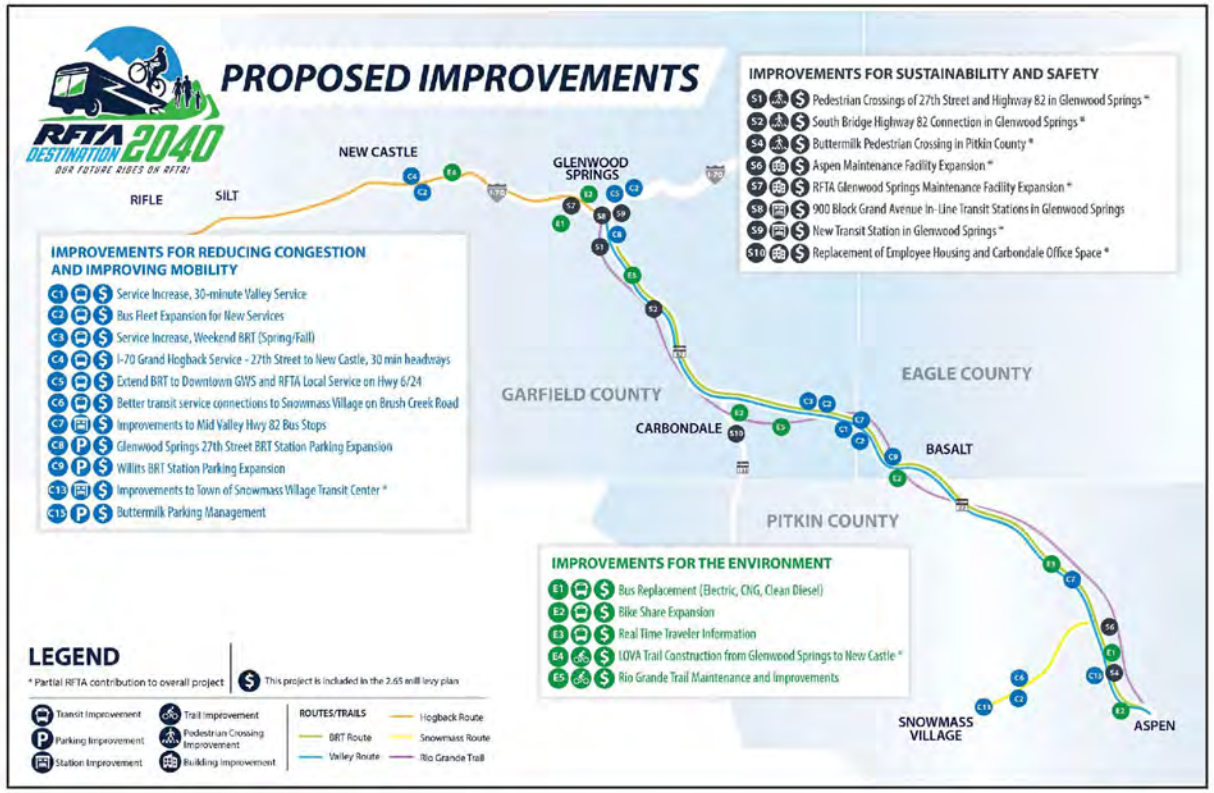
RFTA Policy Alignment: Bringing it All Together



OUTCOME AREAS

The RFTA Board of Directors and Staff have agreed upon the following seven Outcome Areas: **Safe Customers, Workforce and General Public; Accessibility and Mobility; Sustainable Workforce; Financial Sustainability; Satisfied Customers; Environmental Sustainability; and High Performing Organization.** Each RFTA director/manager continuously assesses these themes and ties their departmental goals back to these guiding principles.

RFTA Climate Action Goals

1. Reduce scope 1 and 2 GHG emissions by 50% by 2030 and 90% by 2050.
2. Reduce transportation-related emissions throughout the region by increasing emissions offset compared to emissions produced in 2019 to 3x by 2030 and 5x by 2050.

