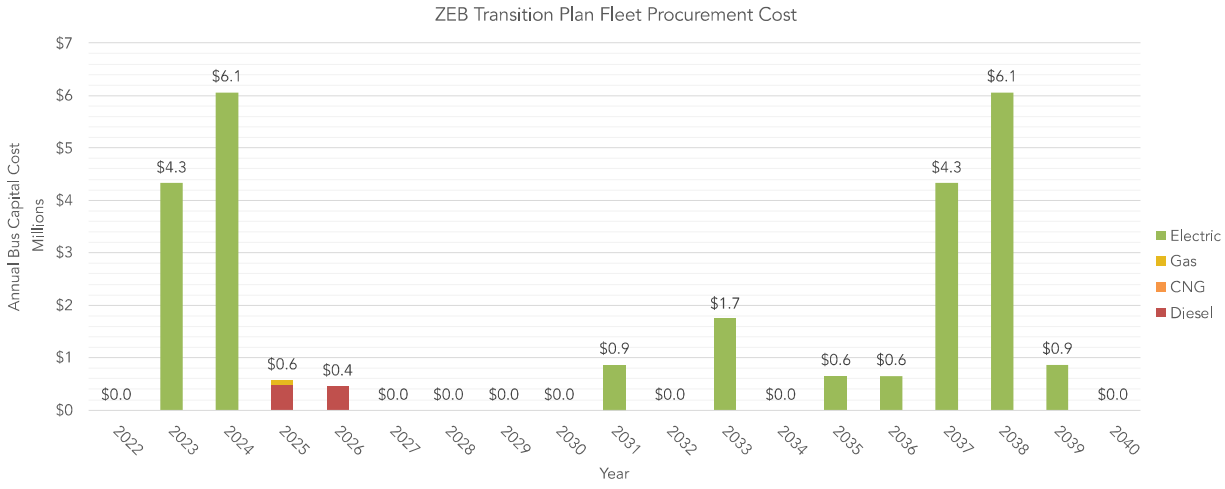

Figure 3 – Annual Capital Costs

Conclusion

Las Cruces is expected to transition to a 100% zero-emission fleet by 2039. The expected total capital cost of vehicles for the transition to a ZEB fleet is estimated at $14.3 million to replace all ICE vehicles with BEBs. In total, Las Cruces expects to incur $26.6 million in vehicle capital costs between 2022 and 2040 including purchasing their last ICE vehicles in 2025 and 2026 and replacement of their first round of BEBs in 2037 and 2038.

Element 2: Funding Needs Assessment

Funding Assessment Overview

Las Cruces allocates funds based on an established procurement timeline determined by the useful life of its buses. Transitioning to a zero-emission bus fleet increases overall fleet costs because of the incremental cost of zero-emission buses, the installation of new infrastructure, and required modifications to maintenance facilities. The current market cost of zero-emission buses is between $750,000 and $1,200,000, which is approximately $250,000 to $700,000 more expensive than diesel buses. Additionally, the necessary infrastructure to support these zero-emission buses adds to the financial burden of transitioning to a zero-emission fleet.

For the purposes of the Zero-Emission Fleet Transition Plan, vehicle costs and infrastructure costs are assessed individually in the Fleet and Facilities Assessments. The results of those cost assessments are compiled here as total costs and then compared to Las Cruces' budget to better understand funding gaps and needs.

Las Cruces Funding Needs

Las Cruces plans to transition all 20 vehicles in the fleet to BEBs by 2039, which will also require supporting charging infrastructure and service capacity upgrades.

To achieve these goals and move towards a successful deployment of zero-emission buses, Las Cruces projects will require $1.3 million for charging infrastructure and $14.3 million to replace all ICE vehicles with BEBs to cover the procurement of vehicles and infrastructure during the transition time period. This cost estimate covers the necessary costs for the transition, as determined via the cost analyses completed for the Fleet and Facilities Assessments.

