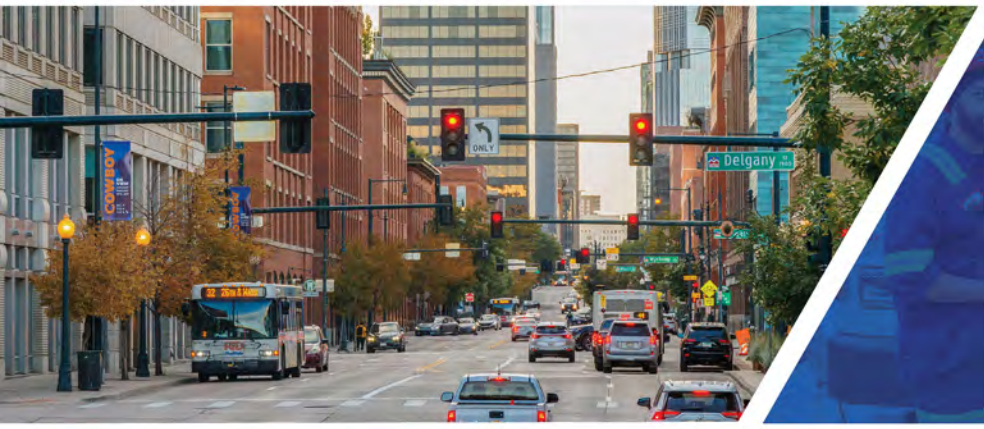
Facilities Transition Blueprint

Facilities and Fleet Transition Plan



December 2024 | FINAL

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List of Acronyms

ADA - Americans with Disabilities Act

BEB - battery electric bus

BESS - battery energy storage system

CO_2 - carbon dioxide

dHEB - diesel-hybrid electric bus

EPA - United States Environmental Protection Agency

EUI - energy use intensity

FCEB - fuel cell electric bus

FFTP - Facilities and Fleet Transition Plan

FTA - Federal Transit Administration

FY - Fiscal Year

GHG - greenhouse gas

IBC - International Building Code

kBtu - thousands of British thermal units

kW - kilowatt

MEP - mechanical, electrical, and plumbing

MPFF - Mobility Plan for the Future

OEM - original equipment manufacturer

O&M - operations and maintenance

ORC - on-route charger

RTD - Regional Transportation District

SB - Senate Bill

SOP - System Optimization Plan

YOE - year of expenditure

ZE - zero-emission

ZEB - zero-emission bus

ZEV - zero-emission vehicle

Executive Summary

Project Overview

In April 2023, the Regional Transportation District (RTD) Board of Directors adopted a Zero Emission Policy with the goal of achieving net-zero emissions by 2050. To achieve the 2050 goal, RTD has developed the Facilities and Fleet Transition Plan (FFTP) to guide the organization with the transition from a diesel fleet service to a low/no-emission bus operation and facilities upgrade strategy. RTD has taken a "Facilities First" approach, which focuses on preparing the facility infrastructure and the workforce before new vehicles are delivered. RTD's transition to low/no emission vehicles will improve air quality in the RTD service area and make the RTD system more environmentally sustainable.

While the main source of greenhouse gas (GHG) emissions in the Denver metro region is the transportation sector, only 0.4 percent of GHG stems from buses. However, it is important that RTD reduce its emissions profile, since the most impactful and effective strategy for improving air quality in the region is to increase transit trips. For this reason, RTD's primary focus is to continue delivering transit service to meet the region's needs.

The FFTP was developed in two phases. The first phase involved an in-depth analysis comparing five potential bus fuels/technologies that could be considered to meet the 2050 goal, including renewable diesel, diesel hybrid, compressed natural gas, fuel cell hydrogen, and battery electric. RTD staff then identified the preferred fuels/technologies, along with strategies to implement them, and determined that the transition would be segmented into near-term (2025–2035) and long-term (2036–2050) strategies. The near-term strategy focuses on facility modifications to support an expanded battery-electric bus (BEB) fleet at Platte Division and the replacement of diesel with diesel-hybrid electric buses (dHEBs). The long-term strategy focuses on full fleet transition to zero-emission buses (ZEBs), depending on how ZE technologies (battery-electric and fuel cell hydrogen) advance.

In the second phase of the FFTP, technical plans were developed outlining how the preferred fuels/technologies should be integrated into and inform facility improvements, fleet procurements, workforce development, and near-term financing and funding strategies. This document, the Facilities Transition Blueprint, summarizes these technical plans. The Blueprint supplements the Zero-Emission Fleet Transition Plan, which outlines the FFTP's conformance with Federal Transit Administration (FTA) requirements for zero-emission vehicle (ZEV) planning processes.

The Blueprint is a comprehensive plan that details the strategy and actions that RTD should take in the near-term (2025–2035) to meet RTD's 2050 net ZE goal. The near-term strategy outlined in this plan provides RTD with the flexibility to take immediate cost-effective emission-reduction strategies, while also providing the agency the opportunity to take advantage of future improvements to pricing, availability, and technological capabilities. Per the RTD Board of Directors' 2023 Zero Emission Policy, the FFTP will be reevaluated annually to incorporate evolving ZE technology considerations, market factors, and RTD bus facility infrastructure changes, while also measuring progress toward the Board's Zero Emission Policy.

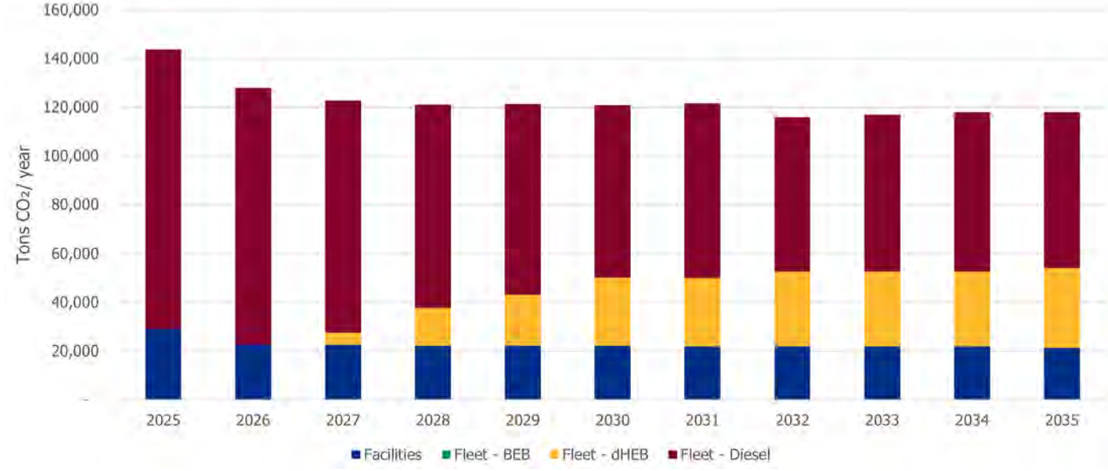
Facilities Blueprint Summary

The near-term strategy outlines a plan to implement infrastructure to support the operation of 75 BEBs at the Platte Division and 334 dHEBs across all facilities. As a result, implementation of the strategy will reduce facility and fleet emissions by 9 percent overall (2025-2035) (**Table ES-1** and **Table E-2**). While diesel bus emissions decline by 36 percent when replacing vehicles with dHEBs, the fleet size is expected to increase between 2027–2035, thereby cutting the net reduction in overall fleet emissions to 4 percent.

For capital and operating needs in the near term, lifecycle cash costs are significantly higher and will require a significantly higher capital investment than if RTD were to procure only diesel buses. Procuring only diesel buses would total nearly $1.8 billion in expenditures in the 2025–2035 period, while implementing the near-term strategy outlined in this plan would increase expenditures by $600 million, to more than $2.4 billion.

The higher costs include the capital costs of vehicles, with both BEBs and dHEBs being more expensive than conventional diesel buses, as well as significant facility upgrade costs especially to accommodate the BEBs, totaling $418 million. In addition, higher maintenance, training, and fuel costs are projected to increase operating expenses by $173 million. The total estimated cost to RTD for implementing the near-term strategy in this plan is estimated to be $591 million more than continuing to procure diesel vehicles. However, the investment in the near-term strategy will create environmental benefits, estimated at more than $69 million between 2025 and 2035. **Figure ES-2** shows the systemwide emissions by year, and **Table ES-3** shows the emissions by facility.

Figure ES-1: Facility and Fleet Emissions 2025–2035 (Tons CO_2/Year)

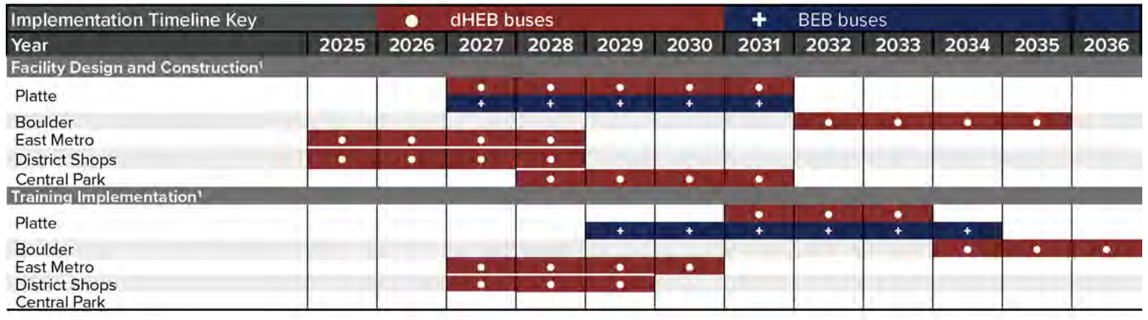


Notes: Facility emissions include the RTD and contracted facilities discussed in this report, as well as 11 others: Denver Union Station Bus Station, Civic Center Station, Downtown Boulder Station, Elati Rail, Mariposa Rail, Commuter Rail Maintenance Facility, Rio Court Rail, Peoria Rail, Security Command Center, North Metro/ 711 Building, and Blake Street Headquarters.

Fleet emissions include buses at Platte, Boulder, East Metro, and contracted facilities.

Source: RTD Utility Data, WSP, and RTD Fleet data.

Table ES-1: Systemwide – Annual Facility and Workforce Training Strategy Summary



Source: WSP

[1] *Years indicated are approximate calendar years during which dHEB or BEB facilities/infrastructure construction and training are expected to take place and may include the entirety of, or a part of, the calendar year indicated. Phasing of construction activities can enable phased vehicle deliveries prior to full buildout.*

Table ES-2: Systemwide – Annual Bus Procurement and Costs Strategy Summary

RTD Division		2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Platte Bus Procurements	Diesel Bus	28		50	22				14				
	dHEB								27				
	BEB						22		53				
Platte Costs (Millions of YOE $)		$38.96	$9.18	$79.53	$76.15	$54.78	$118.94	$59.86	$ 196.75	$60.23	$71.48	$71.07	N/A
Boulder Bus Procurements	Diesel Bus	8		36	20								
	dHEB											40	
Boulder Costs (Millions of YOE $)		$11.56	$2.76	$48.06	$40.09	$19.75	$19.24	$21.28	$28.46	$29.97	$36.92	$94.38	N/A
East Metro Bus Procurements	Diesel Bus	23		51									
	dHEB				106								
East Metro Costs (Millions of YOE $)		$37.23	$10.76	$71.41	$174.22	$34.15	$39.81	$42.54	$55.67	$51.20	$62.11	$73.67	N/A
District Shops Costs (Millions of YOE $)		$2.51	$3.93	$3.26	$1.01	$0.56	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	N/A
Central Park Costs (Millions of YOE $)		$0.00	$0.00	$0.00	$0.59	$3.64	$1.25	$0.65	$0.00	$0.00	$0.00	$0.00	$0.00
Contracted Facilities' Bus Procurements (All Locations)	Diesel Bus			29									
	dHEB			50		55	71					102	

Source: WSP

[1] *Years indicated are approximate calendar years during which dHEB or BEB facilities/infrastructure construction and training are expected to take place and may include the entirety of, or a part of, the calendar year indicated. Phasing of construction activities can enable phased vehicle deliveries prior to full buildout.*

Table ES-3: Near-Term Strategy Summary

Category	Platte	Boulder	East Metro	District Shops	Contracted Facilities
Facility Plan	▸ Infrastructure to support up to 90 BEBs and dHEBs ▸ Implementation between 2027–2031	▸ Infrastructure to support dHEBs ▸ Implementation between 2031–2035	▸ Infrastructure to support dHEBs ▸ Implementation between 2025–2028	▸ Infrastructure to support dHEBs ▸ Implementation between 2025–2028	▸ Contracted services will be expected to have facilities in place to support dHEBs
Fleet Procurement Plan	▸ 216 buses delivered ▸ BEBs, dHEBs, and diesel buses	▸ 104 buses delivered ▸ dHEBs and diesel buses	▸ 180 buses delivered ▸ dHEBs and diesel buses	▸ District Shops does not operate service	▸ 205 buses delivered ▸ dHEBs and diesel buses
Workforce and Training Plan	▸ 72 additional staff needed	▸ 24 additional staff needed	▸ 41 additional staff needed	▸ 5 additional staff needed	▸ To be determined by contractor
Lifecycle Costs	▸ Cash costs: $770.5 million ▸ 40% higher than baseline	▸ Cash costs: $314.4 million ▸ 11% higher than baseline	▸ Cash costs: $604 million ▸ 16% higher than baseline	▸ Cash costs: $11.3 million	▸ Cash costs: $682.9 million ▸ 51% higher than baseline
Emissions	▸ 19,779 tons per year ▸ 24% lower than baseline	▸ 17,372 tons per year ▸ 2% higher than baseline[1]	▸ 28,747 tons per year ▸ 14% lower than baseline	▸ 2,534 tons per year ▸ 33% lower than baseline	▸ 0.4% higher than baseline[2]

Source: WSP

Source: RTD

2025 Action Plan

RTD's ability to successfully implement the near-term strategy will be contingent on actions made at the outset of the program. For example, if there is any delay with design procurement for a facility, the delay will have downstream impacts on not only that facility's operational readiness but also that of other facilities. RTD should take the following steps in the next year:

- **Prepare for upcoming FTA grant cycle (Bus and Bus Facilities (5339(b)) and Low- and No-Emission (5339(c)) grants).**
  - The near-term strategy shows a significant financial shortfall. As part of the FFTP, an FTA-compliant ZE Transition Plan was also developed. RTD should prepare to submit a grant application for these programs to help fund dHEB readiness improvements at East Metro and District Shops.
- **Initiate the design procurement process for District Shops and East Metro.**
  - Construction at District Shops and East Metro to support the new dHEB subfleet is scheduled to begin in 2027. To stay on schedule, RTD must begin the process of 100% designs in 2025.
- **Initiate environmental planning for a new bus facility.**
  - Building a new bus facility involves several stages of development. As part of the FFTP, RTD assessed future facilities. Next steps include analyzing alternatives (which will include a Title VI equity analysis) to select a site and carrying out environmental planning for the selected site to clear it for construction. Following this process ensures that RTD can address the Denver region's evolving needs equitably while maintaining flexibility in service delivery to adapt to changing demands.
- **Continue engaging and coordinating with Xcel Energy regarding power upgrades and schedules.**
  - Platte, in particular, will need power upgrades. However, if other facilities require upgrades in the near future, including the aforementioned future bus facility, RTD will need to communicate these plans to Xcel Energy. Constant communication will mitigate the risk of not delivering projects on time.
- **Reassess cost/benefit of purchasing renewable diesel.**
  - As discussed, RTD has the potential to reduce the estimated near-term GHGs even further if renewable diesel is purchased. Renewable diesel currently costs about $1.20 more per gallon than conventional diesel. RTD will need to continue to monitor the market and decide on how to proceed.
- **Develop facility design criteria.**
  - RTD is currently developing facility design criteria for new and retrofitted bus facilities. The facility design criteria document is expected to be finalized in Q2 2025.
- **Update the FFTP.**
  - Per the Board, RTD is to update the FFTP annually to reflect any changes that will impact meeting the net-zero goal. Updates are expected to be completed annually in Q1.

Source: RTD

Introduction

Project Overview

In April 2023, the RTD Board of Directors adopted a Zero Emission Policy with the goal of achieving net-zero emissions by 2050. To achieve the 2050 goal, RTD has developed the Facilities and Fleet Transition Plan (FFTP) to guide the organization with the transition from a diesel fleet service to a low/no emission bus operation and facilities upgrade strategy. RTD has taken a "Facilities First" approach, which focuses on preparing the facility infrastructure and the workforce before new vehicles are delivered. RTD's transition to low/no emission vehicles will improve air quality in the RTD service area and make the RTD system more environmentally sustainable.

While the main source of greenhouse gas (GHG) emissions in the Denver metro region is the transportation sector, only 0.4 percent of GHG stems from buses. However, it is important that RTD reduce its emissions profile since the most impactful and effective strategy for improving air quality in the region is to increase transit trips. For this reason, RTD's primary focus is to continue delivering transit service to meet the region's needs.

The FFTP was developed in two phases. The first phase involved an in-depth analysis comparing five potential bus fuels/technologies that could be considered to meet the 2050 goal, including renewable diesel, diesel hybrid, compressed natural gas, fuel cell hydrogen, and battery electric. RTD staff then identified the preferred fuels/technologies, along with strategies to implement them, and determined that the transition would be segmented into near-term (2025–2035) and long-term (2036–2050) strategies. The near-term strategy focuses on facility modifications to support an expanded battery-electric bus (BEB) fleet at Platte Division and the replacement of diesel with diesel-hybrid electric buses (dHEBs). The long-term strategy focuses on full fleet transition to zero-emission buses (ZEBs), depending on how ZE technologies (battery-electric and fuel cell hydrogen) advance.

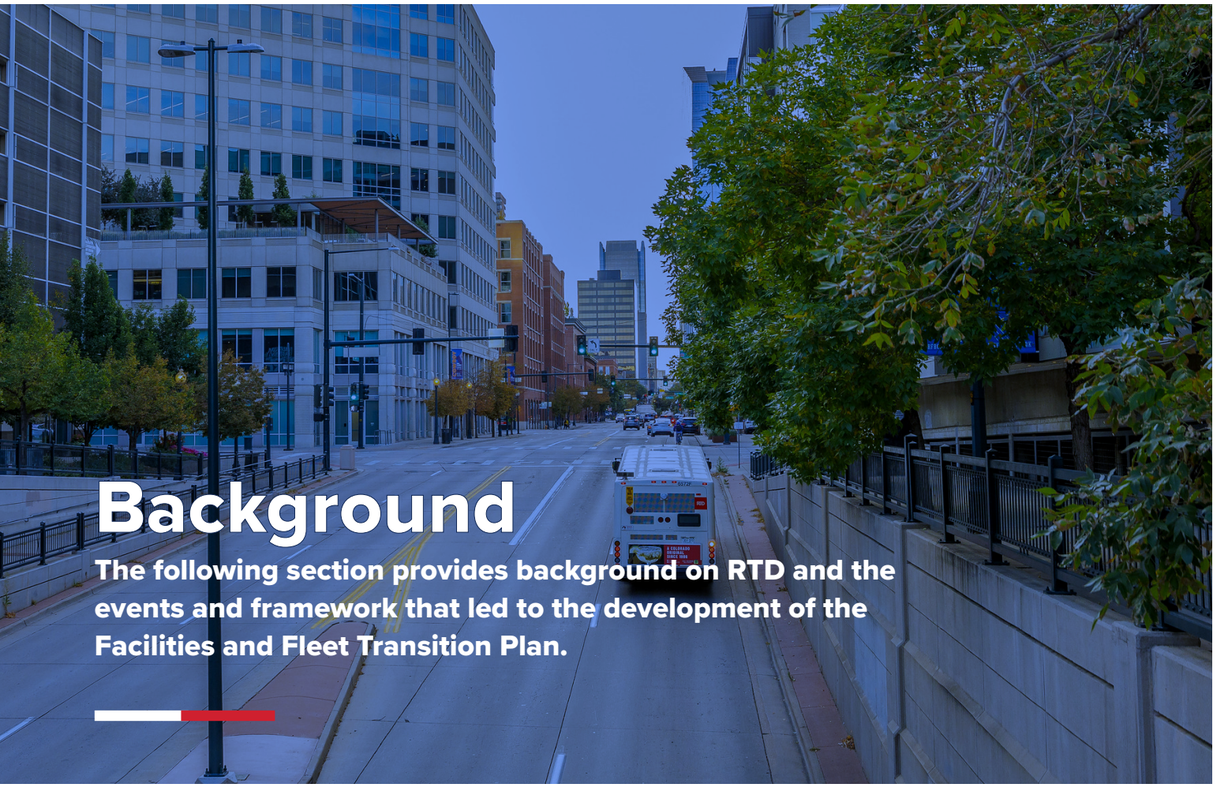
In the second phase of the FFTP, technical plans were developed outlining how the preferred fuels/technologies should be integrated into and inform facility improvements, fleet procurements, workforce development, and near-term financing and funding strategies.