Stantec

ROARING FORK TRANSPORTATION AUTHORITY

Zero Emission Vehicle (ZEV) Transition Plan

JULY 11, 2024
RFTA Board of Directors Meeting, Final Adoption

Stantec

ROARING FORK TRANSPORTATION AUTHORITY

Zero Emission Vehicle (ZEV) Fleet Transition Plan

JULY 11, 2024

Presentation Overview

1. Project Overview & Approach
2. ZE Modeling and Findings
3. Evaluation Criteria and Screening
4. Recommended ZEV Fleet Alternative
5. Discussion

PROJECT OVERVIEW & APPROACH

Project Overview

DEFINE

Technology Mix and Year-to-Year Composition

Revenue bus fleet, including Paratransit and light-duty, support/admin fleet

DETERMINE

ZEV Infrastructure Upgrade and Timeline

GMF, AMF and potential on-route charging locations

ASSESS

Operational Changes and Cost of Ownership

Buses, existing and proposed ZEV support infrastructure

Project Approach

April-June 2023

Project Management and Project Initiation (Task 1) → Evaluation Criteria for ZEB Transition Alternatives (Task 2) → Service Assessment (Task 3) → Modeling and Route Simulations (Task 4) → Fleet and Facilities Replacement and Expansion Plans (Task 5) → Total Cost and Resources of Ownership Assessment (Task 6) → Evaluation of Alternatives/ Prioritization and Selection (Task 7) → Final Plan (Task 8)

July 2024

ZEV MODELING AND FINDINGS

Current Revenue and Non-Revenue Fleets

19	2	5	75	16	FUEL TYPES
Cutaways (Ford)	29-30-ft buses (Optima, Gillig)	35-ft. buses (Gillig)	40-ft buses (New Flyer, Gillig, 8 New Flyer XE40 BEBs).	45-ft. motor coaches (MCI).	Diesel, CNG, Electric, Gasoline

Non-revenue, admin/support vehicles are also considered as part of ZEV transition analysis

ACTIVE REVENUE VEHICLES

117

AVERAGE AGE FOR REVENUE VEHICLE

8 yrs.

