City of Riverside Zero-Emission Fleet Transition Plan Update

Mobility & Infrastructure Committee
June 13, 2024

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About Black & Veatch

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Overview

Sustainable Infrastructure Leader

12,000+ professionals

$4.7 billion in 2023 revenue

Work in **100+** countries on six continents

Safety leader

Consistent high industry rankings

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Black & Veatch
Offerings

Infrastructure has the potential to transform — to unlock new solutions, create clean versions of essential systems, and close gaps so everyone thrives.

Advanced Power Generation
Integrated solutions that address our clients' most pressing issues around **energy transition**.

Advisory Services
Industry-leading consulting services to support **technology, operational, financial and regulatory** challenges.

Commercial & Industrial Facilities
Guiding high-tech, commercial and industrial clients through strategic planning and design of **sustainable, resilient, profitable and compliant facilities**.

Cybersecurity
Providing **Cyber Strategy and Cyber Modernization** solutions to serve the needs of complex operational technology ecosystems and **improve the cybersecurity posture** of critical infrastructure.

Distributed Infrastructure
Deploying **cost-efficient distributed systems** across transportation, energy, communications, modular infrastructure and integrated medical and digital health systems.

Environmental Services
Solve complex environmental challenges by **reducing regulatory complexity and compliance** needs and ensuring budget and project schedules are met successfully.

Federal
Protecting our government and commercial clients' **critical mission facilities**, infrastructure and programs worldwide.

Grid
Preparing utilities for long-term, sustainable growth through the **planning, designing and building of an intelligent, secure and resilient grid**.

Operating Asset
Optimizing infrastructure for heavy asset owners. Combining industry knowledge, lifecycle experience and proven processes to streamline management.

Process
Sustainable process solutions help clients **lead the transition of resilient and affordable energy** while accelerating pathways to global decarbonization.

Water
Complete and customizable technical, management and delivery expertise **to solve any water infrastructure-related need**.

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Zero Emission Vehicle and Distributed Infrastructure Experience

A Global Leader in Sustainable Infrastructure

30,820
L2 and L3 dispensers deployed globally

2.2
GW connected EV charging capacity globally

2,580
Global sites

49
U.S. States

4
European countries

4
Canadian Provinces

Black & Veatch strategically plans and deploys sustainable infrastructure to decarbonize transportation and cost-effectively achieve resilience, sustainability, and growth.

Clean Power & Storage

32
MW of connected solar & storage for EV peak shaving deployed at 2,373 sites

90
Stand-alone BESS Sites totaling 48 MW

Public, Fleet & Transit Charging

1.82
GW of connected global public charging capacity

340
MW of connected fleet charging capacity

28
MW of connected transit charging capacity

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Fleet & Transition Pathway Assessment

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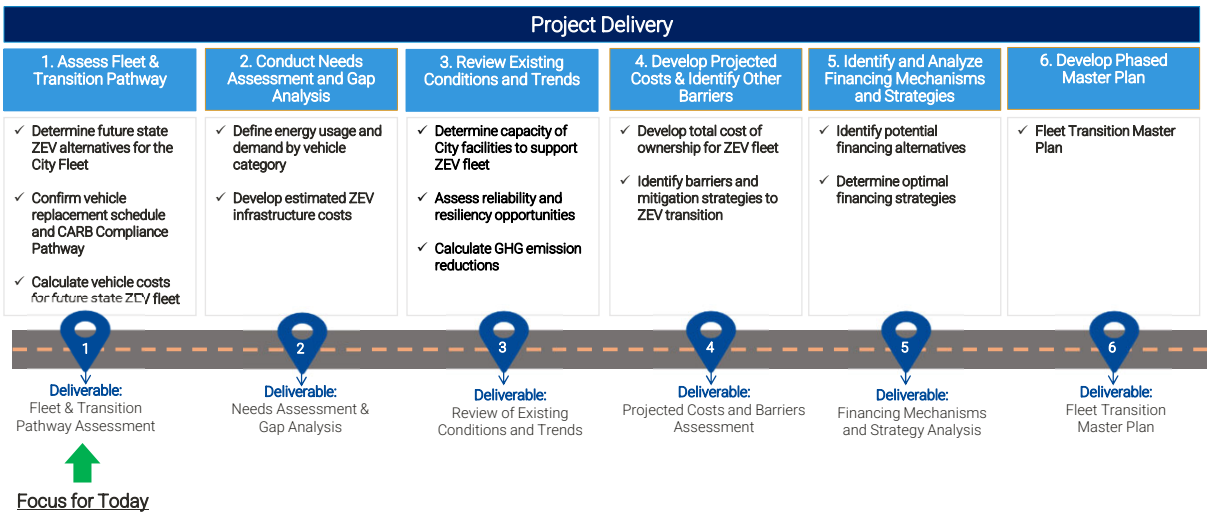
Executive Summary