Facilities Transition Blueprint

The FFTP culminated in this document, the Facilities Transition Blueprint (hereinafter referred to as the Blueprint). The Blueprint is a comprehensive plan that details the strategy and actions that RTD should take in the near term (2025–2035) to meet RTD's 2050 net ZE goal. The near-term strategy outlined in this Blueprint provides RTD with the flexibility to take immediate cost-effective emission-reduction strategies, while also providing the agency the opportunity to take advantage of future improvements to pricing, availability, and technological capabilities. Per the RTD Board of Directors' 2023 Zero Emission Policy, RTD will reevaluate the FFTP annually to incorporate evolving ZE technology considerations, market factors, and RTD bus facility infrastructure changes, while also measuring progress toward the Board's Zero Emission Policy.

The Blueprint supplements the Zero-Emission Fleet Transition Plan, which outlines the FFTP's conformance with Federal Transit Administration (FTA) requirements for zero-emission vehicle (ZEV) planning processes.

Source: RTD



Background

The following section provides background on RTD and the events and framework that led to the development of the Facilities and Fleet Transition Plan.

Regional Transportation District

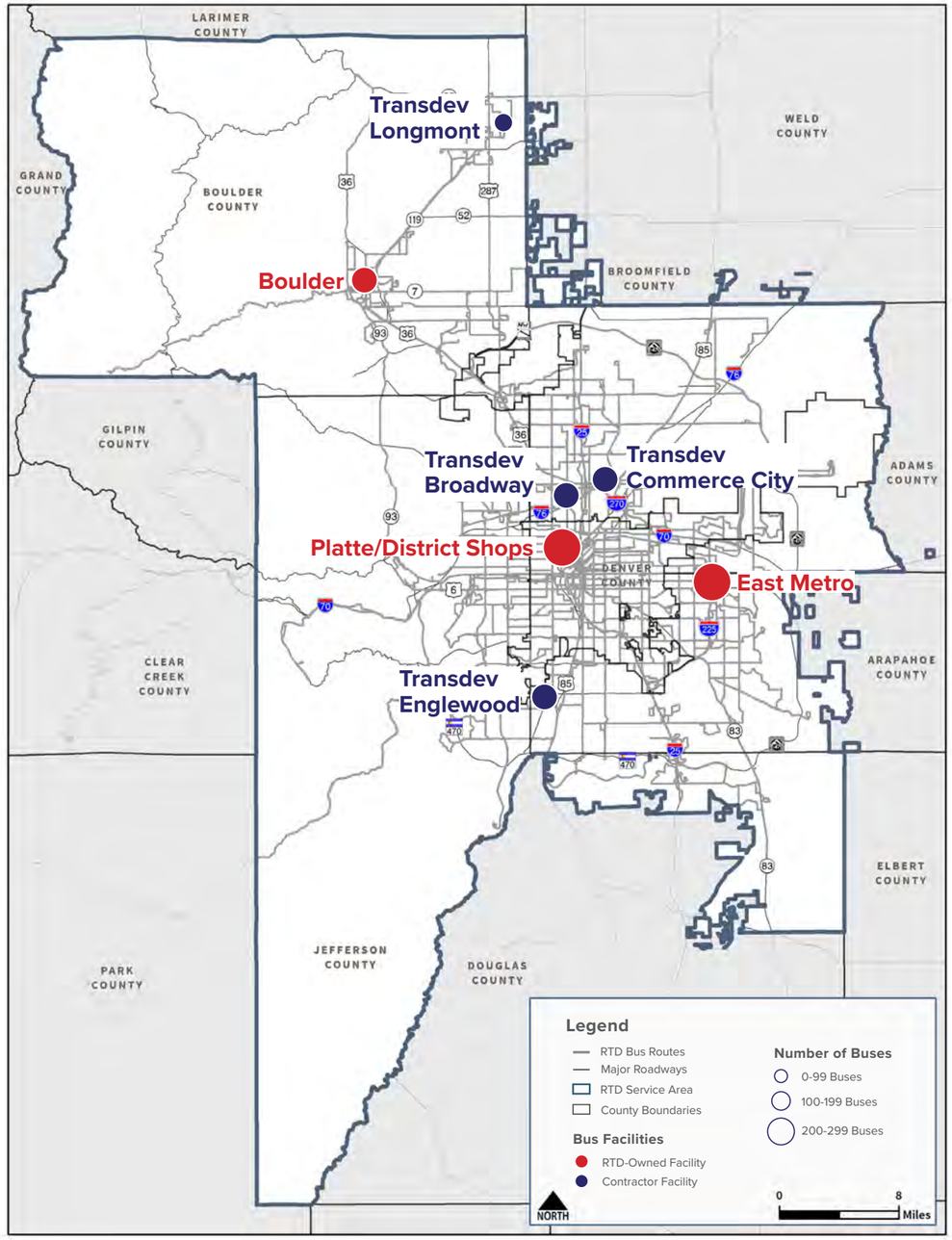
Agency Overview

RTD provides transit services for over 3.1 million people in a service area that spans eight Colorado counties, including Boulder, Broomfield, Denver, and Jefferson counties; and parts of Adams, Arapahoe, Douglas, and Weld counties.[1] With a service area of 2,342 square miles, RTD provides bus, rail, and paratransit services with over 100 bus routes, 6 light rail lines, 4 commuter rail lines, and paratransit mobility options. The agency had 65.2 million annual boardings in 2023, with 41 million as fixed-route bus boardings.

RTD's fleet consists of approximately 1,000 RTD-owned buses, of which 59 percent are operated by RTD and 41 percent are operated by private carriers. Ninety-six percent of RTD's buses are powered by diesel fuel, and the remaining 4 percent— the 16th Street Free MallRide fleet—are BEB. RTD operates and maintains its fleet from 8 facilities. RTD owns the following facilities: Platte, East Metro, Boulder, and District Shops (maintenance facility only). The remaining 4 bus facilities at Longmont, Broadway (in north Denver), Commerce City, and Englewood are contractor-operated facilities. Transdev owns the Commerce City and Englewood facilities and leases the Longmont and Broadway facilities. **Figure 1** shows RTD's service area routes and facilities. RTD is governed by a 15-member, publicly elected Board of Directors. Directors are elected to 4-year terms, and each Director represents a district that contains approximately 200,000 residents.

[1] All RTD agency statistics are from Q1 2024 unless otherwise noted.

Figure 1: RTD Routes and Facilities



Source: Felsburg Holt & Ullevig

Financial Forecast

RTD is primarily funded through local sales and uses taxes, with 70 percent of its revenue coming from local sales and use taxes and the remainder coming from various grant programs (25 percent) and from fares (5 percent). Colorado currently ranks 44th in the nation in state support for regional and local public transit. By comparison, the average transit agency in the United States receives 21 percent of its operating budget and 26 percent of its capital budget from state funding sources.[2]

In November 2024 voters approved Ballot Measure 7A, allowing RTD to keep revenue that would otherwise be returned to taxpayers. This decision allows RTD to retain all future revenue for transit expenditures, and puts the agency in a strong financial position to continue delivering transit services needed in the region. **Table 1** summarizes the 2025-2029 Five-year Financial Forecast (FYFF), which was approved by the Board on September 24, 2024. The FYFF is not an appropriation but a planning tool which is useful from a financial perspective to evaluate fiscal sustainability. The FYFF is one tool used to ensure that budget appropriations are aligned with expectations of financial success and maintenance of a healthy financial position for the agency

Table 1: RTD's Five-Year Financial Forecast ($000's)

Category	2025	2026	2027	2028	2029
Total Revenue	1,192,795	1,224,748	1,263,073	1,301,341	1,344,896
Total Expenditures	1,276,889	1,257,870	1,444,688	1,387,520	1,379,428
Net Sources and Uses	(84,094)	(33,122)	(181,615)	(86,179)	(34,532)
Total Available Reserves	1,007,608	1,018,910	850,439	848,964	848,064
Net Revenue Coverage	1.32	1.39	1.28	1.34	1.35

Source: RTD FY 2025 Budget Book

Greenhouse Gas and Air Quality Impact

Air quality in the Denver metro region has significantly improved over the last 40 years with the number of poor air quality days decreasing by almost 90 percent from 1980—2019. However, the region is not currently meeting Environmental Protection Agency (EPA) ozone standards and has higher rates of asthma than the statewide average.

According to the EPA 2020 National Emissions Inventory, the main culprit for air quality issues and GHG emissions in the Denver metro region is the transportation sector, as it accounts for 86 percent of all GHG emissions in the region. Passenger vehicles account for 61 percent of these emissions, whereas GHG from buses is approximately 0.4 percent of the total (**Figure 2**). Based on this, the most impactful and effective strategy for improving air quality and reducing GHG emissions in the region is to increase transit trips.

[2] https://www.swenergy.org/its-time-for-colorado-to-get-serious-about-funding-public-transit/

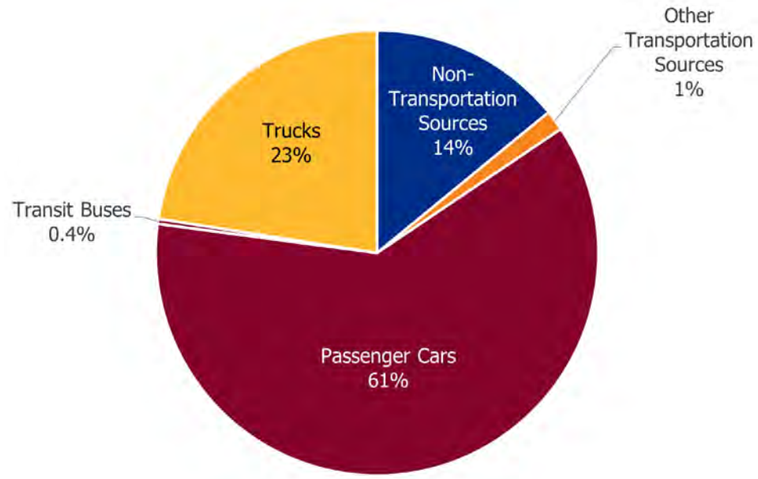
Zero Emission Framework

Testing and Early Adoption

RTD continues to be at the forefront of adopting fuels/technologies and implementing strategies that improve regional air quality and reduce GHG emissions. RTD's rail lines, both light rail and commuter, are powered by electricity. RTD has tested and operated several emerging and clean technologies, including compressed natural gas (CNG), hybrid-electric, and battery-electric for its bus fleet in the past few decades.

In 2015, RTD approved the purchase of 36 BEBs to electrify the 16th Street MallRide fleet (**Figure 3**). The first vehicle arrived in 2016, and the entire route was electrified in 2017, eliminating the MallRide fleet's tailpipe emissions.

Figure 2: Transportation Greenhouse Gas Emissions



Source: EPA 2020 National Emissions Inventory (8-County)

Figure 3: 16th Street MallRide

Source: RTD

Reimagine RTD and "Facilities First"

Reimagine RTD was a multi year effort to evaluate and forecast the changing mobility needs of the region, better position RTD to meet those needs, and collaborate with agency partners to build a cohesive vision for regional mobility. Reimagine RTD also evaluated the viability of expanding RTD's existing BEB fleet. Reimagine RTD provided key input to the FFTP and included two major components: 1) System Optimization Plan (SOP) and 2) Mobility Plan for the Future (MPFF).

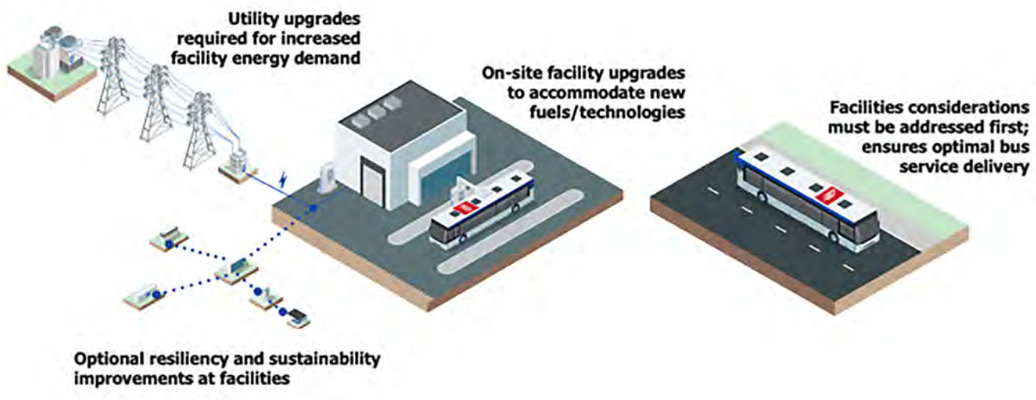
- **System Optimization Plan**: The SOP evaluated travel patterns, demographics, and transit routes. It recommended modifications to RTD's fixed-route services to better meet the region's near-term mobility needs within existing workforce and financial constraints. The implementation of the SOP is planned in a phased manner through 2027 using RTD's standard service changes that occur three times per year. The SOP's service changes, along with associated facility and fleet impacts, are a key input into the FFTP.

- **Mobility Plan for the Future:** The MPFF identified strategies to address the region's future mobility needs. Ongoing industry advancements and societal shifts have altered how and when people travel, how cities function, and how mobility factors into broader visions and goals. The MPFF set a framework for the FFTP by understanding current capabilities, configurations, and future trends, preparing RTD to make informed decisions when considering opportunities for ZEB adoption. Key MPFF elements that set the groundwork for the FFTP include the Bus Facility Condition Assessment and the New Bus Maintenance Facilities Assessment.

On November 16, 2021, the day following President Biden's signing of the federal Bipartisan Infrastructure Law, the RTD Board authorized the General Manager/Chief Executive Officer to enter into a contract with New Flyer of America to purchase 17 forty-foot BEBs. The $18 million contract was executed on January 26, 2022.

After contract execution, staff continued to evaluate factors related to the integration of the BEBs and found that a new or retrofitted facility would be required for incoming BEBs. For this reason, RTD suspended the New Flyer contract for six months, effective October 11, 2022, as staff continued to assess its facilities and infrastructure. Further analysis revealed that East Metro or a new purpose-built facility would be the most feasible place to house the vehicles. However, due to time, costs, and capacity constraints, it was determined that it would be in RTD's best interest to cancel the contract with New Flyer (April 2023). All of these events highlighted the importance of ensuring that infrastructure is in place before vehicles are ordered, thereby establishing the theme: "Facilities First" as illustrated on **Figure 4**.

Figure 4: Facilities First Strategy



Source: Felsburg Holt & Ullevig

As a result of the cancellation, the RTD Board adopted a Zero Emission Policy on April 25, 2023, with the intent for the agency to achieve net ZEs by 2050, as measured by Scope 1 and Scope 2 emissions as defined by the Greenhouse Gas Protocol. Additionally, RTD's Board committed to reevaluate this policy annually after receiving a FFTP to measure progress toward this policy. This approach would ensure that any future decisions pursuant to a low- and/or no-emission transition are informed by a detailed and comprehensive analysis that has evaluated various impacts to RTD's facilities, fleet, workforce, and financial standing.

Facilities and Fleet Transition Plan

To achieve the 2050 goal, RTD completed a comprehensive 14-month effort to develop the FFTP, a framework and technical vision for RTD to meet its transition goals. **Figure 5** summarizes the FFTP's goals, guiding principles, and parameters, established by RTD leadership and staff during the early stages of the FFTP.

Figure 5: Facilities and Fleet Transition Plan Goal, Guiding Principles, and Parameters

Goal

- Achieve **net-zero emissions** from RTD's facilities and fleet by 2050

Guiding Principles

Community Value
Partnerships. Sustainability.

Customer Excellence
Service Quality. Equity.

Employee Ownership
Opportunity. Safety.

Financial Success
Stewardship. Assets.

Parameters

Facilities
- Transit asset management alignment
- Infrastructure compatibility with future fuels and/or technologies
- Maximize long-term facility transition needs
- Regulatory compliance

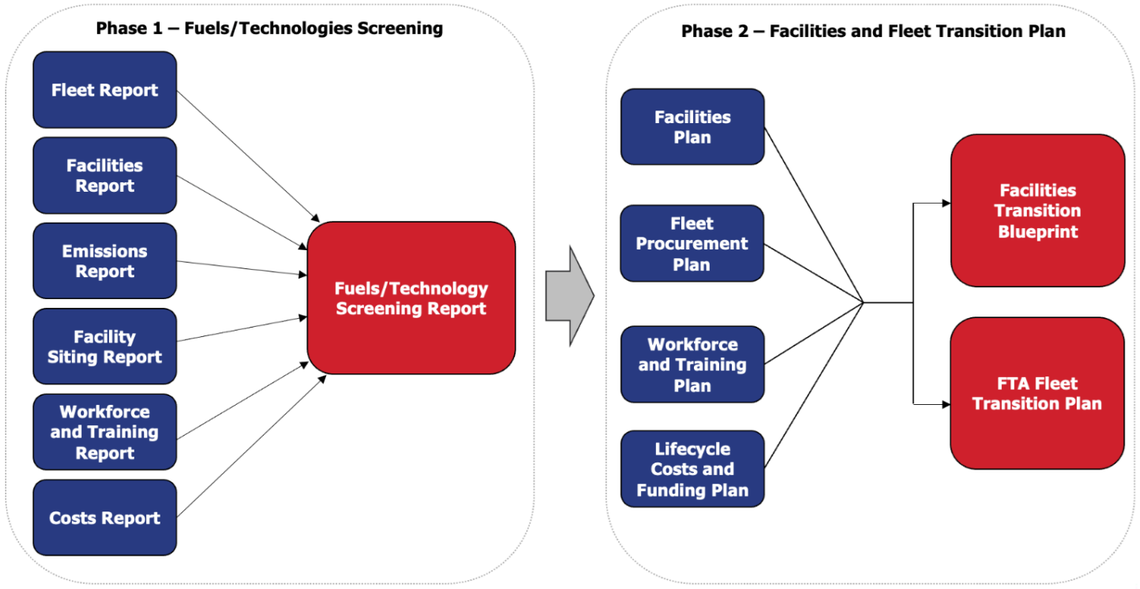
Bus Fleet
- 1:1 bus fleet replacement
- System Optimization Plan (SOP) and DRCOG Transportation Plan alignment

Overall
- Employee growth constellations
- Fiscal accountability
- Favorable customer experience
- Operational effectiveness and efficiency

Source: RTD

The FFTP was developed in two phases (**Figure 6**). Phase 1, the Fuels/Technologies Screening concluded in August 2024), and consisted of an initial screening of five alternative fuels/technologies[3] to determine their respective impacts on RTD's service and fleet, facilities, workforce and training, budget and finances, and emissions. The analysis, along with input from RTD staff, resulted in the selection of preferred fuels/technologies to advance into Phase 2. In Phase 2, which (concluded in December 2024, the project team developed technical plans for the preferred fuels/technologies. These plans (Facilities Plan, Workforce and Training Plan, Fleet Procurement Plan, Lifecycle Costs and Funding Plan) have culminated in the FTA ZE Fleet Transition Plan and this Blueprint, positioning RTD to begin the process of meeting its 2050 net-zero goal.

Figure 6: Facilities and Fleet Transition Plan Project Workflow



Source: WSP

Based on the FFTP's findings, RTD determined that its transition strategy will be two-phased, segmented by near-term (2025–2035) and long-term (2036–2050) objectives. This approach provides RTD with the flexibility to take immediate cost-effective emission-reduction strategies in the near term, while also allowing RTD to take advantage of improved pricing, availability, and technological capabilities as alternative fuels/technologies continue to mature in the long term. Per the RTD Board of Directors' 2023 Zero Emission Policy, the FFTP will be reevaluated annually to incorporate evolving ZE technology considerations, market factors, and RTD bus facility infrastructure changes, while also measuring progress toward the Board's Zero Emission Policy.

[3] Renewable diesel, diesel-hybrid, battery-electric, CNG, and hydrogen.

Near-Term Strategy (2025–2035)

- Update the FFTP annually to capture any changes that may impact RTD's transition timeline, including market and/or policy changes, financial adjustments, and technological improvements.
- Replace existing diesel buses with dHEBs and integrate the use of renewable diesel, if feasible, when available.
- Increase the BEB fleet to the extent possible based on technological advancements, as well as infrastructure and service requirements. Consider and evaluate the feasibility of operating fuel cell electric buses (FCEBs) as a pilot program.
- Plan for the potential acquisition or development of properties for future bus facilities.
- Implement facility improvements that facilitate emission reduction, such as energy efficiency and state of good repair improvements.
- Incorporate language into new fixed-route contracts to accommodate technological changes to the fixed-route revenue fleet.

Long-Term Strategy (2036–2050):

- Continue to update the FFTP annually to reflect any fuel/technology and market updates.
- Replace dHEBs with BEBs and/or FCEBs if the respective fuels/technologies have matured to an appropriate degree.
- If both technologies fail to mature at the expected rate, consider increasing the dHEB fleet.

Near-Term Strategy

The following section describes the existing conditions and proposed facility upgrades, fleet procurement plans, workforce and training requirements, estimated emission reductions, and costs associated with implementing the near-term strategy at RTD facilities.