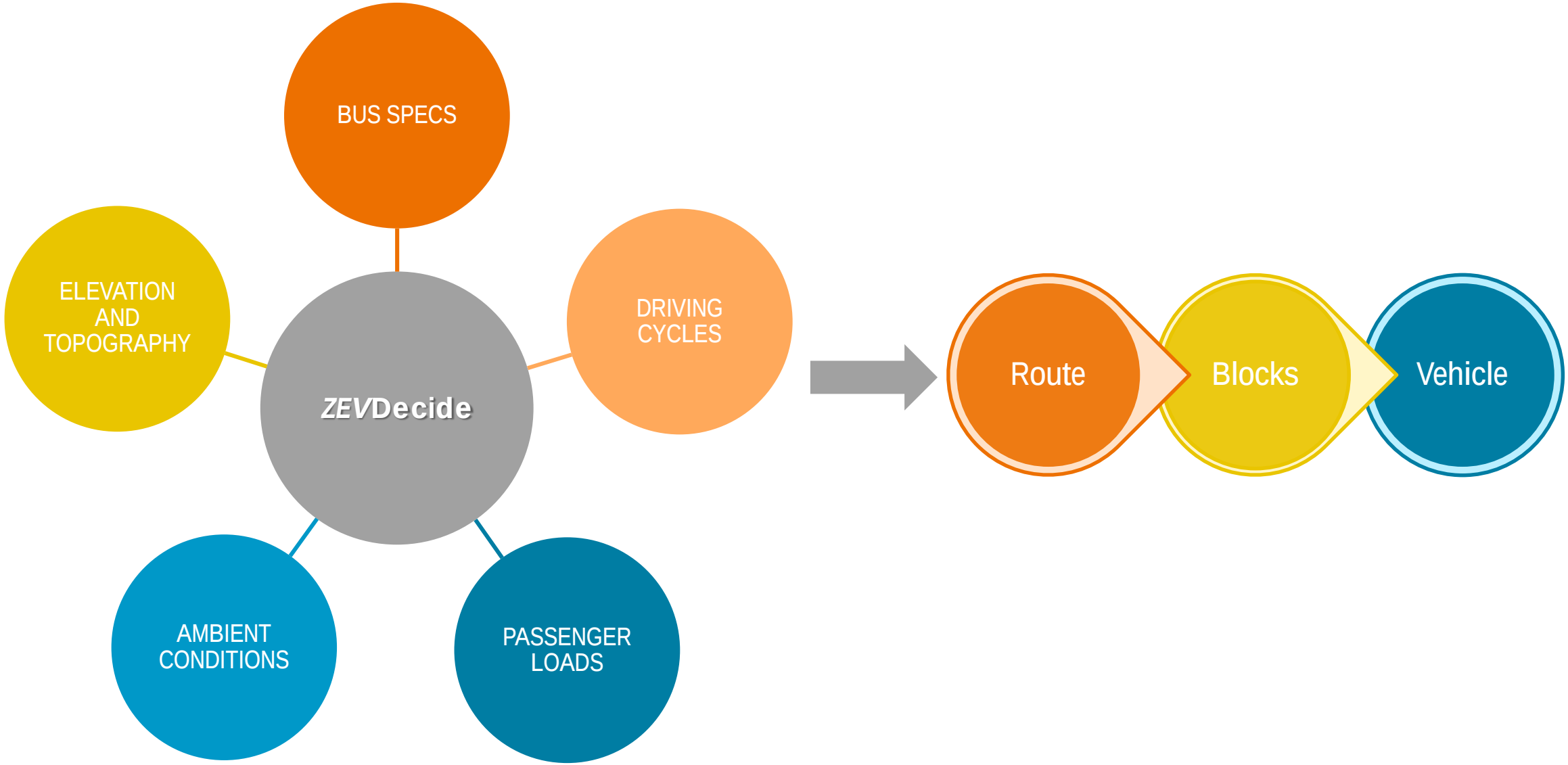
ACTIVE NON-REVENUE VEHICLES

30

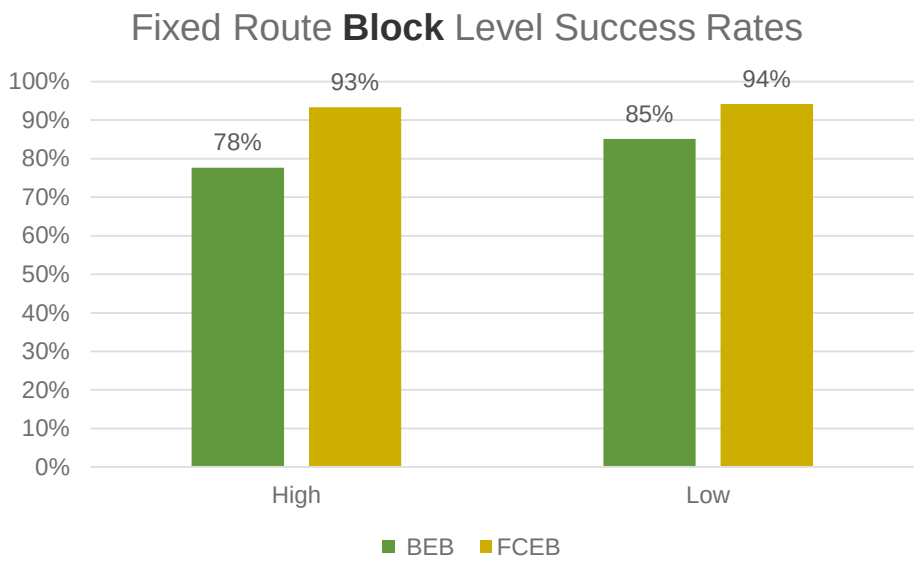
Existing Conditions Key Findings

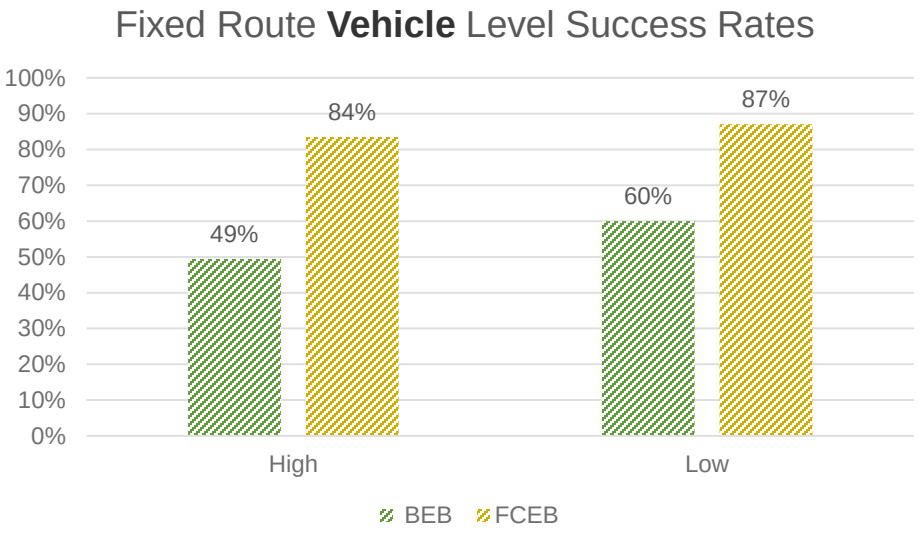
- RFTA maintains and operates a **mix of fixed-route and Paratransit/ADA demand-response services** with contract fleet partners.
- Fixed route blocks run between **16 and 496 miles** per day.
- Paratransit/ADA demand-response cutaways run an average of **71 miles** a day.
- **Limited capacity** for growth at the current **AMF.**
- **The GMF/RTC** is currently undergoing multi-phase construction upgrades as a **100% ZEV Support Facility**.