Fleet Transition Plan – Project Overview



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Executive Summary

City of Riverside is required to comply with the new CARB Advanced Cleet Fleet regulations

Option 1 | Purchase Requirement (Default)

- 2024-2026: 50% of ACF regulated vehicle purchases must be ZEV
- 2027: All ACF regulated vehicle purchases must be ZEV
- ICT transit bus transition plan
- Passenger vehicle transition plan (i.e., 0% in 2024 and 2025, 50% in 2026 through 2034, 100% 2035 and beyond)

Option 2 | ZEV Milestone Schedule

- Milestone schedule drives ZEV purchases
- ICT transit bus transition plan
- Passenger vehicle transition plan (i.e., 0% in 2024 and 2025, 50% in 2026 through 2034, 100% 2035 and beyond)

Offered as a 1-time option before 2030

Share of vehicles that must be ZEVs	10%	25%	50%	75%	100%
Group 1: Box trucks, vans, buses with two axles, yard tractors, light-duty package delivery vehicles	2025	2028	2031	2033	2035
Group 2: Work trucks, day cab tractors, pickup trucks, buses with three axles	2027	2030	2033	2036	2039
Group 3: Sleeper cab tractors and specialty vehicles	2030	2033	2036	2039	2042

Notes:
1. Vehicles purchased under an approved ZEV Purchase Exemption may operate past the 100% Milestones until the vehicle's useful life period ends (at least 13 years from the model year of the engine, and up to 18 years or 800,000 miles).

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Executive Summary

Key insights from the Fleet & Transition Pathway Assessment

Fleet Assessment	Fleet Utilization Analysis	Fleet Suitability Analysis	Compliance Pathways	Vehicle Cost Analysis
Analyze current fleet to identify potential ZEV alternatives based on vehicle types and operational characteristics.	Assess vehicle utilization to identify underutilized vehicles and provide recommendations.	Profile key ZEV operational attributes to determine suitability to meet current fleet requirements.	Evaluate CARB ACF compliance pathway options and provide recommendation for selection and fleet transition.	Analyze the vehicle purchase and lifecycle cost differences between ICE and ZEV alternatives for replacement.
Key Insights				
• 701 total fleet vehicles • 373 are ACF regulated • 34 are ICT regulated • 294 vehicles are exempt from ZEV transition requirements • ZEV alternatives are available for 15 of the 21 vehicle types in the City fleet • Selected ZEV alternatives are all Battery Electric	• 17 vehicles had 0 annual mileage data reported in 2023 • 31 vehicles were under 10% of the average vehicle type utilization in 2023 • Vehicles <1,000 annual miles may apply for ACF Backup Vehicle exemption	• 7 vehicle types have high ZEV transition suitability • 8 vehicle types have medium suitability • 6 vehicle types have low suitability • From the 21 vehicle types, 6 do not have ZEV alternatives with 2 of the 6 being ACF-Exempt.	• ACF Option 1 is the recommended transition pathway • Option 2 increases ZEV purchase burden by more than double of Option 1 • Option 1 is driven by Fleet Manager procurement • Option 2 is driven by ACF Milestone schedule, requiring replacement before vehicle end-of-life	• Option 1: $88.4M cumulative vehicle purchase cost (2024 – 2040) • Option 2: $126.0M cumulative vehicle purchase cost (2024 – 2040) • No ZEV Procurement: $118.0M cumulative vehicle purchase cost (2024 – 2040)

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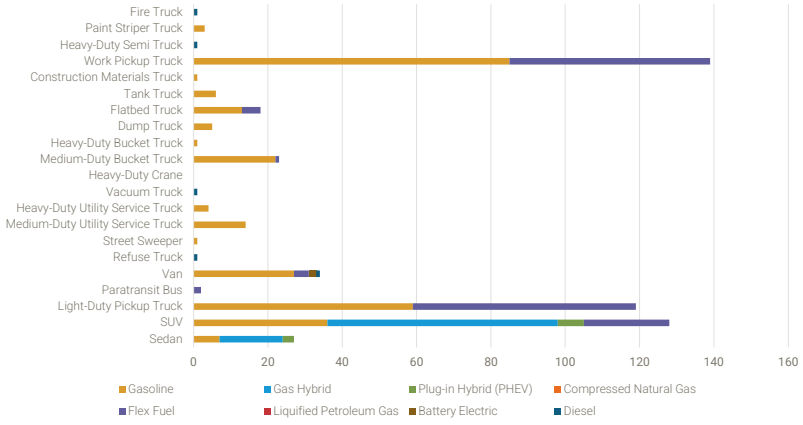
City operates 701 vehicles across 21 different vehicle and 8 fuel / electric types