Overview

The transition strategy in the near term (2025–2035) focuses primarily on retrofitting RTD's existing facilities to support the operation of dHEBs at all facilities and BEBs at Platte. These retrofits will allow an expansion of the existing BEB fleet at Platte (beyond the MallRide fleet) and the full replacement of RTD's existing diesel fleet with dHEBs. The speed and intensity of transitioning RTD's diesel fleet to alternative fuels/technologies depend on the operational readiness at both RTD-owned and contractor-owned facilities.

At RTD-owned facilities, readiness for BEB and dHEB deliveries is contingent on when infrastructure upgrades can be completed. For contracted facilities, the readiness for dHEB deliveries is contingent on the contractors' ability to secure a facility that can store, operate, and maintain dHEBs and align with code requirements.

The following subsections summarize the near-term strategies for each facility and include existing conditions, the infrastructure requirements to support dHEBs and/or BEBs, the vehicle delivery schedules aligned with said improvements, the plan to prepare the workforce for new vehicles, and the estimated emission reduction and costs associated with the transition. The analysis includes the maintenance facility District Shops, as well as Central Park Station, which will be used for on-route chargers to support the new BEBs at Platte. Each specific topic has been assessed and analyzed more comprehensively in the dedicated plans. **Table 2** and **3** presents a comprehensive summary of the strategy, including facility readiness, annual deliveries, and annual fleet mix.

Table 2: Systemwide – Annual Facility and Workforce Training Strategy Summary

Implementation Timeline Key	● dHEB buses						+ BEB buses					
Year	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Facility Design and Construction[1]												
Platte			● +	● +	● +	● +	● +					
Boulder								●	●	●	●	
East Metro	●	●	●	●								
District Shops	●	●	●	●								
Central Park				●	●	●	●					
Training Implementation[1]												
Platte					+	+	● +	● +	● +	+		
Boulder										●	●	●
East Metro			●	●	●	●						
District Shops			●	●	●							
Central Park												

Source: WSP

[1] *Years are approximate calendar years during which dHEB or BEB facilities/infrastructure construction and training are expected and may include the entirety of, or a part of, the indicated calendar year. Phasing of construction activities can enable phased vehicle deliveries before full buildout.*

Table 3: Systemwide – Annual Bus Procurement and Costs Strategy Summary

RTD Division		2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Platte Bus Procurements	Diesel Bus	28		50	22				14				
	dHEB								27				
	BEB						22		53				
Platte Costs (Millions of YOE $)		$38.96	$9.18	$79.53	$76.15	$54.78	$118.94	$59.86	$ 196.75	$60.23	$71.48	$71.07	N/A
Boulder Bus Procurements	Diesel Bus	8		36	20								
	dHEB											40	
Boulder Costs (Millions of YOE $)		$11.56	$2.76	$48.06	$40.09	$19.75	$19.24	$21.28	$28.46	$29.97	$36.92	$94.38	N/A
East Metro Bus Procurements	Diesel Bus	23		51									
	dHEB				106								
East Metro Costs (Millions of YOE $)		$37.23	$10.76	$71.41	$174.22	$34.15	$39.81	$42.54	$55.67	$51.20	$62.11	$73.67	N/A
District Shops Costs (Millions of YOE $)		$2.51	$3.93	$3.26	$1.01	$0.56	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	N/A
Central Park Costs (Millions of YOE $)		$0.00	$0.00	$0.00	$0.59	$3.64	$1.25	$0.65	$0.00	$0.00	$0.00	$0.00	$0.00
Contracted Facilities' Bus Procurements (All Locations)	Diesel Bus			29									
	dHEB			50		55	71					102	

Source: WSP

[1] *Years are approximate calendar years during which dHEB or BEB facilities/infrastructure construction and training are expected and may include the entirety of, or a part of, the indicated calendar year. Phasing of construction activities can enable phased vehicle deliveries before full buildout.*

Platte

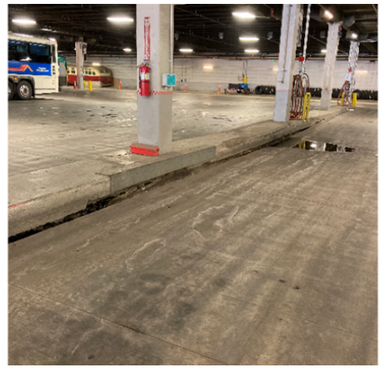
Existing Conditions

Facility

Platte has a reported capacity of approximately 272 buses and uses both interior and exterior parking. It includes maintenance, repair, fueling, and washing bays. Structurally, the main building has concrete columns for support and concrete tees for roof structure, while the exterior walls are masonry.

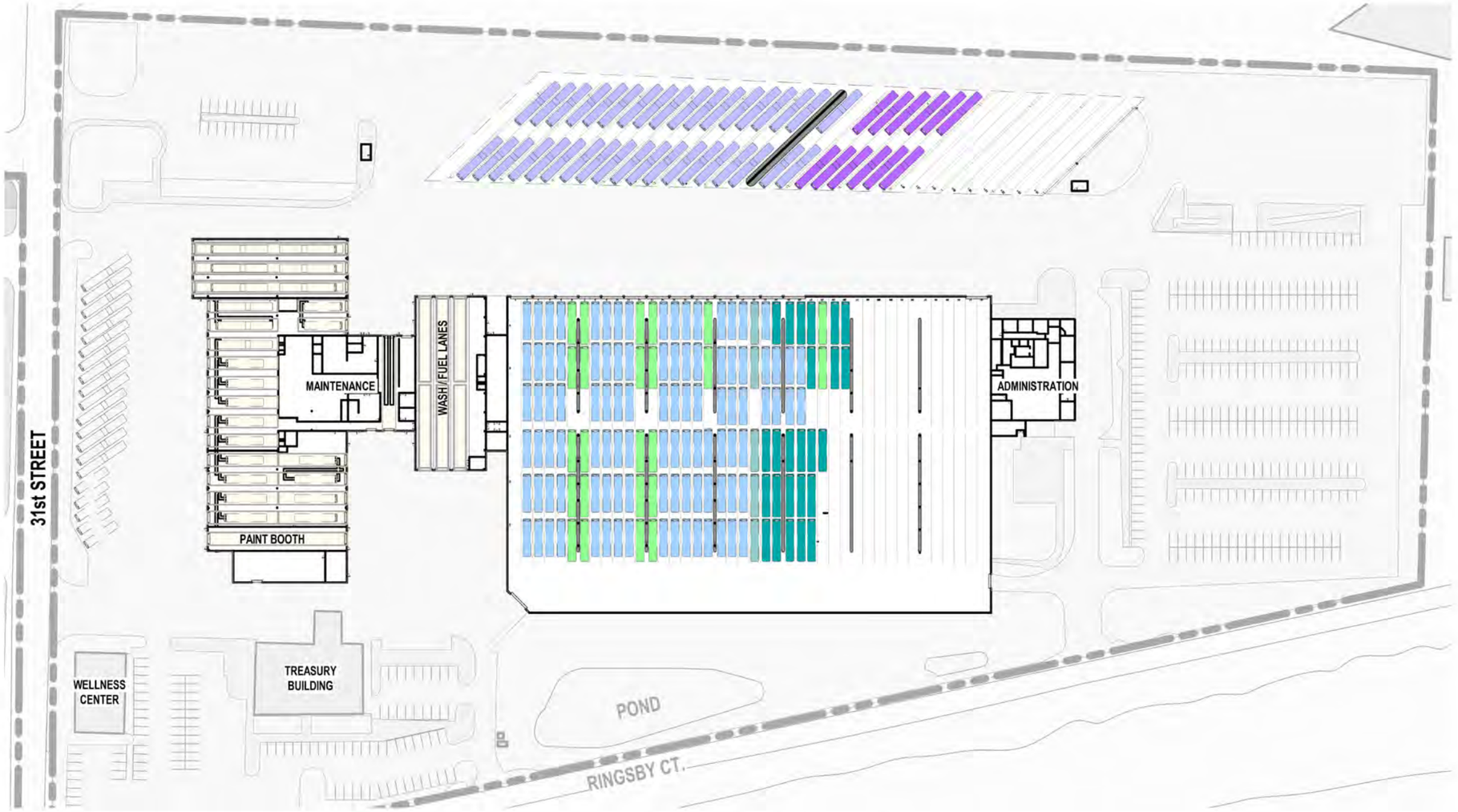
The exterior bus parking is covered with a multipart sloped canopy consisting of concrete support columns, steel girders, open web steel joists, and corrugated steel decking. **Figure 7** shows some of the aforementioned conditions, and **Figure 8** presents the site's existing layout.

Figure 7: Platte – Existing Conditions (Photos)



Source: WSP

Figure 8: Platte – Existing Conditions (Site Plan)



GRAPHIC	DESCRIPTION
	40'-0" OPEN BUS SPACE
	45'-0" OPEN BUS SPACE
	60'-0" OPEN BUS SPACE
	40'-0" BUS PARKING
	60'-0" BUS PARKING
	45'-0" BUS PARKING BEB MALL BUS

GRAPHIC	DESCRIPTION
	45'-0" COACH BUS
	45'-0" COACH FF (US 36) BUS
	60'-0" FMR BUS
	40'-0" EMPTY BUS SPACE
	45'-0" EMPTY BUS SPACE

APPROXIMATE AVAILABLE CAPACITY 2027 = 31%

NOTES:
1. BUS TYPES AND QUANTITIES BASED ON RTD 2027 PROJECTIONS
2. EXACT PARKING LAYOUT IS APPROXIMATE. OTHER CONFIGURATIONS MAY BE POSSIBLE / PREFERRED

Source: WSP

Fleet and Service

The Platte facility currently supports the service and operation of approximately 270 buses, including MallRide BEBs (45-foot) and 40-foot, 45-foot, and 60-foot diesel buses (**Table 4**). Current weekday service includes 151 service blocks across 33 routes. Service blocks from Platte have distances ranging between 16 and 425 miles and durations between one and 22 hours.

Table 4: Platte – Vehicle Inventory (2024)

40-ft	45-ft	60-ft	MallRide	Total
111	65	58	36	**270**

Source: RTD Equipment List, August 14, 2024

Workforce and Training

Currently, 572 staff support Platte's service and operations. RTD provides newly hired bus operators and general repair mechanics with 60 and 59 training days, respectively, to be prepared for their roles. All other positions are supervisory and/or senior to the aforementioned roles. These positions receive between 13 and 30 training days, depending on position, when promoted. All staff, regardless of position, receive refresher training to ensure that they are meeting the most recent standards and protocols. **Table 5** summarizes current staffing at Platte.

Table 5: Platte – Facility Current Staffing

Position	Current Staff[1]
Bus Operators (FT+PT)	384
Street Supervisors	33
Dispatchers + Starters	13
Division Supervisors	8
Lead Division Supervisors	3
General Repair Mechanics	64
Facilities Maintenance Technicians[2]	67
Total	**572**

Source: WSP, RTD, and Transdev Organizational Charts and Staffing Spreadsheets

Costs

The lifecycle costs associated with maintaining existing conditions for Platte (continued operation of diesel buses and electrified MallRide fleet) include cash costs of $549.5 million and non-cash environmental costs of $75.4 million, both in year of expenditure (YOE) dollars. **Figure 9** shows the annual breakout of those costs.

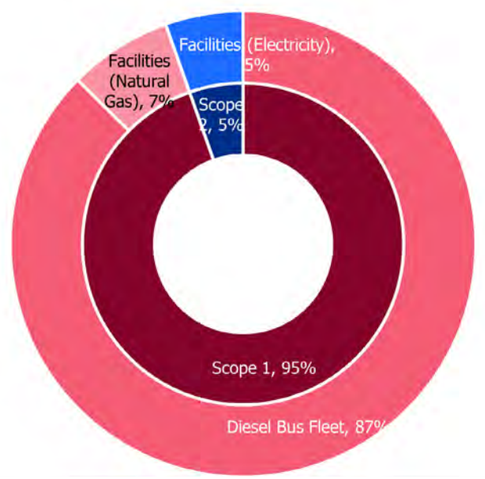
Figure 9: Platte – Existing Conditions Lifecycle Costs (Millions of YOE $)

Source: WSP

Emissions

Under existing conditions, Platte emits 25,530 tons of carbon dioxide (CO_2) emissions per year, with 87 percent attributed to the operation of its diesel fleet and the remaining 13 percent attributed to the facility itself (**Figure 12**).[4] Of the facility emissions, 57 percent (1,832 tons) are Scope 1 emissions from natural gas use, and the remaining 43 percent (1,379 tons) are Scope 2 emissions from electricity use. Platte has an energy use intensity (EUI) of 154 thousands of British thermal units (kBtu) per square foot, which is slightly lower than the 158 kBtu per square foot average EUI across RTD's facilities.

Figure 10: Platte – CO_2 Emissions by Source



Source: RTD Utility Data, WSP, and RTD Fleet data

Note: Electricity consumption by 36 MallRide buses at Platte is included in the Facilities (Electricity) category.

[4] This number has been revised since the Phase 1 Emissions Report based on updated utility information received from RTD.

Near-Term Transition Strategy

Facility Plan

In the next decade (2025–2035), RTD plans to implement strategies and capital improvements at Platte to reduce facility and fleet-related emissions. For the future BEB fleet, RTD plans to install forty-five 180-kilowatt (kW) direct current fast chargers in a 1:2 (charger to dispenser) orientation. This infrastructure is expected to support up to 90 BEBs.

RTD and its electric utility provider, Xcel Energy, are currently coordinating to meet the needs of RTD's facilities transition. Specifically, to support BEBs, Platte will need utility-scale infrastructure improvements outside the facility to accommodate new power demands (subject to Xcel Energy's timelines) and electrification infrastructure on-site (charging cabinets, switchgear, and transformers). During a Q3 2024 coordination meeting between Xcel Energy and RTD, Xcel Energy staff indicated the following related to the Platte facility:

- The system near Platte is constrained.
- A peak load above 2 megawatts would likely require improvements on Xcel Energy's system.
- Overnight charging is preferred.
- Xcel Energy already plans a new substation before 2030 for the area near Platte, along with the reconfiguration of existing feeders.

Based on existing code, no facility-related improvements are required to operate dHEBs. However, language in the not yet adopted International Building Code (IBC) 2024 pertains to fireproofing requirements for the storage of vehicles with lithium-ion batteries. For this reason, RTD is taking a conservative approach and plans to implement fireproofing enhancements to the interior of the Platte facility. In addition, RTD plans to implement strategies and capital enhancements to improve the efficiency of various mechanical, electrical, and plumbing (MEP) systems at Platte. Improvements range from minor operational changes and/or settings to equipment to infrastructure replacements/improvements.

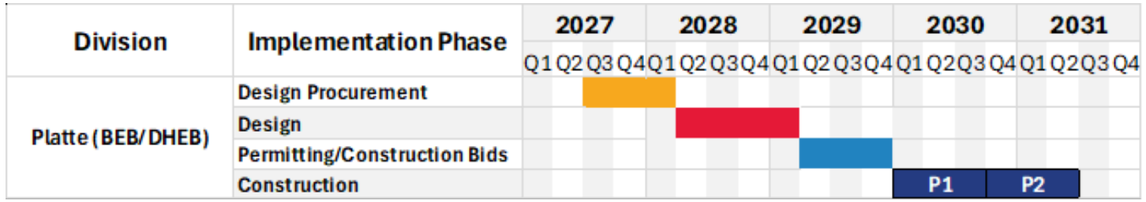
It is assumed that the improvements will be delivered with a design-bid-build contract structure. This means that improvements will first be designed, then the designs will be released for a public bid from a construction contractor, and then the contractor will implement said improvements. All project elements for Platte are expected to occur 2026–2031.

Construction activities are expected to be completed in two phases. These two phases will allow a large portion of work to be completed with minimal impact to service and operations. Regarding expected parking capacity at Platte during this time period, buses can be parked on-site temporarily while a portion of the facility is undergoing construction. Both phases are expected to take nine months.

Phase 1 will result in the charging capacity for 20 BEBs, and Phase 2 will result in the charging capacity for 70 additional BEBs, resulting in a total capacity of 90 BEBs. This phasing strategy allows exterior BEB infrastructure to be constructed and installed simultaneously with fire resistance and other modifications, with relatively minor overlap of dispenser installation. Phase 2 of the BEB infrastructure will occur immediately following completion of the Phase 2 fire resistance and other modifications, essentially making them a single phase. Because fireproofing needs to precede BEB improvements, either or both of the two BEB phases must be completed after the facility has been fully fireproofed (i.e., two phases of fireproofing).

While the expected area for this work will have an effect on daily operations, the work area does not overlap work areas proposed in this plan, allowing some flexibility on future scheduling by RTD. **Figure 11** contains the facility construction schedule for Platte, and **Figure 12** illustrates the division at full buildout in 2035.

Figure 11: Platte – Near-Term Project Schedule



Source: WSP

Note: P = Phase (e.g., P1= Phase 1)

Fleet Procurement Plan

The fleet procurement plan for Platte accounts for the implementation of the fleet reduction plan between 2025–2027 and the replacement of retired vehicles with new technology based on facility readiness. Platte is scheduled to begin accepting BEBs in 2030, which is when the current fleet of 36 MallRide BEBs will be replaced with 22 BEBs (**Table 6**). Before 2030, retired vehicles will be replaced by diesel. In 2032, the 45-foot bus procurements will still be diesel due to a lack of dHEB alternatives and because RTD expressed concerns about luggage space on the one BEB option from MCI (a concern that will be reevaluated in updates to the FFTP).

Table 6: Platte – Fleet Procurements by Year

Vehicle Type	Totals	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
MallRide BEB	22						22					
30' Diesel	0											
40' Diesel	25			25								
40' BEB	53								53			
40' dHEB	27								27			
45' Diesel	50	4		10	22				14			
60' Diesel	39	24		15								
60' BEB	0											
60' dHEB	0											
Total	**216**	**28**	**0**	**50**	**22**	**0**	**22**	**0**	**94**	**0**	**0**	**0**

Source: WSP

Figure 12: Platte – Future Plan (2035)

GRAPHIC	DESCRIPTION
	40'-0" OPEN BUS SPACE
	45'-0" OPEN BUS SPACE
	60'-0" OPEN BUS SPACE
	40'-0" BUS PARKING
	60'-0" BUS PARKING
	45'-0" BUS PARKING BEB MALL BUS

GRAPHIC	DESCRIPTION
	45'-0" COACH BUS
	45'-0" COACH FF (US 36) BUS
	60'-0" FMR BUS
	40'-0" EMPTY BUS SPACE
	45'-0" EMPTY BUS SPACE

APPROXIMATE AVAILABLE CAPACITY 2027 = 31%

NOTES:
1. BUS TYPES AND QUANTITIES BASED ON RTD 2027 PROJECTIONS
2. EXACT PARKING LAYOUT IS APPROXIMATE. OTHER CONFIGURATIONS MAY BE POSSIBLE / PREFERRED

Source: WSP

Workforce Plan

To ensure that RTD's workforce is prepared to operate and maintain the future facilities and fleet, it is essential to have a plan in place. To implement the near-term strategy, RTD has assessed the requirements for the new fuels/technologies and developed a plan to train its workforce before, during, and after vehicles are delivered.

To support Platte's future facilities and fleet in the near term, an additional 72 staff will be needed (compared to current staffing). Most additional staff will fulfill roles as operators (32), street supervisors (17), and maintenance technicians (9).

Initial training to support the new fuels/technologies will be required for all staff, including new recruits, existing staff, and those transitioning into promoted roles. **Table 7** summarizes the estimated staffing requirements by role.

Table 7: Platte – Near-Term Strategy Workforce Summary

Position	Current Staff (2025)	Additional Staff Need[1]	Near-Term Strategy Staff (2035)[2]
Bus Operators (FT+PT)	384	32	416
Street Supervisors	33	17	50
Dispatchers + Starters	13	7	20
Division Supervisors	8	4	12
Lead Division Supervisors	3	2	5
General Repair Mechanics	64	1	65
Facilities Maintenance Technicians	67	9	76
Total	**572**	**72**	**644**

Source: WSP, RTD, and Transdev Organizational Charts and Staffing Spreadsheets

[1] Reflects the net additional staff needed with consideration of staff losses due to attrition and promotion to other roles.

[2] The sum of current staff and additional staff needed.

Lifecycle Costs

The lifecycle costs associated with the near-term strategy for Platte include cash costs of $770.5 million (40 percent higher than existing conditions) and non-cash environmental costs of $66.5 million (11.9 percent lower than existing conditions), both in YOE dollars. **Figure 13** shows the annual breakout of those costs.