Modeling Process Overview



Modeling Summary





- FCEBs have quicker fueling and longer range than BEBs, therefore more successful overall performance outcomes when compared.
- Fleet and/or blocking changes are required with either technology in order to successfully transition to ZEBs and strive for a 1:1 operating environment.

Analysis Cases

01 Timeline

Accelerated Transition by (2040)

- ✓ higher cumulative GHG reduction
- ✓ higher cumulative costs

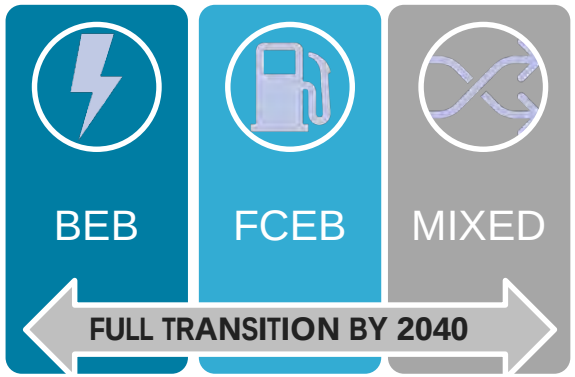
Transition by (2050)

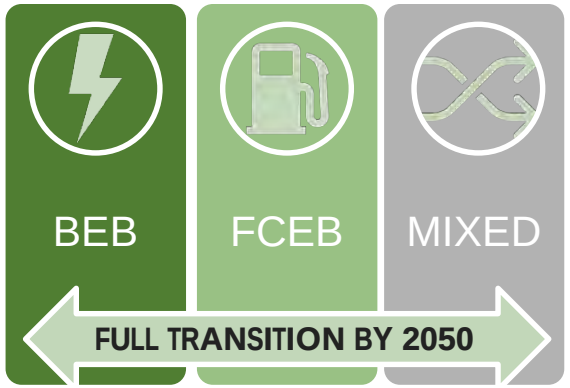
- ✓ lower cumulative GHG reduction
- ✓ lower cumulative costs

02 Technology Type

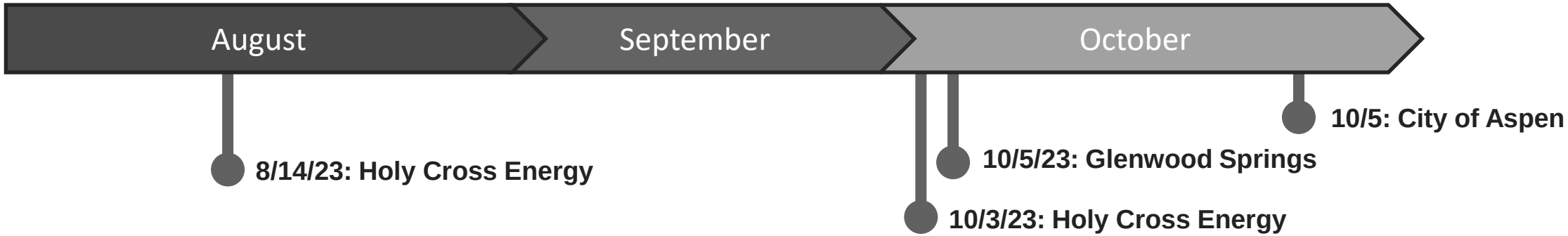
1. **BEB Only**
2. **FCEB Only**
3. **Mixed**
   - ✓ maximizes the operational strengths of various technology types and alignment with RFTA operations