Available Funding Resources & Resulting Funding Shortfalls

Based on the funding needs identified above and an assessment of Las Cruces' current projections, Las Cruces must identify resources that can cover this funding gap. Traditional formula funding will provide support for the transition to a zero-emission fleet (e.g., using formula funds to cover the base price of a zero-emission bus and applying for Low-No funds for the incremental cost difference), but it is likely Las Cruces will require additional funding to offset the higher costs associated with zero-emission technology.

Las Cruces is prepared to pursue funding opportunities at the federal, state, and local level, as necessary and as available.

Currently New Mexico does not have on-going funding for transit capital projects. In the last 2 years NMDOT has competitively funded some small capital projects. In FY21, NMDOT offered to fund about 10% of the cost of four paratransit vehicles.

Local funding sources for the Low No project is coming from a fund, called the Telshor Fund, which supports projects that benefit the health and welfare of disadvantaged populations in the community.

Element 3: Policy Assessment

Policy Assessment Overview

Policies and regulations supporting the transition to zero-emission are proliferating as the efforts to decarbonize the transportation sector expand. Las Cruces is monitoring the implementation of relevant policies and legislation. While relevant funding programs are considered in the Funding Needs Assessment above, policies and regulations that direct aspects of zero-emission transit deployments beyond funding are considered in this section. Las Cruces will thoroughly assess all relevant policies and legislation throughout the fleet transition.

Alignment with Federal Priorities and Policies

With the passage of the Bipartisan Infrastructure Law and Executive Order 14008: Tackling the Climate Crisis at Home and Abroad, the federal government has set a renewed focus on zero-emission transit. Las Cruces' goal to deploy zero-emission vehicles supports the federal administration priorities of safety, modernization, climate, and equity for public transportation. Las Cruces' Low-No request this year supports these goals by allowing the agency to replace 7 diesel buses that have exceeded their useful life with zero-emission vehicles that will result in reduced greenhouse and particulate emissions.

New Mexico Policies & Goals

The State of New Mexico policies relating to regulations of EVs is only in its infancy and, as yet there is nothing specific to transit vehicles. The State has been distributing funds from the VW settlement program to mitigate NO_x emissions, but so far none have been distributed to transit agencies with most funds primarily going to school bus replacement. The State's Energy, Minerals, and Natural Resources Department does have a Climate Action Plan 2023 that calls for State support of electrification in the transportation sector including electric vehicles, charging stations, and infrastructure. The New Mexico Environment Department is in a Road to Clean Cars rulemaking process that would result in the adoption regulations for Low or No emission automobiles, but that is still in the public input process.

Support for Local Policy Goals

In 2020, The City of Las Cruces adopted a Climate Action Plan which includes goals and strategies for reducing greenhouse gas emissions. This includes a commitment to converting the City's vehicle fleet to EVs and promoting the adoption of EVs that is inclusive to the entire community.

Element 4: Facilities Assessment

Facilities Assessment Projects

The following section introduces the timeline and cost estimates for the infrastructure associated with Las Cruces' transition to battery electric buses.

Battery Electric Bus Facilities Assessment Overview

Scaling to a fleetwide battery electric bus deployment requires substantial infrastructure upgrades and a significantly different approach to charging compared to smaller deployments. With initial deployments, charging requirements are met relatively easily with a limited number of plug-in pedestal chargers and minimal infrastructure investment.

Full fleet deployments of battery electric buses, however, require installation of a significant number of charging stations and improvements to existing electrical infrastructure. These improvements may include upgrades to switchgear or service connections. Planning and design work, including development of detailed electrical and construction drawings required for permitting, is also necessary once specific charging equipment has been selected.

To determine the installation timeline and costs for charging equipment, this assessment breaks the infrastructure scope of work into three key project types: planning, power upgrades, and charging equipment (charger and dispensers) installation. Estimated costs associated with each project type are included in **Table 2**.