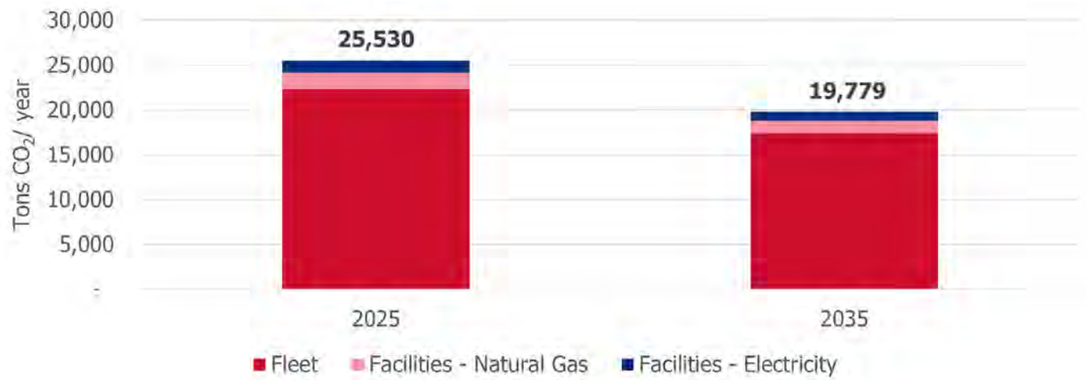
Figure 13: Platte – Near-Term Strategy Lifecycle Costs (Millions of YOE $)

Source: WSP

Emissions

With the proposed fleet changes and MEP improvements, emissions at Platte will decrease by 24 percent between 2025–2035, from 25,530 tons per year to 19,779 tons per year (**Figure 14**). The EUI declines from 154 kBtu per square foot in 2025 to 113 kBtu per square foot in 2035.

Figure 14: Platte – Projected CO_2 Emissions



Source: RTD Utility Data, WSP, and RTD Fleet data

Platte Near-Term Strategy Summary

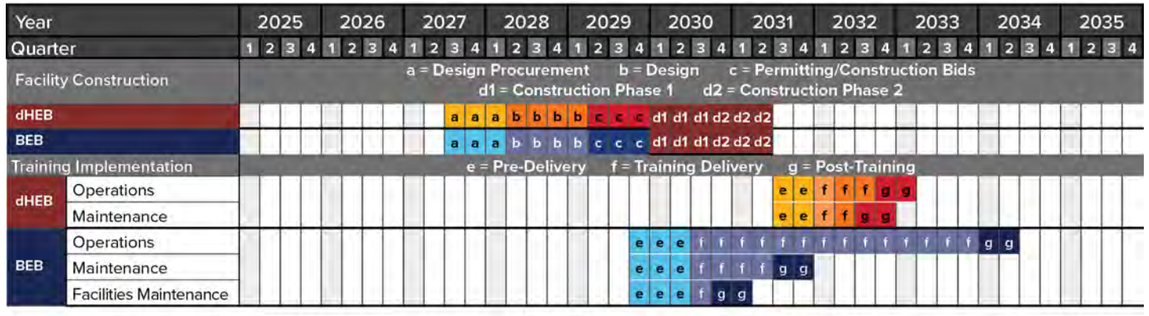
In the next decade (2025–2035), Platte is planned to undergo improvements and changes to further advance RTD's goal of achieving net ZEs by 2050. **Table 8** summarizes the near-term strategy's impacts, and **Tables 9** and **10** summarize the Platte's facility construction schedule, workforce training, bus procurements, and costs in the near term. The summary also includes the annual costs for the transition.

Table 8: Platte – Near-Term Strategy Summary

Category	Summary
Facility Plan	▸ Infrastructure to support up to 90 BEBs and dHEBs ▸ Implementation between 2027–2031
Fleet Procurement Plan	▸ 216 buses delivered ▸ BEBs, dHEBs, and diesel buses
Workforce and Training Plan	▸ 72 additional staff needed
Lifecycle Costs	▸ Cash costs: $770.5 million ▸ 40% higher than baseline
Emissions	▸ 19,779 tons per year ▸ 24% lower than baseline

Source: WSP

Table 9: Platte – Facility Construction and Training Implementation Schedule Summary



Source: WSP

Table 10: Platte – Bus Procurement ad Costs Schedule Summary

Platte Division		2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Bus Procurement	**Diesel**	28		50	22	0		0	14	0		0
	dHEB	0		0		0		0	27	0		0
	BEB	0		0		0	22	0	53	0		0
Costs (Millions of YOE $)	**Capital Costs**	$35.25	$4.08	$67.30	$57.41	$29.45	$89.64	$26.63	$144.94	$2.82	$1.22	$0.00
	Operating Costs	$2.48	$3.85	$8.63	$13.55	$20.02	$23.32	$27.10	$42.61	$48.04	$60.71	$61.44
	Environmental Costs	$1.23	$1.26	$3.61	$5.19	$5.32	$5.98	$6.13	$9.21	$9.36	$9.55	$9.63
	Total Costs	**$38.96**	**$9.18**	**$79.53**	**$76.15**	**$54.78**	**$118.94**	**$59.86**	**$196.75**	**$60.23**	**$71.48**	**$71.07**

Source: WSP

Boulder

Existing Conditions

Facility

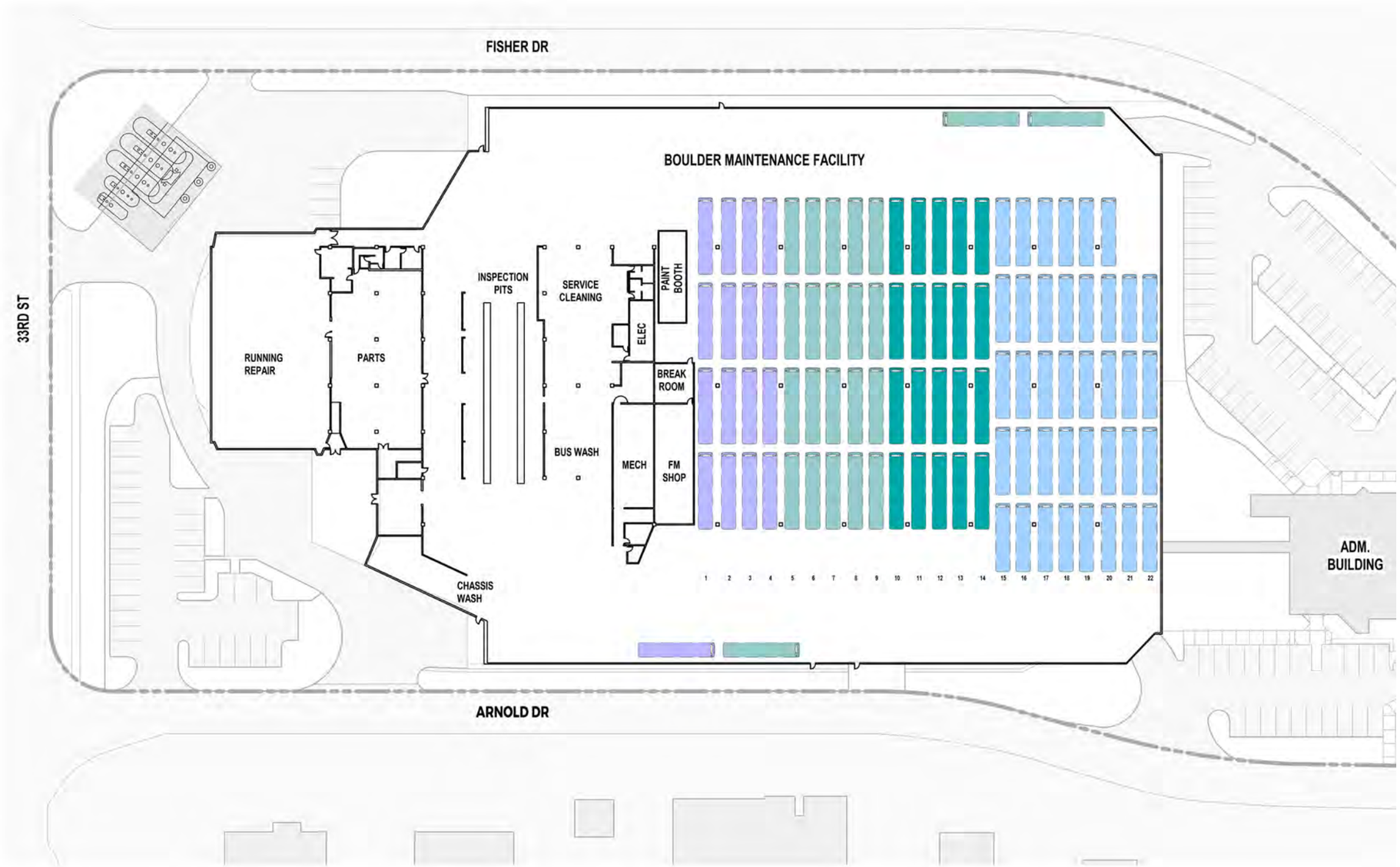
Boulder Division has a reported capacity of approximately 123 buses. The facility includes parking along interior washing and fueling stations. Structurally, the main building uses concrete columns for support and concrete tees for roof structure, and exterior walls are prefabricated concrete panels. **Figure 15** shows some of the aforementioned conditions, and **Figure 16** presents the site's existing layout.

Figure 15: Boulder – Existing Conditions (Photos)

Source: WSP

Source: Colorado Public Radio

Figure 16: Boulder – Existing Conditions (Site Plan)



LEGEND

GRAPHIC	DESCRIPTION
	40'-0" BUS PARKING
	45'-0" COACH BUS
	45'-0" COACH FF (US 36) BUS
	45'-0" COACH FF (CO 119) BUS

APPROXIMATE AVAILABLE CAPACITY 2027 = 0%

Source: WSP

Fleet and Service

Boulder division currently operates 40-foot and 45-foot diesel buses (**Table 11**). Current weekday service includes 74 service blocks across 18 routes. Service blocks from Boulder have distance ranges between 23 and 518 miles and durations between one and 21 hours.

Table 11: Boulder – Current Vehicle Inventory

40-ft	45-ft	60-ft	MallRide	Total
42	73	0	0	**115**

Source: RTD Equipment List, August 14, 2024

Workforce and Training

Currently, 214 staff support Boulder's service and operations. RTD provides newly hired bus operators and general repair mechanics with 60 and 59 training days, respectively, to be prepared for their roles. All other positions are supervisory and/or senior roles to the aforementioned. These positions receive a range of 13 to 30 training days, depending on position, when promoted. All staff, regardless of position, receive refresher training to ensure that they are meeting the most recent standards and protocols. **Table 12** summarizes the current staffing at Boulder.

Table 12: Boulder – Facility Current Staffing

Position	Current Staff[1]
Bus Operators (FT+PT)	175
Street Supervisors	–
Dispatchers + Starters	–
Division Supervisors	8
Lead Division Supervisors	3
General Repair Mechanics	28
Facilities Maintenance Technicians[2]	–
Total	**214**

Source: WSP, RTD, and Transdev Organizational Charts and Staffing Spreadsheets

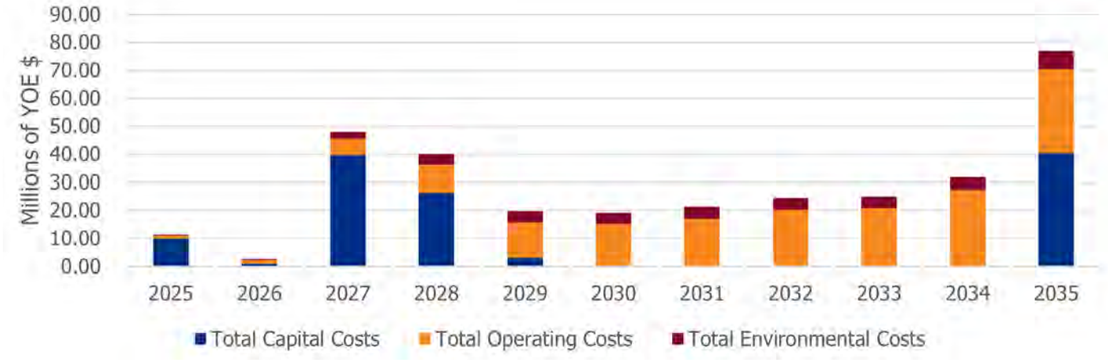
[1] Current staff counts include vacant posts. It is assumed that these posts will be filled independently of the fuel transition.

[2] All unassigned facilities maintenance technicians are included at Platte for the purposes of this analysis, but their work is allocated across all divisions in practice.

Costs

The lifecycle costs associated with a continuation of existing conditions for Boulder include cash costs of $282.1 million and non-cash environmental costs of $39.3 million, both in YOE dollars. **Figure 17** shows the annual breakout of those costs.

Figure 17: Boulder – Existing Conditions Lifecycle Costs (Millions of YOE $)

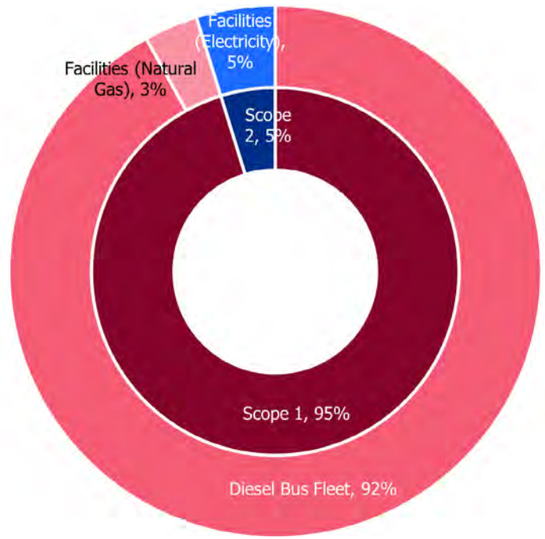


Source: WSP

Emissions

Under existing conditions, Boulder emits 17,460 tons of CO_2 emissions per year; with 92 percent attributed to the operation of its diesel fleet and the remaining 8 percent attributed to the facility itself (**Figure 18**).[5] Of the facility emissions, 41 percent (570 tons) are Scope 1 emissions from natural gas use, and the remaining 59 percent (837 tons) are Scope 2 emissions from electricity use. Boulder has an EUI of 91 kBtu per square foot, which is lower than the 158 kBtu per square foot average EUI across RTD's facilities.

Figure 18: Boulder – CO_2 Emissions by Source



Source: RTD Utility Data, WSP, and RTD Fleet data

[5] This number has been revised since the Phase 1 Emissions Report based on updated utility information received from RTD.

Near-Term Transition Strategy

Facility Plan

In the next decade (2025–2035), RTD plans to implement several strategies and capital improvements at Boulder to reduce facility and fleet-related emissions. Based on the proposed near-term strategy, Boulder will be operationally capable of supporting up to 123 dHEBs or diesel buses by 2035. These numbers represent facility capacity, not projected fleet procurements.

Based on existing code, no facility-related improvements are required to operate dHEBs. However, language in the not yet adopted IBC 2024 pertains to fireproofing requirements for the storage of vehicles with lithium-ion batteries. For this reason, RTD is taking a conservative approach and plans to implement fireproofing enhancements to the interior of the Boulder facility.

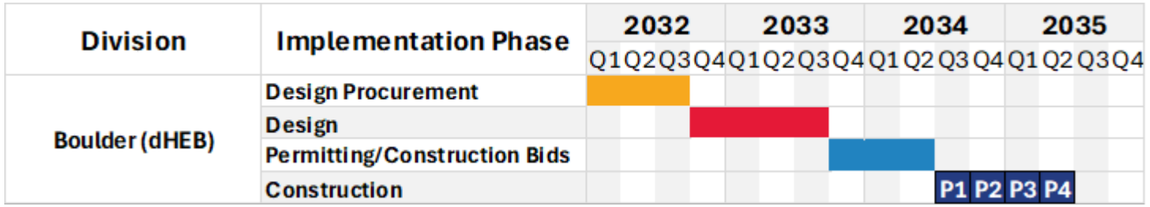
In addition, RTD plans to implement several strategies and capital enhancements to improve the efficiency of various MEP systems at Boulder. Improvements range from minor operational changes and/or settings to equipment to infrastructure replacements/improvements.

It is assumed that the improvements will be delivered with a design-bid-build contract structure. This means that improvements will first be designed, then designs will be released for a public bid from a construction contractor, and then the contractor will implement said improvements. All project elements for Boulder are expected to occur 2032–2035.

Construction activities are expected to be completed in four phases. These phases allow a large portion of work to be completed while reducing impacts to service and operations. Regarding expected parking capacity at Boulder during this time, it will be difficult to park buses on-site while Phases 1, 2, or 3 are undergoing construction. This may require temporary overnight parking on the street surrounding the facility, temporarily parking off-site at another Boulder location, or temporarily running buses from another facility (which would entail significant planning work). Each of the four phases is expected to take three months, allowing for the complete 123-bus capacity upon completion.

The proposed project schedule is shown on **Figure 19**.

Figure 19: Boulder – Near-Term Project Schedule



Source: WSP

Note: P = Phase (e.g., P1 = Phase 1)

Fleet Procurement Plan

The fleet procurement plan for Boulder accounts for the implementation of the fleet reduction plan between 2025–2027 and the replacement of retired vehicles with new technology based on facility readiness. Boulder is scheduled to begin accepting dHEBs in 2034; thus, the procurements occurring in 2035 are for dHEBs and the procurements before 2034 are for diesel (**Table 13**).

Table 13: Boulder – Fleet Procurements by Year

Vehicle Type	Totals	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
30' Diesel	0											
40' Diesel	15			15								
40' dHEB	40											40
45' Diesel	49	8		21	20							
60' Diesel	0											
60' dHEB	0											
Total	**104**	**8**	**0**	**36**	**20**	**0**	**0**	**0**	**0**	**0**	**0**	**40**

Source: WSP

Workforce Plan

To ensure that RTD's workforce is prepared to operate and maintain the future facilities and fleet, it is essential to have a plan in place. To implement the near-term strategy, RTD has assessed the requirements for the new fuels/technologies and developed a plan to train its workforce before, during, and after vehicles are delivered.

To support Boulder's future facilities and fleet in the near term, an additional 24 staff will be needed (compared to current staffing). Most additional staff will fulfill roles as operators (14) and division supervisors (6).

Initial training to support the new fuels/technologies will be required for all staff, including new recruits, existing staff, and those transitioning into promoted roles. **Table 14** summarizes the estimated staffing requirements by role.

Table 14: Boulder – Near-Term Strategy Workforce Summary

Position	Current Staff (2025)	Additional Staff Need[1]	Near-Term Strategy Staff (2035)[2]
Bus Operators (FT+PT)	175	14	189
Street Supervisors	–	–	–
Dispatchers + Starters	–	–	–
Division Supervisors	8	6	14
Lead Division Supervisors	3	3	6
General Repair Mechanics	28	1	29
Total	**214**	**24**	**238**

Source: WSP, RTD, and Transdev Organizational Charts and Staffing Spreadsheets

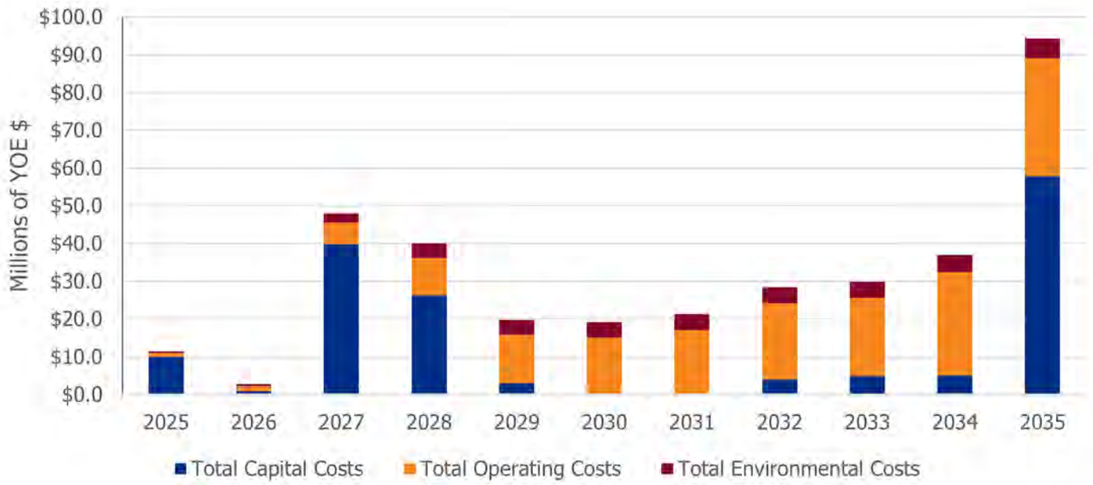
[1] Reflects the net additional staff needed with consideration of staff losses due to attrition and promotion to other roles.

[2] The sum of current staff and additional staff needed.

Lifecycle Costs

The lifecycle costs associated with the near-term strategy for Boulder include cash costs of $314.4 million (11 percent higher than existing conditions) and non-cash environmental costs of $38.1 million (3 percent lower than existing conditions), both in YOE dollars. **Figure 20** shows the annual breakout of those costs.