03 Six Analysis Cases





Utility Coordination Meetings



Common Meeting Topics

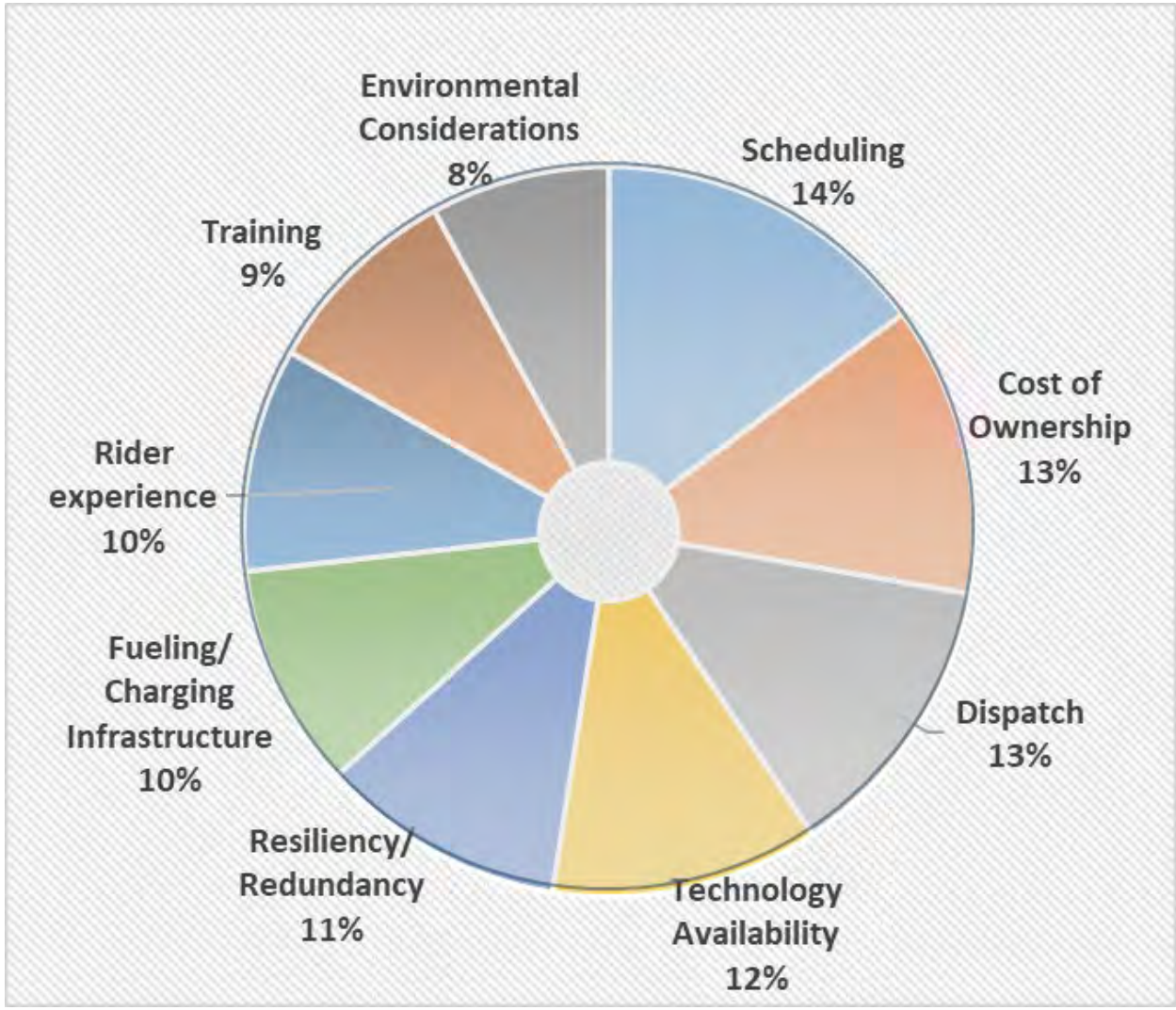
- Discussion of Electric Rate Structures and options
- Utility upgrades, RFTA upgrades, Supply-Side Incentives
- Funding Strategies (On-bill financing, Federal & State grant funding)
- ZEV Strategies (on-route charging, smart charging strategies)
- Exploring Hydrogen Fuel options and “Green” Hydrogen