Existing Fleet Inventory by Vehicle and Fuel Type



Notes:
1. Vehicle count reflects existing inventory as of 04/11/2024
2. Vehicle count and fuel / electric types **do not** include vehicles from the police and fire departments

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Executive Summary

City operates 373 vehicles that are regulated by ACF compliance requirements

701 vehicles

ACF Regulated

373 vehicles

Vehicle Type	Vehicle Count
Van	34
Refuse Truck	40
Street Sweeper	17
MD Utility Service	14
MD Bucket Truck	23
HD Utility Service	15
Dump Truck	21
Flatbed Truck	19
Work Pickup Truck	155
Semi Truck	1
HD Bucket Truck	8
TOTAL	347

Vehicle Type	Vehicle Count
Vacuum Truck*	9
Tank Truck*	7
Construction Truck*	7
Paint Striper*	3
TOTAL	26

ACF Exempt

328 vehicles

Vehicle Type	Vehicle Count	Exemption
Sedan	33	Vehicles under 8,500 GVWR are exempt from ACF
SUV	128	Advanced Clean Cars; only ZEV options will be available for purchase starting 2035
LD Pickup Truck	119	
Paratransit Bus	34	Subject to ICT requirements for ZEV procurement, not ACF.
HD Crane*	13	Heavy cranes as defined in title 13, CCR, section 2021 (b)(16).
Fire Truck*	1	Emergency Vehicles are exempt from ACF
TOTAL	328	

Notes:
1. Vehicle types marked with * do not have currently available ZEV alternatives. For ACF-regulated vehicles, an Unavailability Exemption should be submitted.

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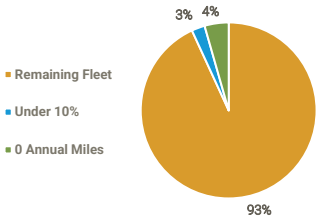
Identified a total of 48 underutilized vehicles, City should conduct further investigation to optimize vehicle utilization and consider pursuit of the ACF Backup Vehicle Exemption

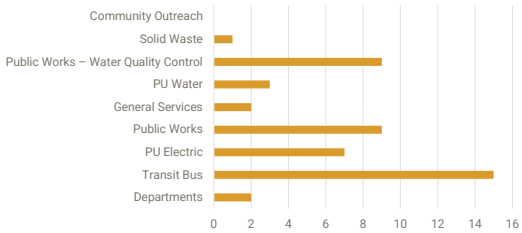
Underutilization Summary



Underutilized Vehicle Count by Vehicle Age

Vehicle Age	0 Annual Miles	Under 10% Utilized
0 to 10 years	7	7
11 to 19 years	10	19
20 or more years	0	5
TOTAL	17	31

Underutilized Vehicle Count by Department



- ✓ Work with departments to review, investigate, and better understand reasons for a vehicle being inactive or underutilized
- ✓ Confirm inactive and underutilized vehicles to prepare for permanent retirement, replacement, or identify as backup vehicle
- ✓ Engage drivers to capture detailed vehicle use information that might otherwise be unavailable in routine data collection
- ✓ Develop strategy to maintain an optimized fleet size and composition to meet operational needs

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Executive Summary

Identified that one-third of City vehicle types have low ZEV alternative suitability and require the City to pursue the ACF Unavailability Exemption

		Range	Payload	GVWR	Configuration	Availability	Suitability
HIGH	Sedan						1.00
	SUV						1.00
	Pickup Truck						1.00
	Paratransit Bus						1.00
	Van						1.00
	Heavy Duty Semi Truck						1.00
	Refuse Truck						1.20
MEDIUM	Work Pickup Truck						1.40
	Street Sweeper						1.40
	Dump Truck						1.60
	Heavy Duty Utility Truck						1.60
	Flatbed Truck						1.80
	Medium Duty Utility Truck						1.80
	Heavy Duty Bucket Truck						1.80
	Medium Duty Bucket Truck						2.00
LOW	Vacuum Truck						3.00
	Tanker Truck						3.00
	Construction Materials Truck						3.00
	Paint Striper Truck						3.00
	Heavy Duty Crane						3.00
	Fire Truck						3.00

Suitability Scoring

Color	Score	Definition
	1	High
	2	Medium
	3	Low

Metric	Definition
Range	Capability of ZEV alternative to meet operational requirements (e.g., duty cycle, or vehicle miles traveled.)
Payload	Carry capacity suitability ZEV alternative to meet operational requirements of current fleet vehicles.
GVWR	Gross Vehicle Weight Rating. Suitability of ZEV alternative to meet required GVWR of the current GVWR of fleet vehicles.
Configuration	Suitability of ZEV alternative to meet the required height, weight, width, length, and vocational body of current fleet vehicles.
Availability	Market availability of ZEV alternatives.