Figure 20: Boulder – Near-Term Strategy Lifecycle Costs (Millions of YOE $)

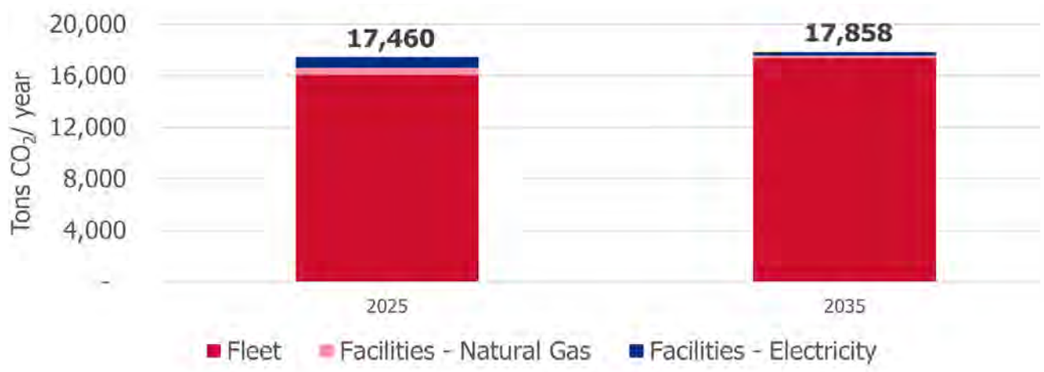


Source: WSP

Emissions

Facility emissions at Boulder decrease from 1,407 tons per year in 2025 to 485 tons per year in 2035, driven by MEP improvements. The EUI correspondingly declines from 91 kBtu per square foot in 2025 to 31 kBtu per square foot in 2035. However, due to the total number of diesel buses increasing from 98 to 106 during this period, fleet emissions increase from 16,054 tons per year to 17,372 tons per year. The net result is a 2 percent increase in total emissions (**Figure 21**).

Figure 21: Boulder – Projected CO_2 Emissions



Source: RTD Utility Data, WSP, and RTD Fleet data

Boulder Near-Term Strategy Summary

In the next decade (2025–2035), Boulder is planned to undergo several improvements and changes to further advance RTD's goal of achieving net ZEs by 2050. **Table 15** summarizes the near-term strategy's impacts, and **Tables 16** and **17** summarizes Boulder's facility construction schedule, workforce training, bus procurements, and costs in the near term. The summary also includes the annual costs for the transition.

Table 15: Boulder – Near-Term Strategy Summary

Category	Summary
Facility Plan	▸ Infrastructure to support dHEBs ▸ Implementation between 2031–2035
Fleet Procurement Plan	▸ 104 buses delivered ▸ dHEBs and diesel buses
Workforce and Training Plan	▸ 24 additional staff needed
Lifecycle Costs	▸ Cash costs: $314.4 million ▸ 11% higher than baseline
Emissions	▸ 17,858 tons per year ▸ 2% higher than baseline[1]

Source: WSP

[1] *Facility emissions decrease; however, due to the addition of eight diesel buses, emissions increase in the short term.*

Table 16: Boulder – Facility Construction and Training Implementation Schedule Summary

Year		2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Quarter		1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Facility Construction		a = Design Procurement		b = Design		c = Permitting/Construction Bids		d1 -d4 = Construction Phases 1-4					
dHEB									a a b b b b c c c d1 d2 d3 d4				
Training Implementation		e = Pre-Delivery		f = Training Delivery		g = Post-Training							
dHEB	Operations										e e f f f f g g		
	Maintenance										e e f f g g		

Source: WSP

Table 17: Boulder – Bus Procurement and Costs Schedule Summary

Boulder Division		2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Bus Procurement	**Diesel**	8		36	20	0		0		0		0	
	dHEB	0		0		0		0		0		40	
Costs (Millions of YOE $)	**Capital Costs**	$10.04	$0.91	$39.81	$26.27	$3.00	$0.00	$0.00	$3.91	$4.86	$5.02	$57.82	N/A
	Operating Costs	$1.03	$1.35	$5.75	$9.93	$12.76	$15.15	$17.09	$20.25	$20.74	$27.43	$31.26	N/A
	Environmental Costs	$0.49	$0.51	$2.50	$3.89	$3.99	$4.09	$4.19	$4.30	$4.38	$4.47	$5.29	N/A
	Total Costs	**$11.56**	**$2.76**	**$48.06**	**$40.09**	**$19.75**	**$19.24**	**$21.28**	**$28.46**	**$29.97**	**$36.92**	**$94.38**	N/A

Source: WSP

East Metro

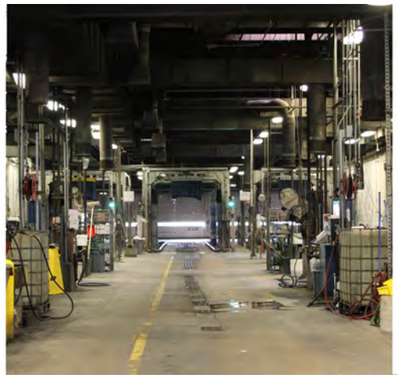
Existing Conditions

Facility

East Metro Division has a reported capacity of approximately 212 buses and largely consists of a single-room structure with multiple smaller rooms surrounding it. The southwestern end of the large single room contains indoor vehicle parking, while the northeast end contains interior vehicle fueling, washing, and repair spaces. Similar to Platte, the structure consists of concrete columns for support and concrete tees for roof structure.

The exterior walls are largely concrete panels. Overall, the building takes up a significant portion of the site. **Figure 22** presents some of the aforementioned conditions, and **Figure 23** presents the site's existing layout.

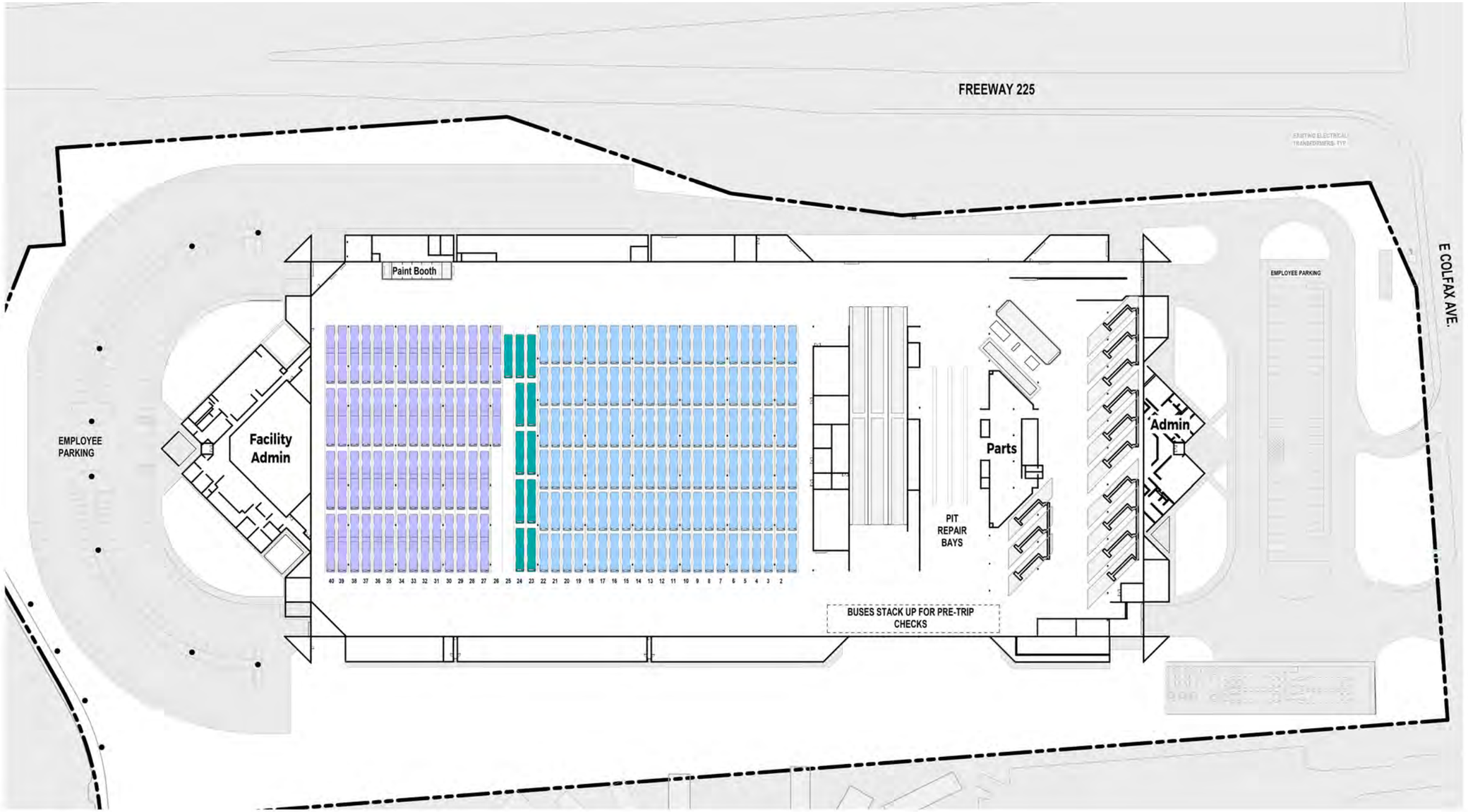
Figure 22: East Metro – Existing Conditions (Photos)



Source: WSP

Source: RTD

Figure 23: East Metro – Existing Conditions (Site Plan)



Source: WSP

Fleet and Service

East Metro division currently operates 40-foot, 45-foot, and 60-foot diesel buses (**Table 18**). Current weekday service consists of 145 service blocks across 24 routes. Service blocks from East Metro have distances ranging from 20 to 741 miles and durations between one and 24 hours.

Table 18: East Metro – Current Vehicle Inventory

40-ft	45-ft	60-ft	MallRide	Total
118	30	58	0	**206**

Source: RTD Equipment List, August 14, 2024

Workforce and Training

Currently, 490 staff support East Metro's service and operations. RTD provides newly hired bus operators and general repair mechanics with 60 and 75 training days, respectively, to be prepared for their roles. All other positions are supervisory and/or senior to the aforementioned and receive between 13 and 30 training days, depending on position, when promoted. All staff, regardless of position, receive refresher training to ensure that they are meeting the most recent standards and protocols. **Table 19** summarizes the current staffing at East Metro.

Table 19: East Metro – Facility Current Staffing

Position	Current Staff[1]
Bus Operators (FT+PT)	419
Street Supervisors	–
Dispatchers + Starters	–
Division Supervisors	8
Lead Division Supervisors	3
General Repair Mechanics	60
Facilities Maintenance Technicians[2]	–
Total	**490**

Source: WSP, RTD, and Transdev Organizational Charts and Staffing Spreadsheets

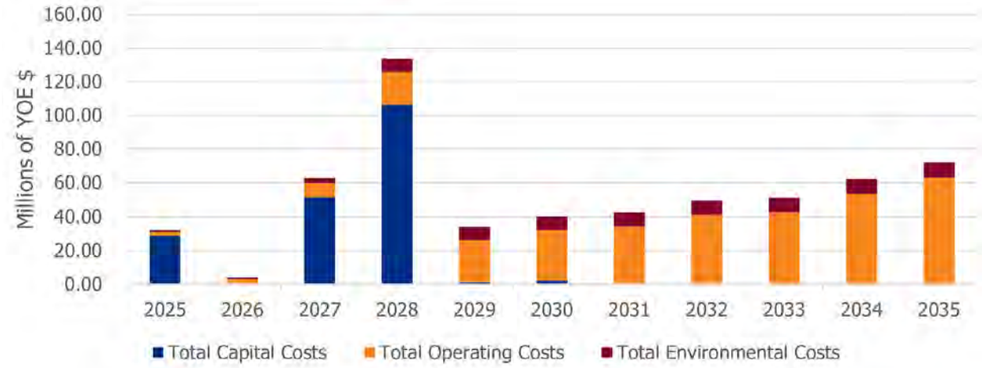
[1] Current staff counts include vacant posts. It is assumed that these posts will be filled independently of the fuel transition.

[2] All unassigned facilities maintenance technicians are included at Platte for the purposes of this analysis, but their work is allocated across all divisions in practice.

Costs

The lifecycle costs associated with maintaining existing conditions at East Metro include cash costs of $518.7 million and non-cash environmental costs of $71.7 million, both in YOE dollars. **Figure 24** shows the annual breakout of those costs.

Figure 24: East Metro – Existing Conditions Lifecycle Costs (Millions of YOE $)

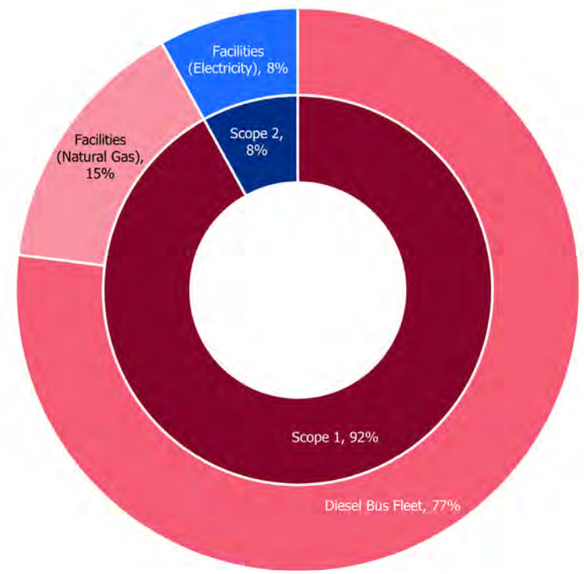


Source: WSP

Emissions

Under existing conditions, East Metro emits 33,372 tons of CO_2 emissions per year, with 77 percent attributed to the operation of its diesel fleet and the remaining 23 percent attributed to the facility itself (**Figure 25**).[6] Of the facility emissions, 65 percent (5,006 tons) are Scope 1 emissions from natural gas use, and the remaining 35 percent (2,675 tons) are Scope 2 emissions from electricity use. East Metro has an EUI of 266 kBtu per square foot, which is higher than the 158 kBtu per square foot average EUI across RTD's facilities.

Figure 25: East Metro – CO_2 Emissions by Source



Source: RTD Utility Data, WSP, and RTD Fleet data

[6] This number has been revised since the Phase 1 Emissions Report based on updated utility information received from RTD.

Near-Term Transition Strategy

Facility Plan

In the next decade (2025–2035), RTD plans to implement several strategies and capital improvements at East Metro to reduce facility and fleet-related emissions. Based on the proposed near-term strategy, East Metro will be operationally capable of supporting up to 212 dHEBs or diesel buses by 2035. These numbers represent facility capacity, not projected fleet procurements.

Based on existing code, no facility-related improvements are required to operate dHEBs. However, language in the not yet adopted IBC 2024 pertains to fireproofing requirements for the storage of vehicles with lithium-ion batteries. For this reason, RTD is taking a conservative approach and plans to implement fireproofing enhancements to the interior of the East Metro facility.

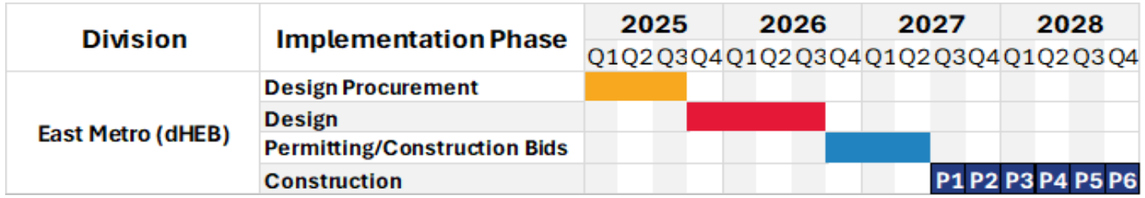
In addition, RTD plans on implementing several strategies and capital improvements to improve the efficiency of various MEP systems at East Metro. Improvements range from minor operational changes and/or settings to equipment to infrastructure replacements/improvements.

East Metro will require improvements to support dHEBs in the near-term strategy. It is assumed that the improvements will be delivered with a design-bid-build contract structure. This means that improvements will first be designed, then the designs will be released for a public bid from a construction contractor, and then the contractor will implement said improvements. All project elements are expected to occur 2025–2028.

Construction activities are expected to be completed in six phases. These phases allow a large portion of work to be completed with minimal impact to service and operations. Regarding expected parking capacity at East Metro during this time, buses can be parked on-site temporarily while a portion of the facility is undergoing construction. Each of the six phases is expected to take three months, with each phase divided roughly evenly in square footage.

The proposed project schedule is shown on **Figure 26**.

Figure 26: East Metro – Near-Term Project Schedule



Source: WSP

Note: P = Phase (e.g., P1 = Phase 1)

Fleet Procurement Plan

The fleet procurement plan for East Metro accounts for the implementation of the fleet reduction plan between 2025–2027 and the replacement of retired vehicles with new technology based on facility readiness. East Metro is scheduled to begin accepting dHEBs in 2028; thus, the procurements occurring in 2028 are for dHEBs and the procurements before that are for diesel (**Table 20**).

Table 20: East Metro – Fleet Procurements by Year

Vehicle Type	Totals	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
30' Diesel	0											
40' Diesel	35			35								
40' dHEB	64				64							
45' Diesel	0											
60' Diesel	39	23		16								
60' dHEB	31				31							
Total	**169**	**23**	**0**	**51**	**95**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Source: WSP

Note: dHEB 60-foot buses are not currently available in the market, though in this plan these replacements are still shown as dHEBs. RTD intends to procure as many dHEBs as possible, and market conditions in the future may allow 60-foot dHEB purchases.

Workforce Plan

To ensure that RTD's workforce is prepared to operate and maintain the future facilities and fleet, it is essential to have a plan in place. To implement the near-term strategy, RTD has assessed the requirements for the new fuels/technologies and developed a plan to train its workforce before, during, and after vehicles are delivered.

To support East Metro's future facilities and fleet in the near term, an additional 41 staff will be needed (compared to current staffing). Most additional staff will fulfill roles as operators (34) and division supervisors (4).

Initial training to support the new fuels/technologies will be required for all staff, including new recruits, existing staff, and those transitioning into promoted roles. **Table 21** summarizes the estimated staffing requirements by role.

Table 21: East Metro – Near-Term Strategy Workforce Summary

Position	Current Staff (2025)	Additional Staff Need[1]	Near-Term Strategy Staff (2035)[2]
Bus Operators (FT+PT)	419	34	453
Street Supervisors	–	–	–
Dispatchers + Starters	–	–	–
Division Supervisors	8	4	12
Lead Division Supervisors	3	2	5
General Repair Mechanics	60	1	61
Total	**490**	**41**	**531**

Source: WSP, RTD, and Transdev Organizational Charts and Staffing Spreadsheets

[1] Reflects the net additional staff needed with consideration of staff losses due to attrition and promotion to other roles.

[2] The sum of current staff and additional staff needed.

Lifecycle Costs

The lifecycle costs associated with the near-term strategy for East Metro include cash costs of $604 million (16 percent higher than existing conditions) and non-cash environmental costs of $48.7 million (32 percent lower than existing conditions), both in YOE dollars. **Figure 27** shows the annual breakout of those costs.

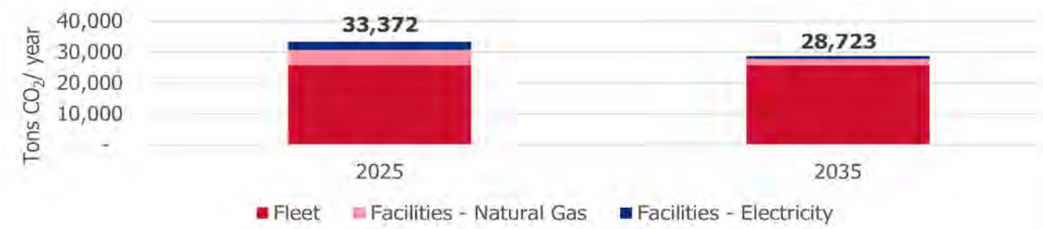
Figure 27: East Metro – Near-Term Strategy Lifecycle Costs (Millions of YOE $)

Source: WSP

Emissions

With the proposed fleet changes and MEP improvements, emissions at East Metro decrease by 14 percent between 2025–2035, from 33,372 tons per year to 28,723 tons per year (**Figure 28**). The EUI declines from 266 kBtu per square foot in 2025 to 109 kBtu per square foot in 2035.

Figure 28: East Metro – Projected CO_2 Emissions



Source: RTD Utility Data, WSP, and RTD Fleet data

East Metro Near-Term Strategy Summary

In the next decade (2025–2035), East Metro is planned to undergo several improvements and changes to further advance RTD's goal of achieving net ZEs by 2050. **Table 22** summarizes the near-term strategy's impacts, and **Tables 23** and **24** summarize East Metro's facility construction schedule, workforce training, bus procurements, and costs in the near term. The summary also includes the annual costs for the transition.