EVALUATION CRITERIA AND SCREENING

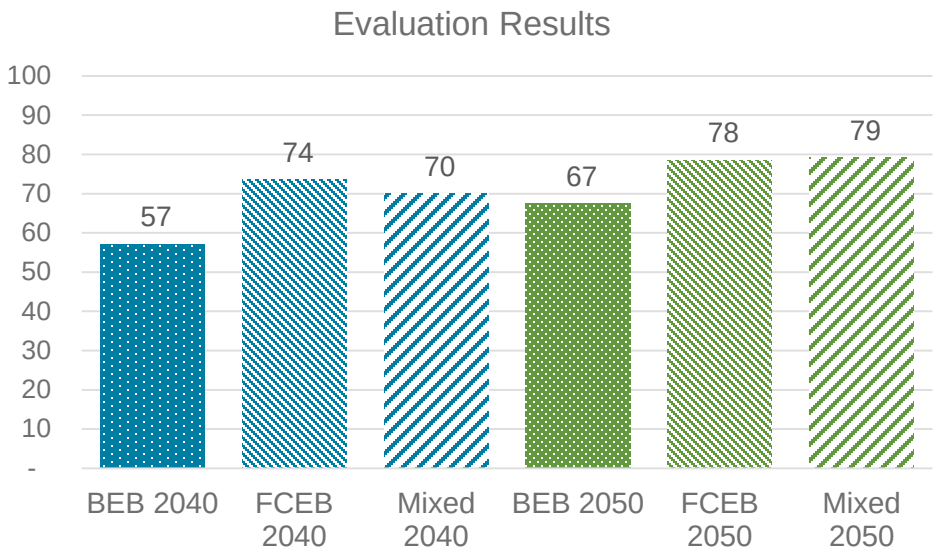
Evaluation-Decision Criteria

- RFTA staff selected and weighted **Seven Base and Two Secondary Criteria** (June 2023) via:
  - Internal staff survey
  - In-person staff workshop

- Stantec evaluated with RFTA staff **Forty-Nine Sub-Criteria** :
  - Final evaluation-decision workshop in February 2024



Evaluation-Decision Results



Preferred Fleet: **2050 Mixed Case**

- Mixed Case received highest score when considering all nine evaluation criteria
- Benefits from diversification increased the Mixed Case relative scoring
- FCEB Case scoring weighed down by limited OEM availability and risks associated with hydrogen availability and distribution

Mixed 2050 Case (79)

Has the highest score

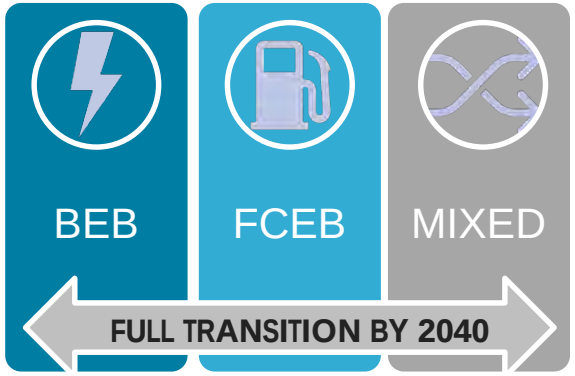
FCEB 2050 Case (78)

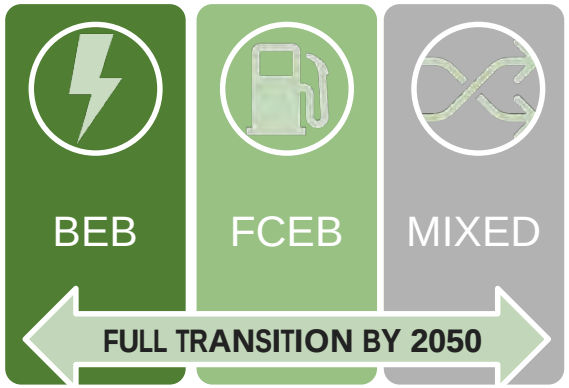
FCEB 2040 Case (74)

Mixed 2040 Case (70)