Table 2 – Battery Electric Bus Infrastructure Project Cost Assumptions

Project	Estimate Metrics	Cost Estimate	Source
Infrastructure Planning	Infrastructure Design and Planning	$200k per project	Engineer's estimate
Power Upgrade Projects	Design, Construction, & Equipment	Variable ($200k-$400k) per project dependent on capacity added	Engineer's estimate, includes 20% contingency
Charging Installation Projects	Charging Equipment & Installation	$132k per 150 kW charger $12k per dispenser	Quotes and estimates, includes 20% contingency

Key assumptions applied in the Las Cruces' Facilities Assessment are as follows:

- One plug-in dispenser per bus;
- One bus per 80 kW charger;
- Two charge windows, i.e., no more than half the buses charge at any given moment;
- Incremental power requirements are met over time. Power upgrades are consolidated to occur in selected years, in accordance with the required demand; and

- Dispenser capacity to serve up to 80% of the fleet at a time; no movement of buses overnight.

Battery Electric Bus Infrastructure Cost Summary

Figure 4 summarizes all costs for charging infrastructure for Las Cruces' transition to a battery electric bus fleet. The estimated total infrastructure costs are approximately $1.2 million. This total cost includes power upgrade projects, charger and dispenser installations, planning projects, design-engineering costs, and a 20% contingency on all costs.

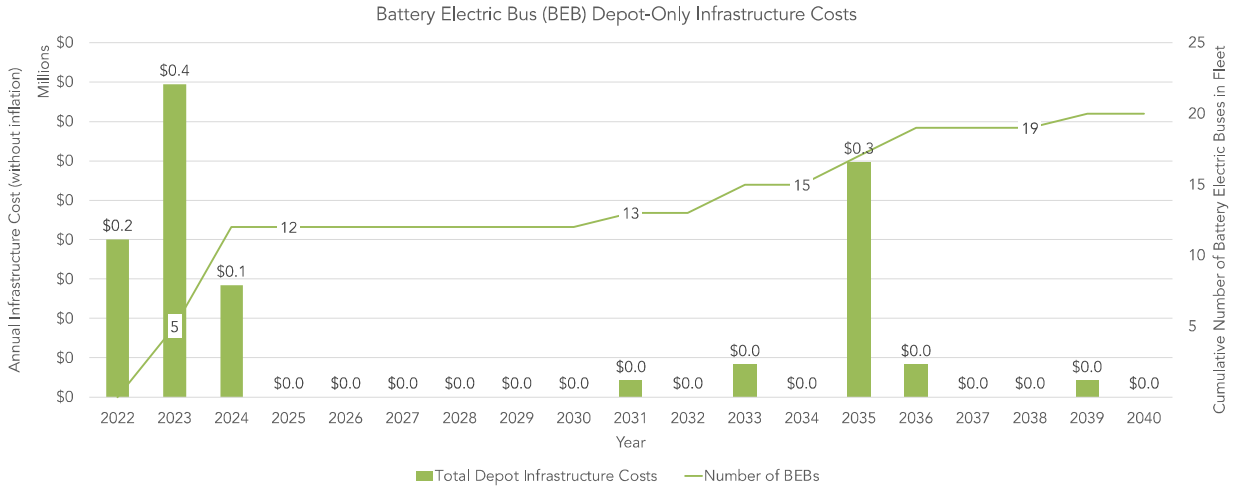

Figure 4 - Depot Only Cumulative Costs, Infrastructure

The total number of each infrastructure type included in this cost analysis is included in **Table 3**.

Table 3: Infrastructure Summary

Infrastructure Element	Total Quantity Required (2022 2040)
Planning and Design	1
Chargers	20
Dispensers	20
Added Service Capacity	2MW

Las Cruces' Current Facilities

Las Cruces is currently in the process of building a new depot that will house all of the agency's fixed route service vehicles. This site is being planned to have the necessary space required to

accommodate 20 80kW chargers in coordination with parking all 20 of the agency's vehicles. The site is also being prepared to have the necessary power capacity.