Table 22: East Metro – Near-Term Strategy Summary

Category	Summary
Facility Plan	▸ Infrastructure to support dHEBs ▸ Implementation between 2025–2028
Fleet Procurement Plan	▸ 180 buses delivered ▸ dHEBs and diesel buses
Workforce and Training Plan	▸ 41 additional staff needed
Lifecycle Costs	▸ Cash costs: $604 million ▸ 16% higher than baseline
Emissions	▸ 28,723 tons per year ▸ 14% lower than baseline

Source: WSP

Table 23: East Metro – Facility Construction and Training Implementation Schedule Summary

Year		2025				2026				2027				2028				2029				2030				2031				2032				2033				2034				2035			
Quarter		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Facility Construction		a = Design Procurement								b = Design								c = Permitting/Construction Bids								d1 -d6 = Construction Phases 1-6																			
dHEB		a	a	a	b	b	b	b	c	c	c	d1	d2	d3	d4	d5	d6	d7																											
Training Implementation		e = Pre-Delivery																f = Training Delivery																g = Post-Training											
dHEB	Operations									e	e	f	f	f	f	f	f	f	f	g	g																							
	Maintenance									e	e	f	f	f	f	f	f	f	f	g	g																							

Source: WSP

Table 24: East Metro – Bus Procurement and Costs Schedule Summary

East Metro Division		2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Bus Procurement	**Diesel**	23		51		0		0		0		0
	dHEB	0		0	106	0		0		0		0
Costs (Millions of YOE $)	**Capital Costs**	$34.06	$7.01	$60.18	$147.66	$1.83	$2.06	$0.00	$0.00	$0.00	$0.00	$0.00
	Operating Costs	$2.23	$2.79	$8.13	$21.51	$27.14	$32.44	$37.10	$50.09	$45.54	$56.34	$67.90
	Environmental Costs	$0.93	$0.96	$3.10	$5.05	$5.18	$5.31	$5.44	$5.57	$5.66	$5.77	$5.77
	Total Costs	**$37.23**	**$10.76**	**$71.41**	**$174.22**	**$34.15**	**$39.81**	**$42.54**	**$55.67**	**$51.20**	**$62.11**	**$73.67**

Source: WSP

District Shops

Existing Conditions

Facility

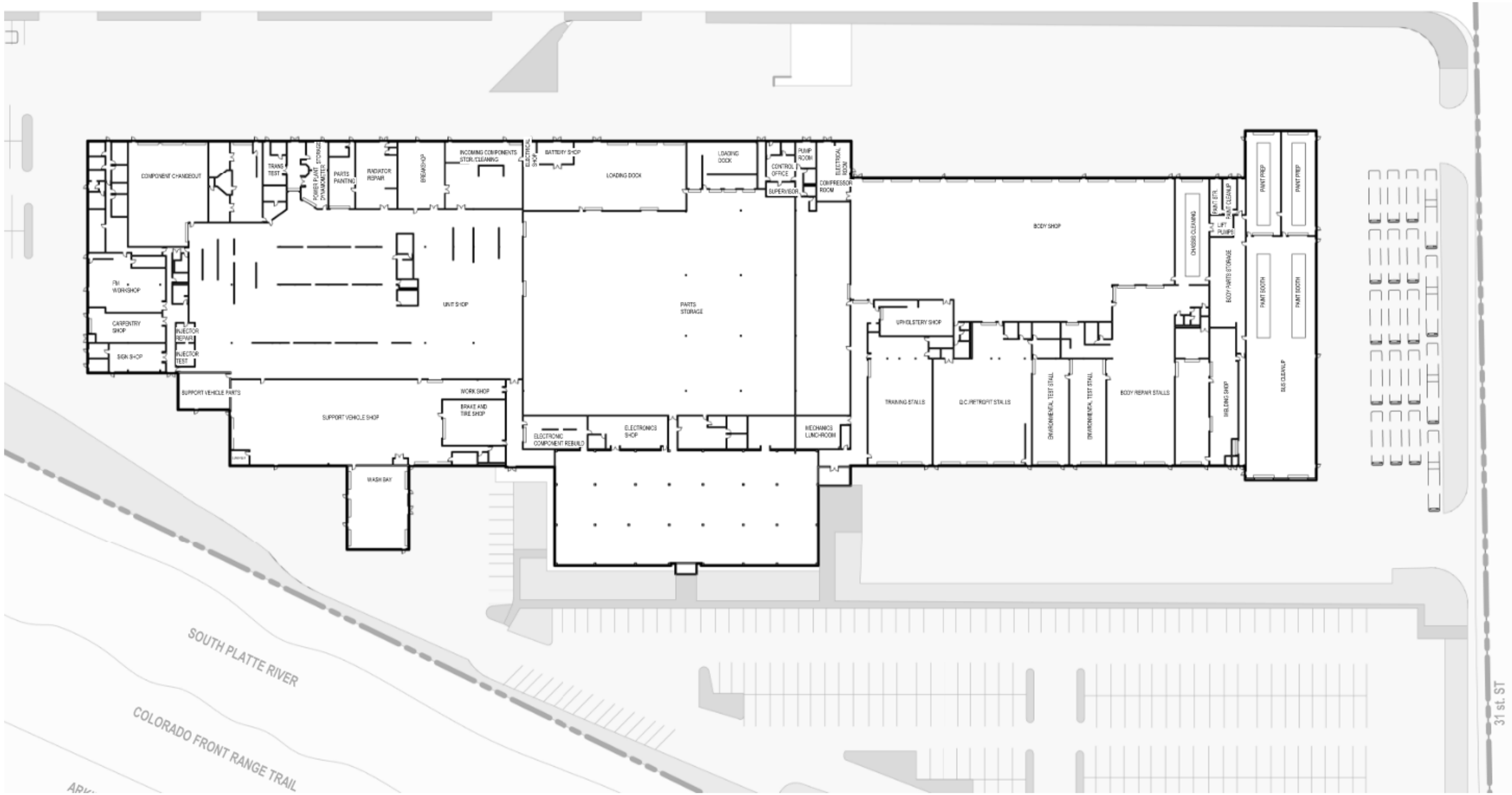
District Shops is RTD's maintenance division. The facility has vehicle repair bays located primarily at the east wing of the District Shops main building, which consists of body shop repair bays, retrofit bays, and similar heavy maintenance and repair vehicle bays. The west wing also has a series of component change out bays. These spaces all share a common configuration and construction type in that they are all high ceiling spaces consisting of bare steel interior columns, bare steel open web joists at the ceiling, corrugated steel decking at the ceiling (which in some areas has sound attenuating panels applied), and concrete masonry unit walls that go to deck. Some areas have gypsum board/stud walls that also go to deck in most observed instances. **Figure 29** shows some of the aforementioned conditions, and **Figure 30** presents the site's existing layout.

Figure 29: District Shops – Existing Conditions (Photos)

Source: WSP

Source: RTD

Figure 30: District Shops – Existing Conditions (Site Plan)



Source: WSP

Workforce and Training

District Shops has 35 general repair mechanics assigned to the division. RTD provides newly hired general repair mechanics with 75 training days to be prepared for their roles. As with all positions, RTD provides District Shops' general repair mechanics with refresher training to ensure that they are meeting the most recent standards and protocols. **Table 25** summarizes the current staffing at District Shops.

Table 25: District Shops – Facility Current Staffing

Position	Current Staff[1]
General Repair Mechanics	35
Total	**35**

Source: WSP, RTD, and Transdev Organizational Charts and Staffing Spreadsheets

[1] Current staff counts include vacant posts. It is assumed that these posts will be filled independently of the fuel transition.

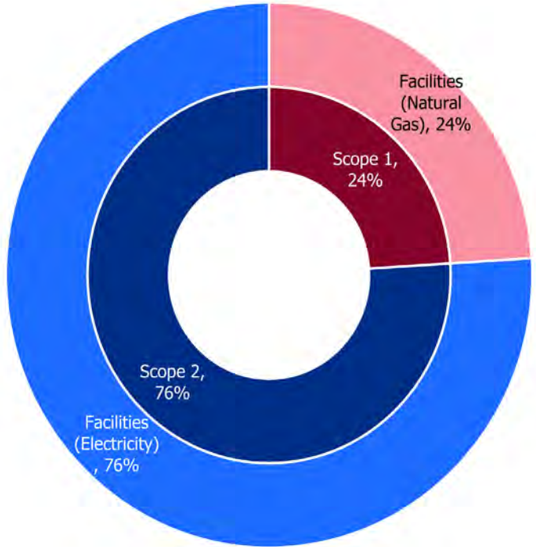
Costs

There are no lifecycle costs for the evaluated cost categories associated with maintaining existing conditions at District Shops.

Emissions

Under existing conditions, District Shops emits 3,796 tons of CO_2 emissions per year, all of which are attributed to the facility itself (**Figure 31**).[7] Twenty-four percent (912 tons) are Scope 1 emissions from natural gas use, and the remaining 76 percent (2,885 tons) are Scope 2 emissions from electricity use. District Shops has an EUI of 124 kBtu per square foot, which is lower than the 158 kBtu per square foot average EUI across RTD's facilities.

Figure 31: District Shops – CO_2 Emissions by Source



Source: RTD Utility Data, WSP, and RTD Fleet data

[7] This number has been revised since the Phase 1 Emissions Report based on updated utility information received from RTD.

Near-Term Transition Strategy

Facility Plan

Based on the proposed near-term strategy, District Shops will be operationally capable of supporting BEBs and dHEBs by 2028. Potential interior modifications at District Shops will focus on the vehicle repair bays, located primarily at the east wing of the District Shops main building, and consist of body shop repair bays, retrofit bays, and similar heavy maintenance and repair vehicle bays. While the support vehicle fleet was not included as part of the project scope the support vehicle shop will need to be upgraded should RTD pursue ZEVs for its support fleet.

Based on existing code, no facility-related improvements are required to operate dHEBs. However, language in the not yet adopted IBC 2024 pertains to fireproofing requirements for the storage of vehicles with lithium-ion batteries. For this reason, RTD is taking a conservative approach and plans to implement fireproofing enhancements to the interior of the District Shops facility.

In addition, RTD plans on implementing several strategies and capital enhancements to improve the efficiency of various MEP systems at District Shops. Improvements range from minor operational changes and/or settings to equipment to infrastructure replacements/improvements.

Because the recommended improvements fall below the level of what would typically be shown on a conceptual drawing, no conceptual drawing is provided for this facility.

District Shops will require improvements to support dHEBs and BEBs in the near-term strategy. It is assumed that the improvements will be delivered with a design-bid-build contract structure. This means that improvements will first be designed, then the designs will be released for a public bid from a construction contractor, and then the contractor will implement said improvements. Each of the project elements is expected to occur between 2025–2028.

Charging for BEBs at District Shops is expected to be done with portable chargers, a suitable alternative that can provide buses with enough energy to drive BEBs to Platte if more energy is needed. Construction activities are expected to be completed in three phases. These phases allow a large portion of work to be completed with minimal impact to service and operations. Each of these phases is expected to take three months.

The proposed project schedule is shown on **Figure 32**.

Figure 32: District Shops – Near-Term Project Schedule

Division	Implementation Phase	2025				2026				2027				2028			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
District Shops (dHEB)	Design Procurement																
	Design																
	Permitting/Construction Bids																
	Construction													P1	P2	P3	

Source: WSP

Note: P = Phase (e.g., P1 = Phase 1)

Workforce Plan

To ensure that RTD's workforce is prepared to operate and maintain the future facilities and fleet, it is essential to have a plan in place. To implement the near-term strategy, RTD has assessed the requirements for the new fuels/technologies and developed a plan to train its workforce before, during, and after vehicles are delivered.

To support District Shops' future facilities and fleet in the near term, an additional five general repair mechanics will be needed (compared to current staffing).

Initial training to support the new fuels/technologies will be required for all staff, including new recruits, existing staff, and those transitioning into promoted roles. **Table 26** summarizes the estimated staffing requirements by role.

Table 26: District Shops – Near-Term Strategy Workforce Summary

Position	Current Staff (2025)	Additional Staff Need[1]	Near-Term Strategy Staff (2035)[2]
General Repair Mechanics	35	5	40
Total	**35**	**5**	**40**

Source: WSP, RTD, and Transdev Organizational Charts and Staffing Spreadsheets

[1] Reflects the net additional staff needed with consideration of staff losses due to attrition and promotion to other roles.

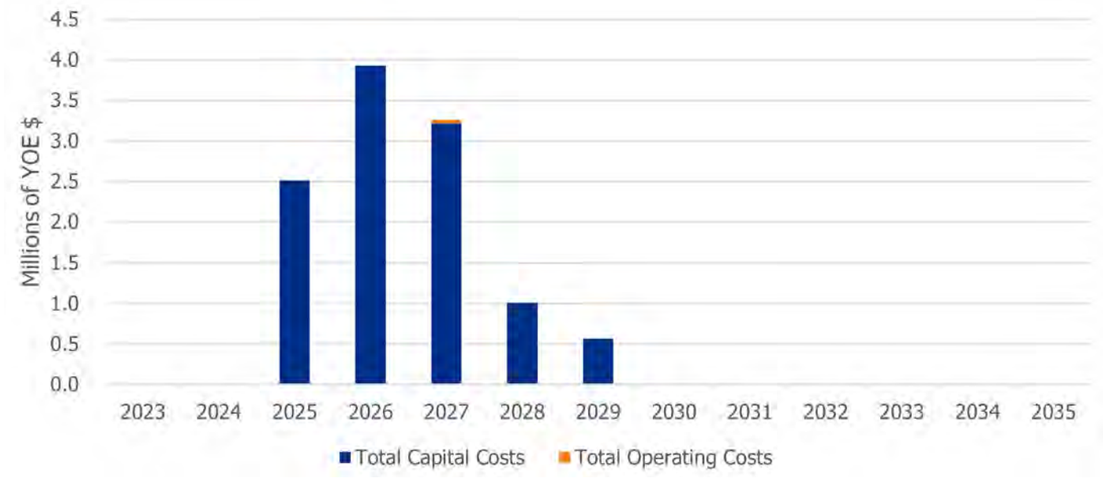
[2] The sum of current staff and additional staff needed.

Source: RTD

Lifecycle Costs

The lifecycle costs associated with the near-term strategy for District Shops include cash costs of $11.3 million YOE dollars. **Figure 33** shows the annual breakout of those costs.

Figure 33: District Shops – Near-Term Strategy Lifecycle Costs (Millions of YOE $)

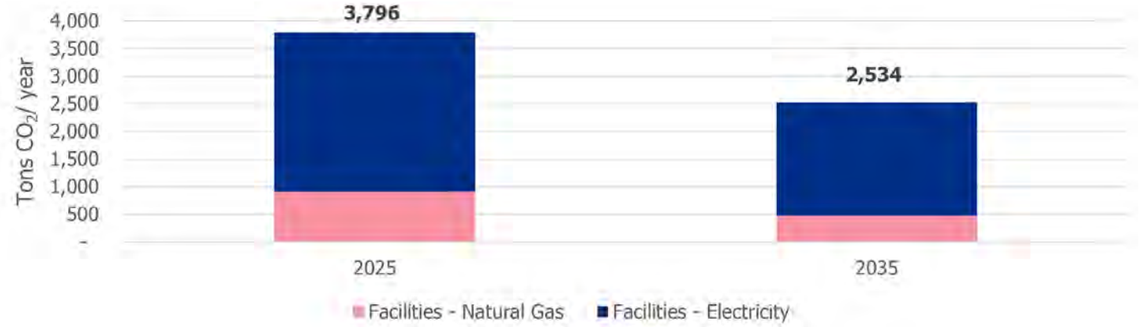


Source: WSP

Emissions

With the proposed MEP improvements, emissions at District Shops decrease by 33 percent between 2025–2035, from 3,796 tons per year to 2,534 tons per year (**Figure 34**). The EUI declines from 124 kBtu per square foot in 2025 to 78 kBtu per square foot in 2035.

Figure 34: District Shops – Projected CO_2 Emissions



Source: RTD Utility Data, WSP, and RTD Fleet data

District Shops Near-Term Strategy

In the next decade (2025–2035), District Shops is planned to undergo several improvements and changes to further advance RTD's goal of achieving net ZEs by 2050. **Table 27** summarizes the near-term strategy's impacts, and **Tables 28** and **29** summarize the District Shops' facility construction schedule, workforce training, bus procurements, and costs in the near term. The summary also includes the annual costs for the transition.

Table 27: District Shops – Near-Term Strategy Summary

Category	Summary
Facility Plan	▸ Infrastructure to support dHEBs ▸ Implementation between 2025–2028
Fleet Procurement Plan	▸ District Shops does not operate service
Workforce and Training Plan	▸ 5 additional staff needed
Lifecycle Costs	▸ Cash costs: $11.3 million
Emissions	▸ 2,534 tons per year ▸ 33% lower than baseline

Source: WSP

Table 28: District Shops – Facility Construction and Training Implementation Schedule Summary

Year	2025				2026				2027				2028				2029				2030				2031				2032				2033				2034				2035			
Quarter	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Facility Construction	a = Design Procurement				b = Design				c = Permitting/Construction Bids				d1 -d3 = Construction Phases 1-3																															
dHEB	a	a	a	b	b	b	b	c	c	c	d1	d2	d3																															
Training Implementation	e = Pre-Delivery				f = Training Delivery				g = Post-Training																																			
dHEB Maintenance												e	e	f	f	f	f	f	f	f	f	f	f	g	g																			

Source: WSP

Table 29: District Shops – Costs Schedule Summary

District Shops		2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Costs (Millions of YOE $)	**Capital Costs**	$2.51	$3.93	$3.22	$1.01	$0.56	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Operating Costs	$0.00	$0.00	$0.04	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Environmental Costs	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Total Costs	**$2.51**	**$3.93**	**$3.26**	**$1.01**	**$0.56**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**

Source: WSP

Central Park Station

Existing Conditions

Facility

Central Park Station is a bus and rail station that is also used as a service layover site. It is located at 8200 Smith Road in Denver. The station consists of customer vehicle parking on the east and west sides, several covered customer waiting zones in between with direct bus access, and a layover island with a rock garden and driver relief stations. The site has direct access to Smith Road to the north and 37th Place to the south. **Figure 35** presents an aerial of the site.

Figure 35: Central Park Station – Existing Conditions

Source: Google Earth

Fleet and Service

Service from the following facilities uses Central Park Station: East Metro, Platte, Transdev Commerce City, Transdev Broadway, and Transdev Englewood. A total of 71 blocks, representing 18 routes, stop at Central Park Station during each weekday.

Near-Term Transition Strategy

Fleet and Service Plan

Seven BEB service blocks originating from Platte will use on-route chargers (ORCs) at Central Park Station. The seven blocks serve two routes; with the frequencies planned in the SOP for the two routes, the maximum number of charging vehicles in the schedule is two.

Facility Plan

To reduce transportation-related emissions, RTD plans to install two ORCs at Central Park Station, which will enable seven service blocks to be operated by BEBs. Based on the proposed near-term strategy, Central Park Station will be operationally capable of supporting up to two charging positions by 2031. Ideally, development of Central Park to serve BEBs can act as a model and provide lessons learned for future development of other transit centers, as needed.

Similar to Platte, but at a much smaller scale, utility infrastructure improvements will be needed for Central Park Station to enable on-route charging. RTD and Xcel Energy are currently coordinating to evaluate the needed improvements. It is assumed that the infrastructure improvements will be delivered with a design-bid-build contract structure. This means that improvements will first be designed, then designs will be released for a public bid from a construction contractor, and then the contractor will implement said improvements. All project elements are expected to occur 2028–2031.

For the BEB fleet, construction will include the installation of various electrification infrastructure (charging cabinets, dispensers, switchgears, and transformers), and in parallel, additional electrical capacity outside the facility (via Xcel Energy).

Construction activities are expected to be completed in two phases, with each phase expected to take three months. The first phase consists of transformer, switchgear, and one direct current charging cabinet block with pantograph and mast. The second phase would include a second direct current charging cabinet block with pantograph and mast. Since the covered passenger waiting zones are separated by route, locating the ORC stations at the layover island will maximize the availability of chargers to multiple buses. Doing so also avoids potential conflicts with the existing passenger canopies.

Figure 36 contains the facility construction schedule for Central Park Station, and **Figure 37** presents the conceptual design of the ORC infrastructure.