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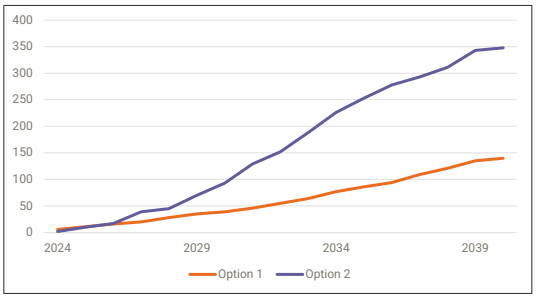
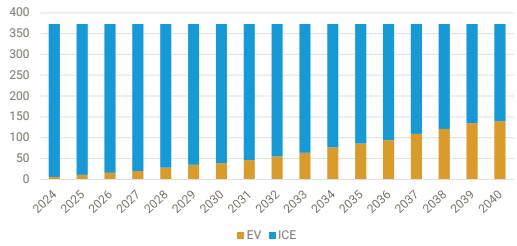
We recommend the City implement ACF Option 1 due to Option 2 requiring more than double ZEV purchases by 2040

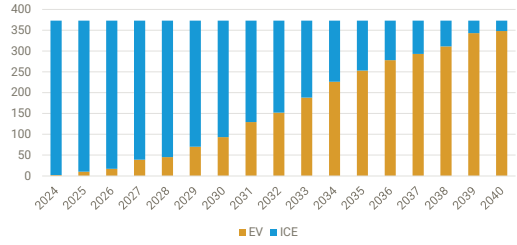
ZEV Purchase Analysis (Option 1 & 2 Scenarios)



ACF Fleet Composition – Option 1



ACF Fleet Composition - Option 2



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From 2024 to 2026, we recommend the below vehicle replacement schedule under ACF option 1, due to those vehicles having the most suitable ZEV alternatives and lowest purchase price

2024 Replacements

	Vehicle ID	Vehicle Type
EV	H267	Van
EV	H320	Van
EV	E342	MD Bucket Truck
EV	E347	MD Bucket Truck
EV	E335	Flatbed Truck
EV	C1069	Work Pickup Truck
ICE	J175	Refuse Truck
ICE	J183	Refuse Truck
ICE	I064	Street Sweeper
ICE	E327	Vacuum Truck
ICE	E340	HD Bucket Truck
ICE	E341	HD Bucket Truck

2025 Replacements

Vehicle ID	Vehicle Type
C1059	Work Pickup Truck
C1098	Work Pickup Truck
E356	MD Bucket Truck
E357	MD Bucket Truck
E368	MD Bucket Truck
J172	Refuse Truck
J176	Refuse Truck
E354	MD Bucket Truck
E355	MD Bucket Truck

2026 Replacements

Vehicle ID	Vehicle Type
H271	Van
E362	MD Bucket Truck
E376	MD Bucket Truck
E383	MD Bucket Truck
E369	MD Bucket Truck
E412	Construction Materials Truck
E363	Construction Materials Truck
J165	Refuse Truck
E361	Vacuum Truck
E372	Vacuum Truck

	2024	2025	2026
Replaced with EV	6	5	5
Replaced with ICE	6	4	5
Total Replacements	**12**	**9**	**10**

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Executive Summary

When comparing vehicle purchase and lifecycle costs scenarios, ACF Option 1 is also the most cost-effective scenario against Option 2 and No ZEV Procurement

Scenario: ACF Option 1

- ACF Purchase Requirement
- ICT transit bus transition plan
- Passenger vehicle transition plan

Total Transition Costs = $88.4M

Scenario: ACF Option 2

- ACF Milestone Schedule
- ICT transit bus transition plan
- Passenger vehicle transition plan