Have a close score to the preferred scenario

Cost of Ownership Analysis





STEPS

1) Collected relevant financial data on current operations

2) Determined financial model inputs in collaboration with RFTA staff

3) Projected annual costs 2023-2050

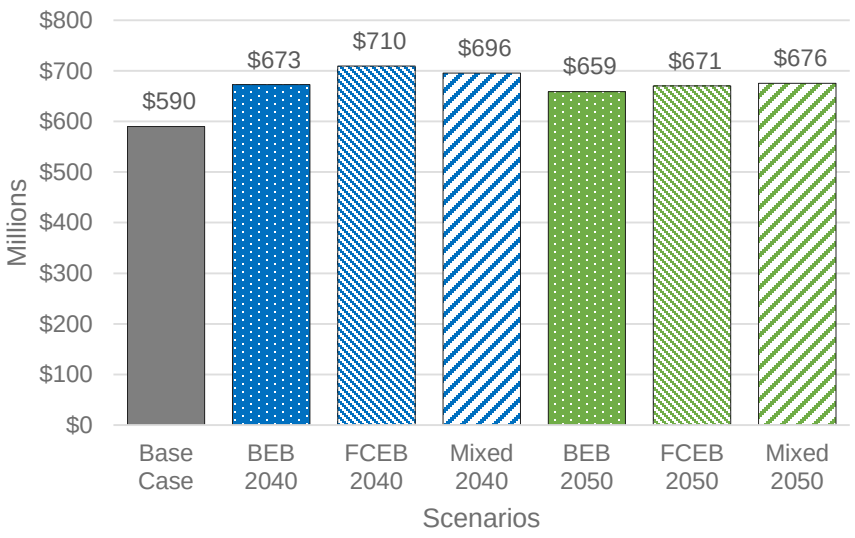
4) Compared cumulative costs between the six analyzed cases

LIMITATIONS

1) The cost categories modeled are focused on the impacts of a change in propulsion type

2) This analysis is meant to be a comparison between the different scenarios and not a detailed capital and operational forecast for RFTA

Cost of Ownership Summary Results

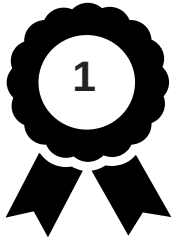


Analysis Period:
Costs are cumulative for the period 2023-2050

Base Case:
Follows the Destination 2040 Plan
with programmed 29% BEBs by 2032

2040 ZEB Cases have higher costs due to:

- Earlier procurement of vehicles
- More ZEB vehicles are procured during the analysis period
- Charging infrastructure replacement occurs



BEB 2050 Case ($659 million)

Estimated to be 12% higher than the base case.

FCEB 2050 Case ($671 million)

BEB 2040 Case ($673 million)

Case.

Mixed 2050 Case ($676 million)

Estimated to be 14%-15% higher than the base case

RECOMMENDED ALTERNATIVE

Mixed Case 2050 SWOC

Internal Origin

Helpful

Harmful

External Origin

STRENGTHS

- ✓ Utilizes current investments of the already planned BEB fleet and charging equipment
- ✓ Leans on FCEB technology to cover longer ranges which reduce operational changes
- ✓ Provides the highest operational flexibility to RFTA

WEAKNESSES

- ✓ Complexity of operating and maintaining two ZEB technologies
- ✓ Maintenance and fueling for FCEBs exclusively at GMF