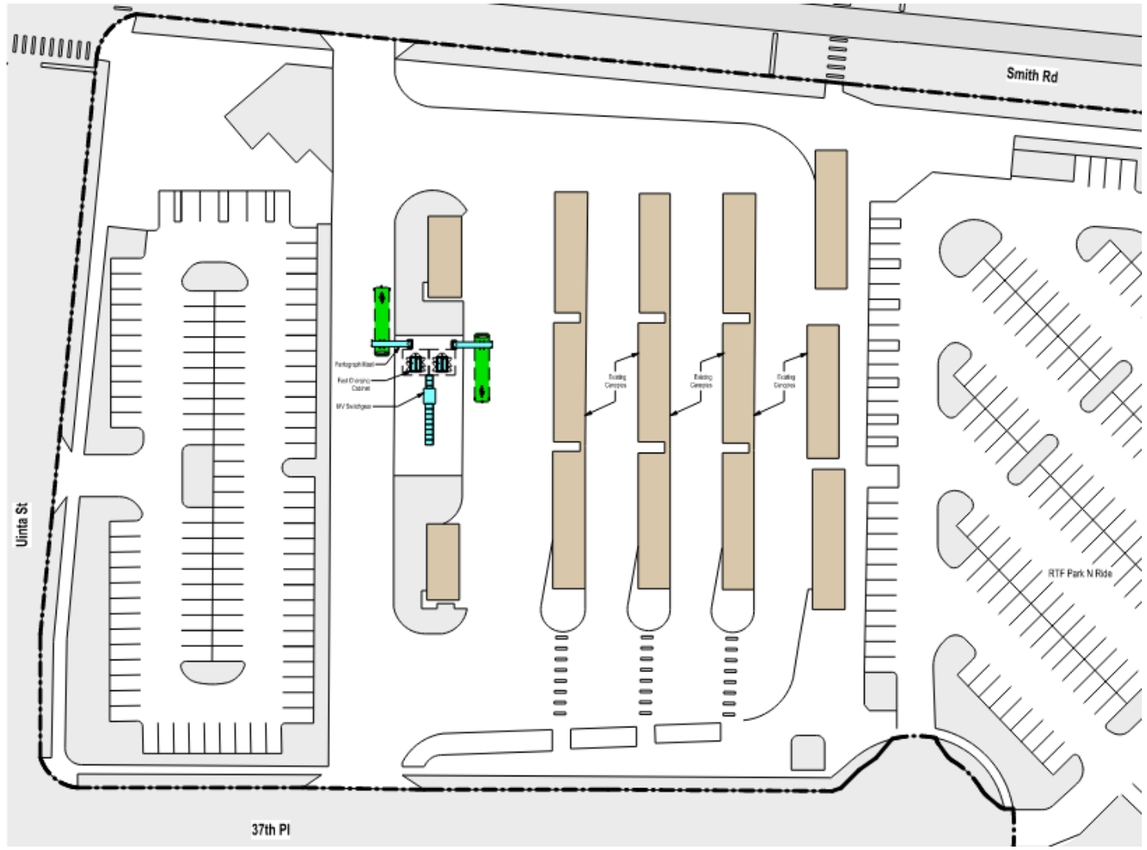
Figure 36: Central Park Station – Proposed Near-Term Construction Schedule

Division	Implementation Phase	2028				2029				2030				2031			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Central Park (Layover Charging)	Design Procurement																
	Design																
	Permitting/Construction Bids																
	Construction													P1	P2		

Source: WSP

Note: P = Phase (e.g., P1 = Phase 1)

Figure 37: Central Park Station – Future Plan (2035)



Source: WSP

Lifecycle Costs

The cost of developing ORC at Central Park Station is $6.1 million YOE dollars. This cost incorporates estimated direct and indirect costs of construction, professional services fees, RTD personnel costs, and contingencies.

Central Park Station Near-Term Strategy Summary

In the next decade (2025–2035), Central Park Station is planned to undergo improvements to further advance RTD's goal of achieving net ZEs by 2050. **Table 30** summarizes the near-term strategy's impacts, and **Tables 31** and **32** summarize the Central Park Station's facility construction in the near term. The summary also includes the annual costs for the transition.

Table 30: Central Park Station – Near-Term Strategy Summary

Category	Summary
Facility Plan	▸ Infrastructure to support two DC fast chargers ▸ Implementation between 2028–2031
Lifecycle Costs	▸ Cash costs: $6.1 million

Source: WSP

Table 31: Central Park Station – Facility Construction Schedule Summary

Year	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Quarter	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Facility Construction	a = Design Procurement			b = Design		c = Permitting/Construction Bids			d1 -d2 = Construction Phases 1-2			
dHEB					a a a b b b b c c d1 d2							

Source: WSP

Table 32: Central Park Station – Facility Construction Schedule Summary

Central Park		2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Costs (Millions of YOE $)	**Total Costs**	**$2.51**	**$3.93**	**$3.26**	**$1.01**	**$0.56**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**

Source: WSP

Contracted Facilities

Existing Conditions

Facilities

RTD currently contracts with Transdev to operate approximately 364 RTD-owned buses from four facilities: Commerce City, Broadway, Longmont, and Englewood. Transdev currently owns or leases these facilities. The location of facilities may change in the future due to the selection of a new vendor and/or changes in fuels/technologies.

Fleet and Service

The contracted facilities operate 30-foot and 40-foot buses that serve between 15 and 18 routes with 49 to 62 service blocks. **Table 33** summarizes the contracted services fleet and service.

Table 33: Contracted Services – Fleet and Service Summary

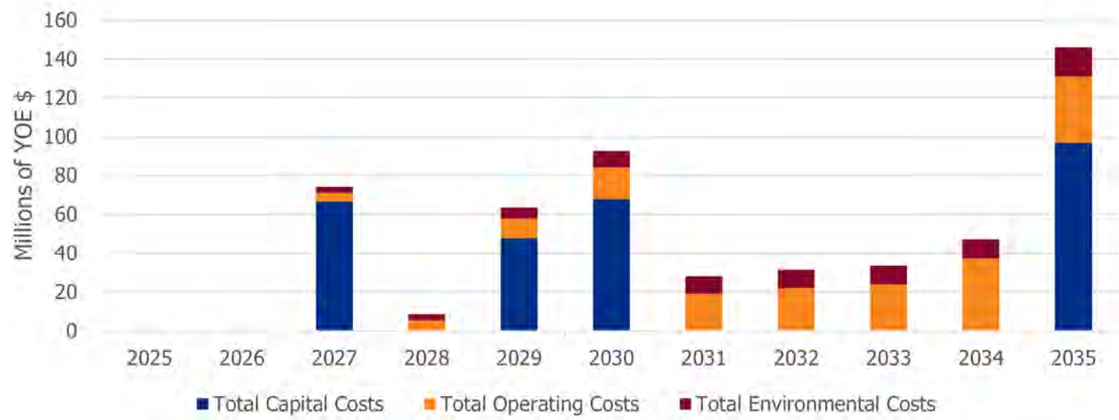
Facility	Vehicles	Service Blocks	Routes	Distance Range (mi.)	Duration Range (hrs)
Commerce City	92	54	17	28-266	1-21
Broadway	115	62	17	28-311	1-21
Longmont	75	49	18	50-382	3-19
Englewood	107	59	15	24-294	1-21
Total	**389**	**224**	**67**	**24-382**	**1-21**

Source: RTD Equipment List, August 14, 2024

Costs

The lifecycle costs associated with maintaining existing conditions at all contracted facilities include cash costs of $451.7 million (capital and operations and maintenance [O&M] costs for vehicles and O&M costs for training) and non-cash environmental costs of $74.3 million, both in YOE dollars. **Figure 38** shows the annual breakout of those costs.

Figure 36: Contracted Facilities – Existing Conditions Lifecycle Costs (Millions of YOE $)

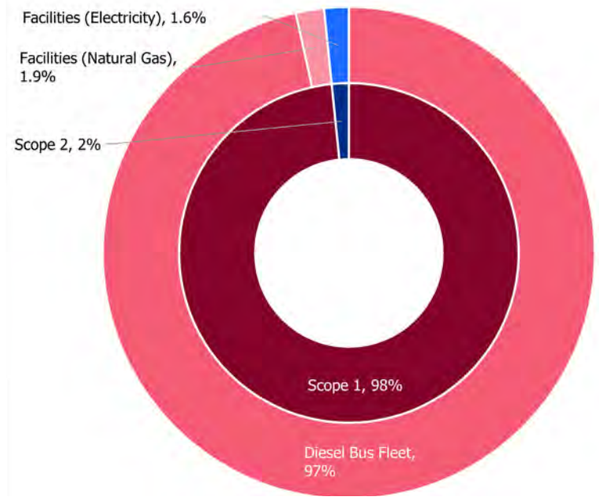


Source: WSP

Emissions

Under existing conditions, the contracted facilities emit 37,442 tons of CO_2 emissions per year, with 97 percent (36,142 tons) attributed to the operation of the diesel fleet and the remaining 3 percent attributed to the facilities themselves[8] (**Figure 39**). Of the facility emissions, 53 percent (695 tons) are Scope 1 emissions from natural gas use, and the remaining 47 percent (605 tons) are Scope 2 emissions from electricity use.

Figure 39: Contracted Facilities – CO_2 Emissions by Source



Source: RTD Utility Data, WSP, and RTD Fleet data

Near-Term Transition Strategy

The fleet procurement plan for the contracted facility fleets accounts for the implementation of the fleet reduction plan between 2025–2027 and the replacement of retired vehicles with new technology based on facility readiness. **Table 34** shows when the contracted facilities will be rebid and the expected capacities in 2035. Note that these dates are when a new contract would go into effect. The service operated out of these facilities will be bid competitively. For simplicity, the contracts are referred to by the existing facility location.

Table 34: Contracted Facilities – Renewal and 2035 Capacity

Facility	Contract Rebid	2035 dHEB Capacity	2035 BEB Capacity
Longmont	2026	63	0
Broadway	2028	115	0
Commerce City	2029	92	0
Englewood	2030	94	0

Source: WSP and RTD

It is assumed that the contracted facilities will be ready to accept dHEBs one year after the contracts have been rebid. Based on this, **Table 35** summarizes the procurements for the contracted fleets through 2035.

Table 35: Contracted Facilities – Fleet Procurements by Year

Vehicle Type	Totals	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
30' Diesel	0											
30' dHEB	25											25
40' Diesel	21			21								
40' dHEB	184			58	11	55	60					
45' Diesel	0											
60' Diesel	0											
60' dHEB	11											
Total	216	0	0	79	11	55	60	0	0	0	0	25

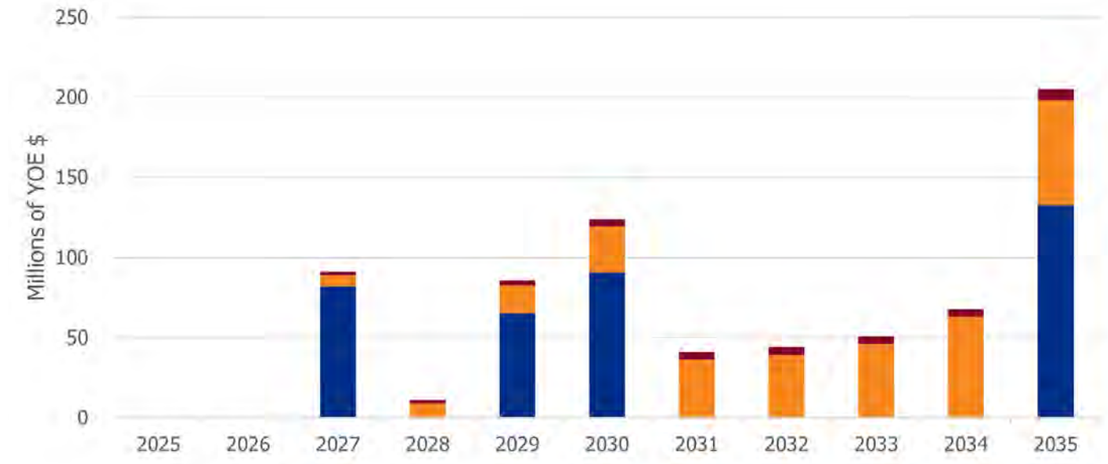
Source: WSP

Note: 30-foot buses are required on Longmont local routes in order to make certain turns. If 30-foot dHEBs are not available in 2035, this will be addressed.

Lifecycle Costs

The lifecycle costs associated with the near-term strategy for the contracted facilities include cash costs of $682.9 million (capital and O&M costs for vehicles and O&M costs for training) and non-cash environmental costs of $38.1 million, both in YOE dollars. These are 51 percent higher and 49 percent lower than existing conditions for cash costs and non-cash costs, respectively. **Figure 40** shows the annual breakout of those costs.

Figure 40: Contracted Facilities – Near-Term Strategy Lifecycle Costs (Millions of YOE $)

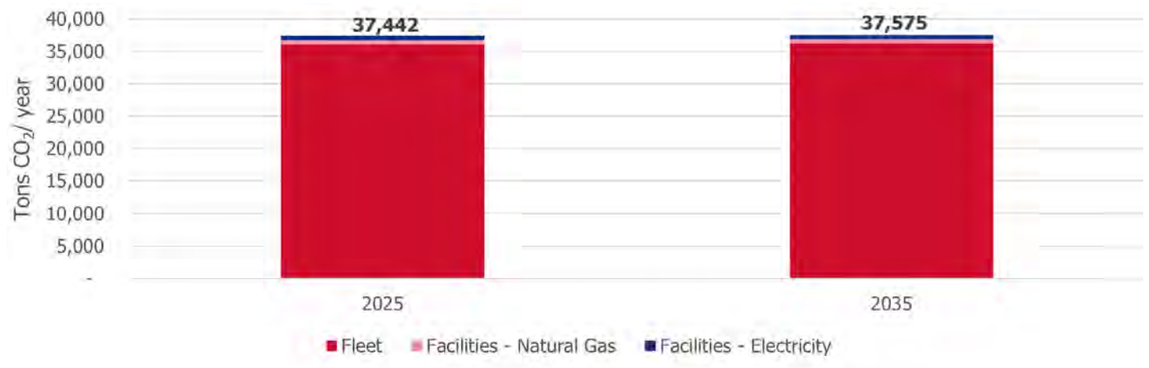


Source: WSP

Emissions

With the proposed fleet changes, emissions at the contracted facilities increase by 0.4 percent between 2025–2035, from 37,442 tons per year to 37,575 tons per year (**Figure 41**). This slight emissions increase is due to the fleet size increasing during this period, which offset the emissions reductions achieved from replacing diesel vehicles with dHEB.

Figure 41: Contracted Facilities – CO_2 Emissions by Source



Source: RTD Utility Data, WSP, and RTD Fleet data

Contracted Facilities Near-Term Strategy Summary

Table 36 summarizes the near-term strategy's impacts.

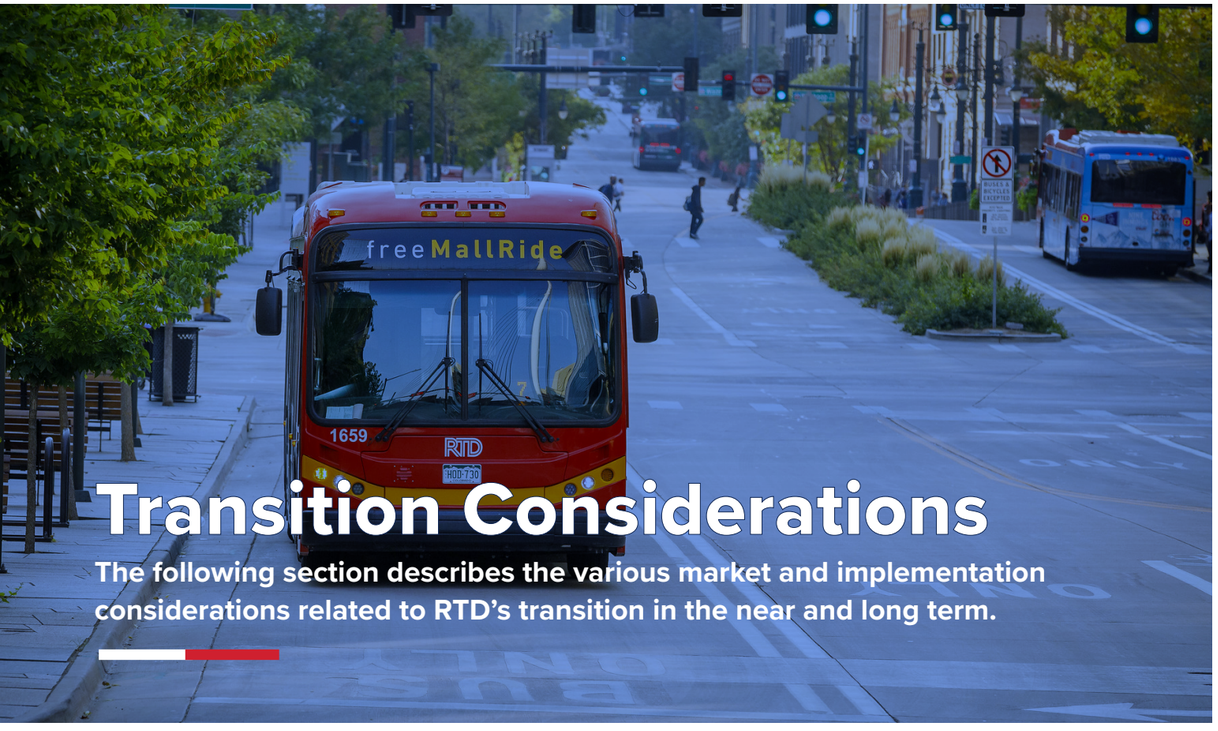
Table 36: Contracted Facilities – Near-Term Strategy Summary

Category	Summary
Facility Plan	▸ Contracted services will be expected to have facilities in place that can support dHEBs
Fleet Procurement Plan	▸ 216 buses delivered ▸ dHEBs and diesel buses
Workforce and Training Plan	▸ To be determined by contractor
Lifecycle Costs	▸ Cash costs: $682.9 million ▸ 51% higher than baseline
Emissions	▸ 0.4% higher than baseline[1]

Source: WSP

[1] Attributed to the number of dHEBs increasing to 201 vehicles in 2035, offsetting some of the emissions reductions achieved by reducing the number of diesel buses to 145 vehicles.

Source: RTD



Transition Considerations

The following section describes the various market and implementation considerations related to RTD's transition in the near and long term.

Overview

Considering RTD's experience with various fuels/technologies, agency staff understand that testing, piloting, and transitioning to a new fuel/technology have implications that impact all aspects of the agency. To ensure that RTD can implement the near-term strategy, it is important to identify the factors that need to be considered and/or continuously monitored during the transition so that RTD can mitigate risks or barriers and take advantage of opportunities.

This section summarizes the elements that RTD should consider as it embarks on its path to an eventual net ZE fleet. Areas of consideration have been broken out into two overarching categories: market considerations and implementation considerations. Market considerations largely capture categories that are outside RTD's control, such as changes in the technology, supplier, policy, or funding markets. Implementation considerations are related to decisions that RTD will have to make during the transition.

Market Considerations

Technology Landscape

The near-term strategy primarily focuses on transitioning RTD's largely diesel fleet to dHEBs and BEBs. This decision was driven by the need to effectively reduce emissions with consideration to RTD's net-zero goal, financial position, and the technology market. Also included in the near-term strategy is the use of renewable diesel, if financially feasible, and a detailed evaluation, and possible pilot, of FCEBs.

Throughout the near term, shifts in technology or pricing may impact how RTD proceeds in both the near and long term. For example:

- **Renewable Diesel:** Renewable diesel can provide an estimated 60 percent reduction in GHG compared to diesel fuel, but it is currently approximately $1.20 more per gallon. RTD continues to evaluate this alternative—a supplier has been identified in Wyoming—to implement in the near term as a drop-in fuel for both existing diesel buses and future dHEBs.
- **Battery-Electric:** Current and forecasted battery technology dictated the number of BEBs proposed in the near-term strategy. Battery-technology has improved over the past few years, based on improved range, safety, and costs. However, under current conditions, these factors are still not in a place to justify a full fleet transition for RTD. The extent to which battery-electric technology improves, or fails to improve, will inform RTD on how to proceed in the future.
- **FCEBs:** From a service completion perspective, FCEBs can complete nearly all of RTD's current service blocks. While the technology currently has a low adoption rate in the United States, and there are no hydrogen fuel suppliers near RTD's service area, adoption continues to grow and the number of fuel providers is increasing. RTD will continue to monitor the market for hydrogen fuel and FCEBs and consider its potential as a long-term solution for the fleet.

Funding Landscape

There are discretionary grant opportunities to fund portions of the transition; however, this funding is in high demand due to the market shift to alternative fuels. For example, FTA's Bus & Bus Facilities (5339b) and Low and No Emissions (5339c) programs—some of the most well-funded but oversubscribed programs—received 477 applications ($9 billion) in the FY24 cycle. The programs awarded $1.5 billion to 117 projects.[9]

In assessing RTD's capacity to implement the near-term strategy, Baseline and Aspirational funding cases were developed to assess the incremental capital needs associated with the near-term strategy across all facilities. **Table 37** shows that in the Baseline funding case, the near-term strategy is estimated to require an additional $418 million in funding, relative to the No-Build scenario, which represents RTD's expected capital need using only diesel vehicles. The cost of the near-term strategy is not currently funded.

Table 37: Capital Need in Baseline Funding Case (Millions of YOE $)

Category	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	Total
No-Build	$74	$9	$212	$162	$52	$110	$3	$145	$3	$2	$138	$910
Near-Term Strategy	$82	$19	$253	$233	$104	$204	$29	$199	$9	$7	$190	$1,328
Incremental Capital Need	$8	$10	$41	$71	$51	$98	$25	$54	$6	$6	$53	$418

Source: WSP

Note: Values rounded to nearest million

The "Aspirational" scenario projects potential cashflows if RTD pursues and wins discretionary grants and monetizes relevant tax incentive programs. Approximately $123 million in potential external funds is available for the near-term strategy, $56.4 million more than the project team estimates to be available for the No-Build scenario based on the project criteria underlying the nine funding programs deemed high or moderate potential sources of funds. If RTD can secure awards from all programs in each category, **Figure 43** shows that the incremental capital need for the near-term strategy may be reduced from $417.6 million to $361.2 million, relative to the no-build scenario.