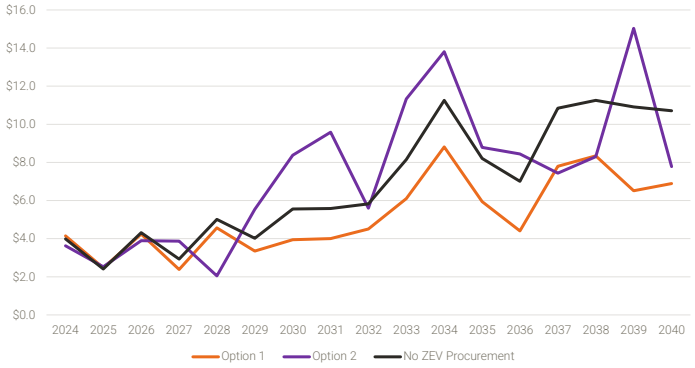
Total Transition Costs = $126.0M

Scenario: No ZEV Procurement

- Based on benchmark vehicle replacements derived for Option 1
- No ZEV purchases, only ICE replacements

Total Transition Costs = $118.0M

Annual Cost Comparison: ACF Option 1 vs ACF Option 2 vs No ZEV Procurement (millions)



Notes:
1. Costs excludes EV charging infrastructure and installation
2. Costs include EV incentives and rebates (*Option 1 - Total Rebates*: $3.2M, *Option 2 - Total Rebates*: $7.0M)

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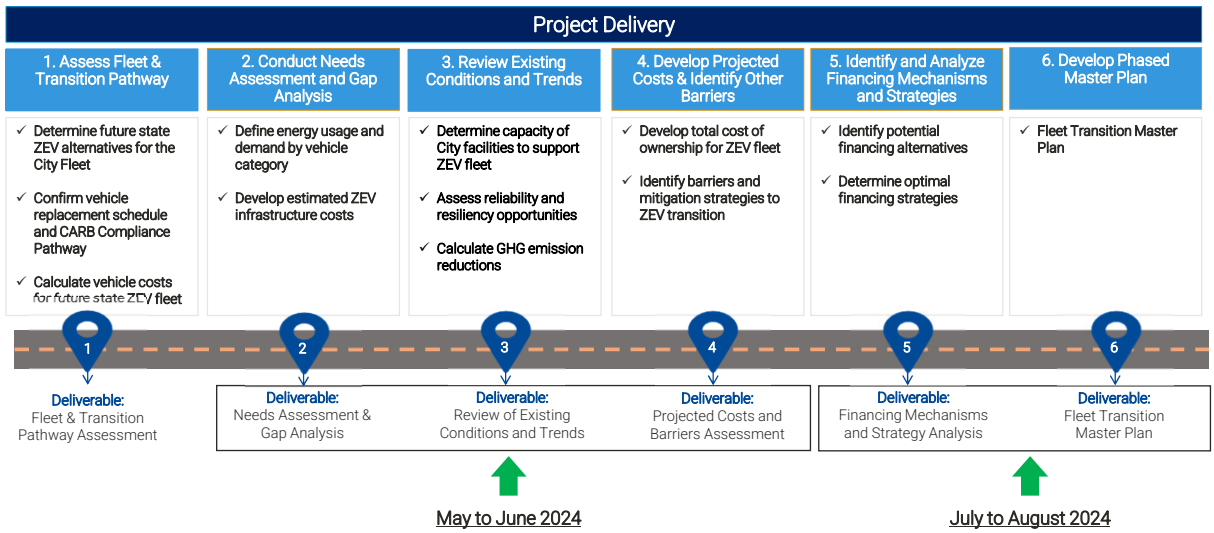
Executive Summary

Ongoing Work and Next Steps



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Performance Disclosure

In conducting our analysis and in forming an opinion of the projection of future operations summarized in this report, B&V has made certain assumptions with respect to conditions, events, and circumstances that may occur in the future. This methodology utilized by B&V in performing the analysis follows generally accepted practices for such projections. Such assumptions and methodologies are summarized in this report and are reasonable and appropriate for the purpose for which they are used; however, actual results may differ materially from those projected, as influenced by the conditions, events, and circumstances that actually occur. Such factors may include, but are not limited to, the ability to execute the capital improvement program as scheduled and within budget, regional climate and weather conditions affecting demand and supply, and adverse legislative and regulatory actions, or legal decisions (including but not limited to environmental law and regulations) affecting the ability of B&V's client to operate its system. Readers of this report are advised that any projected or forecasted financial, operating, performance, or strategy merely reflects the reasonable judgment of B&V at the time of the preparation of such information and is based on a number of factors and circumstances beyond B&V's control. Accordingly, no assurances are made that the projections or forecasts will be consistent with actual results or performances. Use of this report will constitute agreement by the user that (i) there is no warranty, express or implied, in this report, (ii) the user accepts the sole risk of any such use, and (iii) the user waives any claim for damages of any kind against B&V.

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