Element 5: Partnership Assessment

Battery Electric Bus Partnership

Establishing and maintaining a partnership with the local electric utility is critical to successfully deploying zero-emission vehicles and maintaining operations. With the addition of battery electric buses to a fleet, a transit Las Cruces may likely become a utility's largest customer with added implications for grid-side infrastructure and Las Cruces operational costs. Early coordination and discussions can avoid costly delays and misaligned operational strategies while also revealing opportunities for lower operational costs and smart investments. Fortunately, electric utilities are beginning to develop electric vehicle rates and streamlined processes for charging infrastructure interconnections that can support successful zero-emission fleet deployments.

Las Cruces is aware that taking advantage of these benefits and ensuring a successful battery electric bus deployment requires close, ongoing coordination with El Paso Electric (EPE). Las Cruces' discussion of short- and long-term fleet goals with EPE ensures that EPE can properly plan grid-side electrical infrastructure upgrades and that LAS CRUCES can adequately upgrade behind-the-meter equipment to support battery electric buses. Once the infrastructure upgrade needs are established, Las Cruces will incorporate the design and construction timelines into the overall transition plan timeline.

Las Cruces recognizes El Paso Electric (EPE) as a critical partner in electrification and will continue to partner with EPE after the planning stages, so that charge management strategies and fleet expansion efforts can be coordinated effectively. EPE has provided a letter of support (See attachment L) for this project which is included in the attachments to the grant application. EPE is currently going through rate negotiations with the State of New Mexico. The City retains an expert in rate negotiations who is actively negotiating rates that will be to the greatest benefit to the City, including electrification of the City's transit fleet. EPE has certified a for Experimental Electric Vehicle Charging (EEVC) that us very favorable to the City's BEB deployment plans. The current rate offers .04585 per kWh super off peak 12:00am -8:00am; .09352 per kWh off peak 8:00am – 3:00pm & 7:00pm -12:00am; .41995 per kWh on peak 3:00pm – 7:00pm.

Element 6: Workforce Analysis

Las Cruces, located in Las Cruces, NM, operates a fleet of 16 buses and 4 cutaways. Las Cruces is committed to transitioning to a fully BEB fleet by 2039. Over the next 3 years, Las Cruces plans to deploy a total of 12 BEBs. In order to support ZEB operations at this scale, Las Cruces has identified opportunities to ensure the current and future workforce is prepared to manage its full fleet of 20 future ZEBs. This Workforce Development Plan focuses on ZEB operations and maintenance.

In alignment with FTA's requirements under the Workforce Development for the 2022 Low No program, Las Cruces will build a ZEB workforce program in consultation with labor representatives and will continue to build on a current apprenticeship program already in works and determine

how to best reskill and upskill the current workforce to meet the needs of Las Cruces' future operational and maintenance needs.

Workforce Analysis Overview

Developing and training the workforce required to operate and maintain zero-emission buses requires significant investment and planning. Las Cruces is experienced in recruiting, hiring, training, and integrating new staff to ensure that employees are qualified to provide quality services to our riders. Las Cruces recognizes that a trained ZEB workforce is not readily available, and the transit industry must address the shortage of technicians and mechanics together.

The labor union representing the City's Blue-Collar employees, United Steelworkers Local 9424, is fully supportive of the City's applications for BEBs, the opportunity to create specialized training for these vehicles, and the opportunity to create better paying jobs in the community. The union has provided a letter of support (See attachment L)for this project.

Las Cruces plans to develop and maintain a qualified ZEB staff by hiring qualified new staff and retraining existing staff who have previously worked with internal combustion engine (ICE) systems. Meaningful investment is required to upskill maintenance staff and bus operators that were originally trained in diesel vehicle maintenance and fossil fuel fueling infrastructure. Transitioning to zero-emission vehicles is a paradigm shift for all aspects of transit operations including but not limited to scheduling, maintenance, and yard operations. Las Cruces' workforce development activities will address the identified skills and tools needed for each relevant team.

Identified Training Needs

Several training needs have been identified by Las Cruces staff in order to support their transition to a 100% ZEB fleet. Las Cruces is committed to ensuring new training and technologies do not displace current workers and has placed a priority on training existing staff as well as developing an apprenticeship program. The identified training needs are anticipated to evolve as Las Cruces' fleet expands. As such, the following training plans are intended to provide a framework.