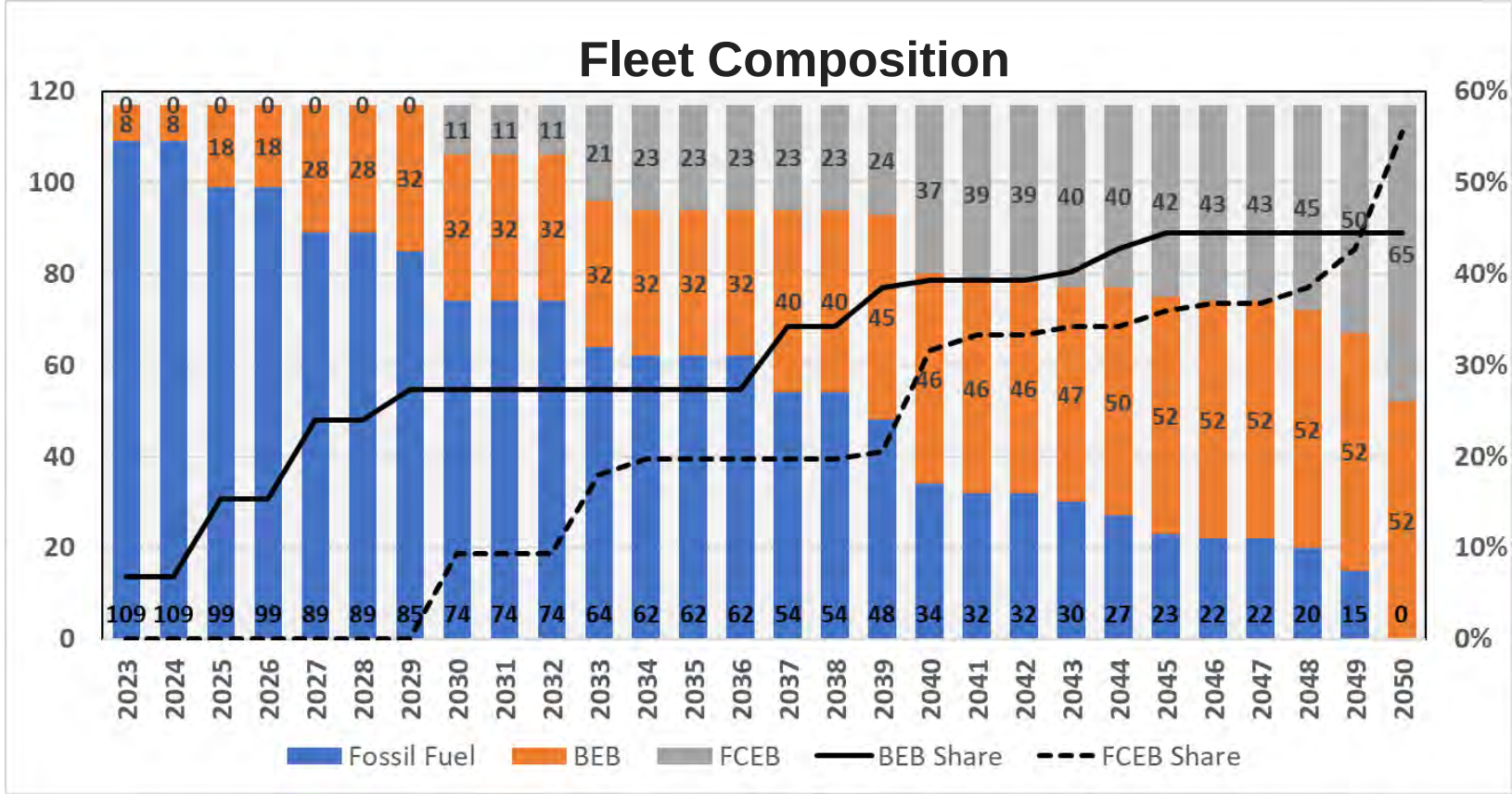
OPPORTUNITIES

- ✓ Diversified energy/fuel sources
- ✓ Allows a smooth pivot if one technology outpaces the other
- ✓ Allows for both technologies to mature until they can satisfy operational needs

COSTS

- ✓ By investing in two ZEB technologies, slightly higher costs are expected and potential for economy of scale is underutilized
- ✓ Hydrogen supply chain can take longer to mature in the region

2050 Mixed ZEV Fleet Composition



2023
109 fossil fuel (FFs) buses and 8 BEBs

2050
0 FFs, 52 BEBs (44%) and 65 FCEBs (55%)

40-ft and 30-35-ft buses
Transition first

45-ft coach buses
Transition later as more options for BEB coaches with on-route charging, and FCEB coaches are expected in the future

Cutaways
Transition last since technology has limited ranges

2050 Mixed ZEV Fleet Estimated Costs

Estimated Cumulative Cost of Ownership (2023-2050)

<u>Estimated Savings for:</u>

- Fleet Maintenance
- Fleet Refurbishments

<u>Estimated Higher Costs for:</u>

- Fleet Acquisition
- Fuel/Electricity
- Infrastructure

<u>Estimated Total Costs:</u>

- 2050 Mixed Case $676 million
- Base Case $590 million
- Difference $86 million

Futureproofing

- The preferred option allows for a smooth pivot if one technology outpaces the other given the rapid evolution of ZEV technologies.

- RFTA has full ownership of the living ZEV transition plan and can modify any detail, phase, subtask, or recommendation as RFTA and the ZEV industry evolve.

- To inform and adapt the pace and implementation of the transition, RFTA's team will need to proactively track market trends for ZEV costs, charging/fueling infrastructure costs and fuel and electricity costs.

- A best practice could be for Staff and/or consultants to update both the CAP and ZEV Plan at regular intervals i.e. every 2 years to recognize progress and revisit goal-setting.

Questions?