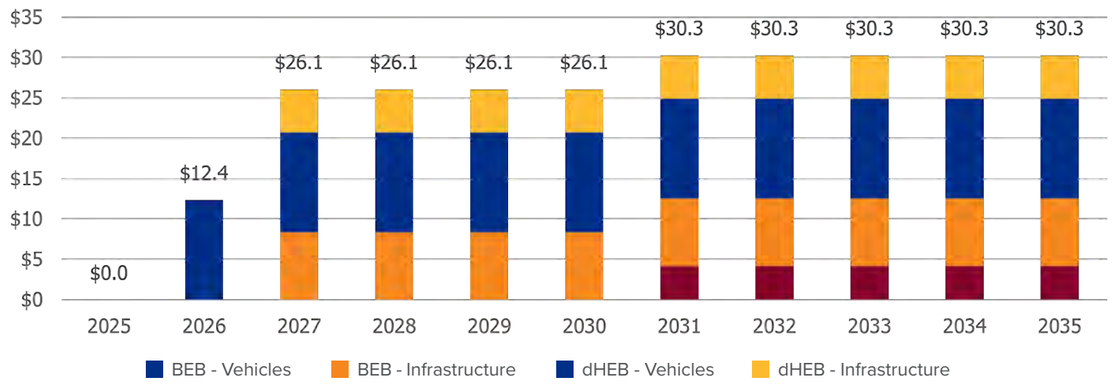
[9] Grant funding analysis was based on the 2020-2024 Biden administration. Subsequent administrations may alter how federal funding is awarded and thus funding availability.

Figure 43: Funding Availability for Near-Term Strategy (Millions of YOE $)

Source: WSP

To meet the remaining $361 million shortfall in incremental capital costs, the team also assessed the potential cost associated with financing. Assuming financing terms of 12 years for vehicles and 30 years for facilities/infrastructure investment, the total debt service would be $611 million, which reflects a total interest cost of $234 million. **Figure 43** shows annual debt service payments over the near term.

Figure 44: Annual Debt Service for Capital Shortfall 2025-2035 (Millions of YOE $)



Source: WSP

If RTD is unsuccessful or opts not to pursue discretionary grant or incentive funds, it may be required to seek financing for the full $418 million cost of the near-term strategy. Under the same previous financing conditions, it is estimated that total debt service for this larger transaction would climb to $660 million, with a total interest cost of $243 million. Annual average debt service would rise by $1.5 million relative to the grant supported funding case, to $20.6 million.

Policy Landscape

RTD's current goal is to achieve net ZE by 2050 as established by the Board; however, achieving this goal is also impacted by policy decisions and actions made by other entities. For example, if RTD were to transition its fleet to all BEBs or FCEBs, under existing conditions, the infrastructure would be supported by electricity that is not generated from renewable sources, thereby making a net-zero transition impossible. However, it should be noted that Xcel Energy, the utility that provides natural gas and electricity to RTD, also has a goal to be 100 percent carbon free by 2050.

Market Landscape

The path and speed with which RTD transitions its facilities and fleets to low- and no-emission fuels/technologies will also be dictated by the availability and delivery schedules of buses, infrastructure, and, if applicable, fuel. In the low-emission marketplace, no coach or 60-foot dHEBs are currently available.

For ZEBs, there are only two Buy America-compliant original equipment manufacturer (OEMs) that offer BEBs—and only one of these has an FCEB (though Gillig plans to offer FCEBs in the near-future). This dynamic puts constraints on vehicle delivery and can potentially increase the costs of vehicles. While there is hope that more OEMs will enter the market by the time RTD significantly ramps up ZEB purchases, the ability to acquire buses—and align them with facility construction and utility electrification—will continue to be a challenge.

There is no hydrogen fuel supplier in the region, but due to extensive investment by the federal government and demand by heavy-duty vehicle operators, that there may be a potential supplier in the near future. For renewable diesel fuel, there are currently three plants in the Rocky Mountain region, with production continuing to increase. RTD found that a gallon of renewable diesel is estimated to cost $4.20 per gallon as of 2024, which is $1.20/gallon over current diesel fuel prices.

Implementation Considerations

Service Changes

RTD's Comprehensive Operational Analysis (also known as the System Optimization Plan) served as the baseline conditions for the near-term strategy. Any changes to service—increases or decreases—will impact fleet needs and size, which then informs infrastructure, power needs, etc. Therefore, it is important both to consider these needs when adjusting service and to implement infrastructure in stages.

Equity

ZEBs provide significant environmental benefits, such as reduced air and noise pollution, which can directly enhance the quality of life in communities served by these routes. These benefits are particularly impactful in disadvantaged communities that have historically faced higher environmental burdens. To ensure an equitable transition to ZEB technology, RTD must prioritize deploying these buses in ways to address the needs of equity populations, including low-income, minority, and limited English proficient (LEP) communities and disadvantaged communities.

Beyond the technical feasibility of deploying these buses—particularly BEBs—RTD is committed to evaluating the equity implications of these changes. This commitment includes assessing how service improvements align with Justice40 and Title VI requirements, which mandate fair and equitable distribution of benefits and services.

Based on RTD's Title VI analysis, all RTD facilities, except the Boulder facility, and the contracted facilities, are situated within Justice40-designated disadvantaged communities. The Boulder facility also serves the fewest equity routes. **Table 38** provides a breakdown of equity routes by facility. These findings can help prioritize bus route deployment or facilities for upgrades to support low- or no-emission buses.

In addition to evaluating service impacts, RTD recognizes the importance of community engagement to identify and address equity concerns related to the ZEB transition. Community engagement will include targeted outreach to disadvantaged communities, ensuring transparency and opportunities for meaningful participation in the planning process. By integrating equity considerations into both planning and implementation, RTD can maximize the benefits of ZEB technology while advancing environmental justice and transit equity goals.

Table 38: Equity Routes by Facility

Facility	Located in Justice40 Communities	Total Number of Routes Originating from Facility	Number of Routes Serving >50% Disadvantaged Communities (Title VI)	Number of Routes Serving Justice40 Communities
Boulder	No	18	0	8
East Metro	Yes	24	5	24
Platte	Yes	33	3	30
Broadway	Yes	17	1	14
Commerce City	Yes	17	4	15
Englewood	Yes	15	2	12
Longmont	Yes	18	0	9

Source: RTD, CEJST

Note: Routes can originate from multiple facilities.

Resilience

RTD's reliance on Xcel Energy will increase as its ZEB fleet grows. Service continuity then becomes vulnerable to power outages and, therefore, requires some level of backup. Considering the amount of investment required to implement the near-term strategy, RTD must find ways to protect its assets and mitigate any disruptions.

As part of the FFTP, RTD conducted a high-level evaluation of resiliency options. Existing conditions at each facility may necessitate different options, at least in the near term, but resiliency options generally include backup power generators (permanent and mobile), on-site battery energy storage systems (BESS), and redundant utility feeds. RTD is also exploring the option of coupling a solar energy generation system with BESS and a microgrid so that solar energy can be used for typical overnight charging during an outage. A BESS, microgrid, and photovoltaics would also enable peak-shaving, whereby solar energy would be used to reduce reliance on the grid during high-demand periods.

All of these options come at considerable costs that were not evaluated in this plan; however, as RTD approaches design and other implementation stages, it is important to make decisions on these resiliency options.

Risks

The implementation of new bus technologies introduces risks that are not typically encountered with conventional diesel buses.

- **State of the Market:** Compared to conventional diesel buses, BEBs currently face limitations in range and fueling times, while both BEBs and FCEBs face limitations with costs and reliability. These factors may impact operations and require changes to planning, service procedures, and maintenance processes. Further, only a few Buy America-compliant OEMs produce dHEBs, BEBs, and/or FCEBs. Recent market exits by several OEMs have left some customers with uncertainty for future support for their existing vehicles. Given the recent and volatile nature of the ZEB market, RTD risks entering a fluctuating market.

- **State of the Market (continued):** Staying informed of the latest market developments and OEM stability will be crucial to guide future procurement and decision-making. Additionally, if considering FCEBs, the demand for hydrogen has not yet scaled to a point where prices are competitive with diesel, meaning FCEBs will require a premium fuel cost until broader adoption drives prices down
- **Vehicle Lead Times and Costs:** The limited number of OEMs also impacts vehicle lead times and prices as the few OEMs available try to meet increasing demand from agencies transitioning to cleaner technologies. The limited selection of OEMs can result in extended delivery times and potentially higher costs for each vehicle.
- **Obsolescence Risk:** This rapid pace of advancement also presents a risk: committing to a fleet of the current models could leave RTD with a fleet of older, potentially less efficient buses if superior technology becomes available before the next procurement cycle. Strategic planning can help mitigate this risk by assigning older BEBs to routes that require less battery use (generally, the shorter routes).
- **Fire Risk:** BEBs and dHEBs rely on lithium-ion batteries, which introduce unique fire hazards not typically seen in diesel buses. Diesel fires usually ignite from external sources or fuel leaks, while battery fires can result from internal factors like thermal runaway—a rapid increase in temperature leading to spontaneous combustion. Such fires are challenging to extinguish and may reignite, requiring specialized firefighting techniques and protocols. FCEBs store hydrogen gas, which is highly flammable and can create intense and volatile fires compared to diesel. Hydrogen fires are often invisible and can spread quickly, posing distinct containment and suppression challenges. Transitioning to these technologies will require enhanced safety protocols, infrastructure modifications, and specialized training for both RTD staff and local emergency response teams.
- **Utility Upgrades:** It is essential to coordinate vehicle delivery schedules with utility infrastructure readiness. Timely communication with utility providers is key to ensuring that necessary upgrades are completed in time for charger installation and vehicle deployment.

Decision Points

In the coming years, RTD will need to make many decisions that will determine the speed and manner in which it transitions its facilities and fleet. The following summarizes some of these decisions and how they may impact the transition.

- **Underground tank replacements:** While relatively routine if RTD were to continue operating diesel fuel, the decision to invest in costly underground tank replacements may further extend RTD's operation of diesel-powered vehicles with respect to return on investment. Therefore, the near-term and long-term strategies need to be considered before making decisions on tank replacements.
- **Future facilities:** It is easier to integrate infrastructure needed to support ZEBs into a facility when the facility is being constructed, rather than retrofitting this infrastructure into existing facilities. RTD is currently in the process of planning for a new bus operating facility and will explore integrating ZEB infrastructure into the design during the planning process. The outcomes of these decisions will directly impact the near-term strategy. Before identifying a preferred site for a new facility, RTD must also complete a Title VI equity analysis of candidate sites.
- **MEP improvements:** An analysis of all RTD facilities, even beyond bus facilities, has revealed several strategies and capital improvements that RTD can invest in to reduce GHG emissions. Some of those strategies have been outlined in this report; however, the timing and specific strategies that RTD selects will determine GHG reductions.

Coordination and Collaboration

To meet its ZE goal, it is essential that RTD collaborate with stakeholders, suppliers, OEMs, peer agencies, and Xcel Energy. Alignment and communication with various entities may improve decision-making processes and also foster strategic procurement and implementation strategies. For example, Los Angeles County Metropolitan Transportation Authority (LA Metro) coordinated with regional agencies for a joint ZEB purchase, thereby reducing costs and streamlining purchases for all. This sort of collaboration may also help attract a market for hydrogen fuel.

Conclusion

The following section summarizes the near-term strategy and the action items needed to begin implementation.

Achieving RTD's 2050 net-zero goal will entail commitments to new technologies that require substantial capital investments and facility upgrades that are yet to be proven for RTD's service. RTD's incremental approach to procuring and operating BEBs and FCEBs in the next 10 years, while replacing diesel buses with low-emission diesel-hybrids, will prepare the agency to make long-term commitments that succeed in delivering service while reducing, and in some cases, eliminating tailpipe emissions. As RTD monitors the ZE bus market, each RTD facility will undergo efficiency and safety upgrades to save costs and reduce energy use.

In 2035, at the end of the near-term period, RTD will have procured 75 BEBs at Platte and 334 dHEBs across all facilities. RTD will also have gained valuable experience incorporating on-route BEB charging into operations and using charge management software for dispatch.

Table 39, **Table 40, Table 41,** and **Table 42** summarize procurement, facilities, costs, and emissions for the near term.

Table 39: Systemwide – Annual Facility and Workforce Training Strategy Summary

Implementation Timeline Key	● dHEB buses						+ BEB buses					
Year	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Facility Design and Construction[1]												
Platte			● +	● +	● +	● +	● +					
Boulder								●	●	●	●	
East Metro	●	●	●	●								
District Shops	●	●	●	●								
Central Park				●	●	●	●					
Training Implementation[1]												
Platte					+	+	● +	● +	● +	+		
Boulder										●	●	●
East Metro			●	●	●	●						
District Shops			●	●	●							
Central Park												

Source: WSP

[1] *Years indicated are approximate calendar years during which dHEB or BEB facilities/infrastructure construction and training are expected to take place and may include the entirety of, or a part of, the calendar year indicated. Phasing of construction activities can enable phased vehicle deliveries prior to full buildout.*

Table 40: Systemwide – Annual Bus Procurement and Costs Strategy Summary

RTD Division		2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Platte Bus Procurements	Diesel Bus	28		50	22				14				
	dHEB								27				
	BEB						22		53				
Platte Costs (Millions of YOE $)		$38.96	$9.18	$79.53	$76.15	$54.78	$118.94	$59.86	$ 196.75	$60.23	$71.48	$71.07	N/A
Boulder Bus Procurements	Diesel Bus	8		36	20								
	dHEB											40	
Boulder Costs (Millions of YOE $)		$11.56	$2.76	$48.06	$40.09	$19.75	$19.24	$21.28	$28.46	$29.97	$36.92	$94.38	N/A
East Metro Bus Procurements	Diesel Bus	23		51									
	dHEB				106								
East Metro Costs (Millions of YOE $)		$37.23	$10.76	$71.41	$174.22	$34.15	$39.81	$42.54	$55.67	$51.20	$62.11	$73.67	N/A
District Shops Costs (Millions of YOE $)		$2.51	$3.93	$3.26	$1.01	$0.56	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	N/A
Central Park Costs (Millions of YOE $)		$0.00	$0.00	$0.00	$0.59	$3.64	$1.25	$0.65	$0.00	$0.00	$0.00	$0.00	$0.00
Contracted Facilities' Bus Procurements (All Locations)	Diesel Bus			29									
	dHEB			50		55	71					102	

Source: WSP

[1] *Years indicated are approximate calendar years during which dHEB or BEB facilities/infrastructure construction and training are expected to take place and may include the entirety of, or a part of, the calendar year indicated. Phasing of construction activities can enable phased vehicle deliveries prior to full buildout.*

Table 41: Systemwide – Workforce Staffing Near-Term Strategy Summary

RTD Facility	Current Staff (2025)	Additional Staff Need[1]	Near-Term Strategy Staff (2035)[2]
Platte	572	72	644
Boulder	214	24	238
East Metro	490	41	531
District Shops	35	5	40

Source: WSP, RTD, and Transdev Organizational Charts and Staffing Spreadsheets

[1] *Reflects the net additional staff needed with consideration of staff losses due to attrition and promotion to other roles.*

[2] *The sum of current staff and additional staff needed.*

Table 42: Systemwide – Near-Term Strategy Lifecycle Costs, 2025–2035 (Millions of 2023 $)

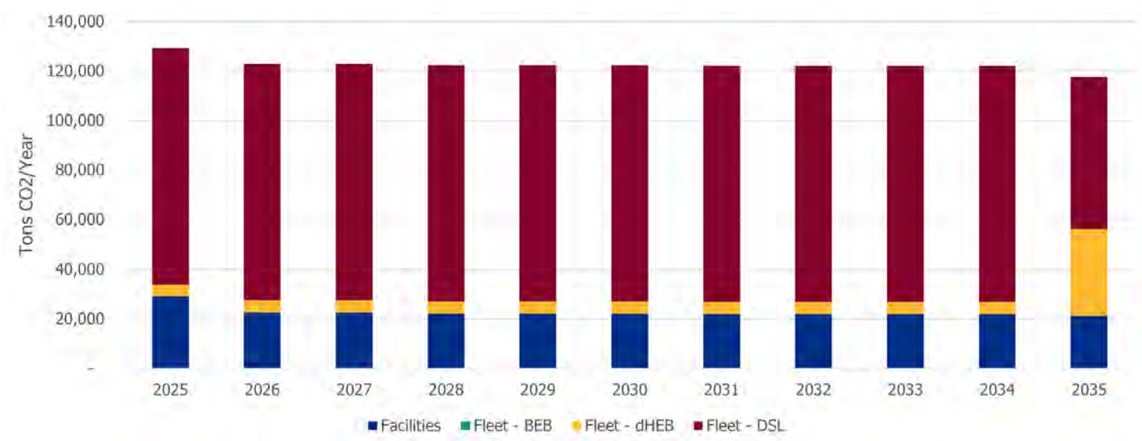
Cost Category	East Metro	Platte	Boulder	Longmont	Denver	Commerce City	Englewood	District Shops	Central Park	Total
Total Cash Cost	$531	$688	$273	$163	$207	$106	$116	$11	$5	$2,100
% Difference in Comparison to Diesel No-Build	18%	41%	10%	64%	52%	43%	34%	400%	-	32%
Non-Cash (Environmental)	$40	$54	$31	$7	$12	$8	$4	$0	$0	$156
Total Cash and Non-Cash Cost	$571	$743	$304	$170	$218	$114	$120	$11	$5	$2,256

Source: WSP Cost Estimate

Emissions

Fleet and facility emissions decline by 9 percent overall between 2025–2035 (**Figure 45**). Facility emissions decrease by 26 percent, from 28,991 tons per year to 21,320 tons per year. While diesel bus emissions decline by 36 percent when replacing vehicles with dHEBs, the fleet size increases between 2027–2035, thereby cutting the net reduction in overall fleet emissions to 4 percent (from 100,206 tons per year to 96,337 tons per year).

Figure 45: Facility and Fleet Emissions 2025–2035



Source: RTD Utility Data, WSP, and RTD Fleet data

(1) Facility emissions shown on this chart include the RTD and contracted facilities discussed in this report, as well as 11 others: Denver Union Station Bus Station, Civic Center Station, Downtown Boulder Station, Elati Rail, Mariposa Rail, Commuter Rail Maintenance Facility, Rio Court Rail, Peoria Rail, Security Command Center, North Metro/711 Building, and Blake Street Headquarters.

(2) Fleet emissions include buses at Platte, Boulder, East Metro, and contracted facilities.

2025 Action Plan

RTD's ability to successfully implement the near-term strategy will be contingent on actions made at the outset of the program. For example, if design procurement for a facility is delayed, the delay will have downstream impacts on not only that facility's operational readiness but also that of other facilities. RTD should take the following steps in the next year:

- **Prepare for upcoming FTA grant cycle (Bus and Bus Facilities and Low- and No-Emission grants).**
  - The near-term strategy shows a significant financial shortfall. As part of the FFTP, an FTA-compliant ZE Transition Plan was also developed. RTD should prepare to submit a grant application for these programs to help fund dHEB readiness improvements at East Metro and District Shops.
- **Initiate the design procurement process for District Shops and East Metro.**
  - Construction at District Shops and East Metro to support the new dHEB subfleet is scheduled to begin in 2027. To stay on schedule, RTD must begin the process of 100% designs in 2025
- **Initiate environmental planning for a new bus facility.**
  - Building a new bus facility involves several stages of development. As part of the FFTP, RTD assessed future facilities. Next steps include analyzing alternatives (which will include a Title VI equity analysis) to select a site and carrying out environmental planning for the selected site to clear it for construction. Following this process ensures that RTD can address the Denver region's evolving needs equitably while maintaining flexibility in service delivery to adapt to changing demands.
- **Continue engaging and coordinating with Xcel Energy regarding power upgrades and schedules.**
  - Platte, in particular, will need power upgrades. However, if other facilities require upgrades in the near future, including the aforementioned future bus facility, RTD will need to communicate these plans to Xcel Energy. Constant communication will mitigate the risk of not delivering projects on time.
- **Reassess cost/benefit of purchasing renewable diesel.**
  - As discussed, RTD has the potential to reduce the estimated near-term GHGs even further if renewable diesel is purchased. Renewable diesel currently costs about $1.20 more per gallon than conventional diesel. RTD will need to continue to monitor the market and decide on how to proceed.
- **Develop facility design criteria.**
  - RTD is currently developing facility design criteria for new and retrofitted bus facilities. The facility design criteria document is expected to be finalized in Q2 2025.
- **Update the FFTP.**
  - Per the Board, RTD is to updated the FFTP annually to reflect any changes that will impact meeting the net-zero goal. Updates are expected to be completed annually in Q1.