1) *Vendor training from OEM*
   Las Cruces plans to take advantage of trainings from the bus manufacturers and infrastructure suppliers, including maintenance and operations training, maintenance and safety, first responder training, and other trainings that may be offered by the providers. BYD trainings provide critical information on operations and maintenance aspects specific to the equipment model procured. Las Cruces has a Transit Training Coordinator dedicated to training and safety. The Training Coordinator will work closely with the OEMs providing vehicles to ensure all mechanics, service employees, and bus operators complete necessary training prior to deploying ZEB technology. Las Cruces staff will also be able to bring up any issues or questions they may have about

their training with their trainers. Additionally, trainers will observe classes periodically to determine if any staff would benefit from further training from the OEM.

2) *ZEB tools*
Las Cruces intends to purchase a bus simulator for specialized driver training. Bus simulators are equipped with the ability to use different software programs to ensure our staff are trained on the newest technologies and offer the opportunity to run future software developments that simulate other technologies that may come in the future. Personal Protective Equipment (PPE) will be purchased and used for safety training. There are specialized tools used to monitor correct operational functions of the electrical power train and diagnose anomalies and failures to the system. These diagnostic tools will be used for training to make sure technicians are well equipped and versed in the correct usage of such tools.

3) *Professional Associations*
The City of Las Cruces is an active member of APTA, which includes stakeholders involved in planning, operating, and maintaining ZEBs. As part of The City of Las Cruces' workforce development strategy, development and training for all levels of our team, including the executives, managers, and technical staff that represent our agency, is of critical importance to better understand ZEBs and make informed performance, maintenance, operating, and purchasing decisions related to zero-emission vehicles and infrastructure.

Resources and Strategies to Meet Identified Needs

In order to incorporate the above training needs, Las Cruces envisions using the following resources and strategies. To achieve these goals and ensure a successful deployment of zero-emission buses, Las Cruces will require $357,491 in funding to cover the workforce development initiatives identified. FY2022 Low-No funding will ensure the workforce development plan can be implemented in parallel with deployment of vehicles and infrastructure.

Table 4: Training Resources

Training Resource/Strategy	FY2022 Low No Budget
Bus OEM Operator, Maintenance, First Responder Training	$75,000
Infrastructure Training	$39,000
PPE, Tools, and Equipment	$45,000
Training Aids, Simulators, Components, Equipment	$200,000

Workforce Development Timeline

Demand for skilled and experienced workers will increase rapidly as new clean transportation policies and programs take effect and as numerous agencies begin fleet transitions. Aligning

workforce development activities with the fleet transition timeline ensures that a qualified workforce is ready and available to support a successful deployment. Based on Las Cruces' fleet transition plan of becoming 100% ZEB by 2039, the graphic below shows the anticipated progression. By 2025, Las Cruces will have a BEB fleet of 12 buses, which is 60% of the total fleet. By 2040, Las Cruces will have a BEB fleet of 20 buses and be 100% zero-emission.

Existing transit mechanics will receive training from the OEM starting 3 months before the deployment of the BEBs and will have ongoing training for new employees and refresher training after deployment. Drivers will receive training once the buses are on-site and before they are deployed in service. Using monitoring tools, drivers will receive additional training as needed to help improve efficiencies in their driving techniques. Initially there will not be any expansion that would require additional employees since the first BEBs received will be replacement and not expansion buses. Once skills are acquired, Las Cruces will be doing a classification and compensation study on these mechanic positions to ensure they are fairly compensated for their additional skills.

Workforce development is an ongoing process that must continue as fleets scale up and deploy additional zero-emission vehicles. To ensure that the workforce scales efficiently and cost-effectively, Las Cruces will employ training strategies that support additional zero-emission vehicle deployments in the future. Las Cruces anticipates training funding availability will evolve to support workforce and training needs going forward.