CALACT
CALIFORNIA ASSOCIATION FOR COORDINATED TRANSPORTATION

AC TRANSIT

Charge Management Systems

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AC Transit Overview

IN OPERATION SINCE

1960

A stand-alone special district governed by a **publicly-elected board of directors**

We are the 3rd largest:

- Bus-only transit agency in the United States, based out of Oakland in the San Francisco Bay Area
- Public transit agency in the San Francisco Bay Area

Operates a fleet of:

640 BUSES

& **6** FACILITIES

Has a workforce of over

2,200

EMPLOYEES

THE LARGEST public bus-only system in California

Provides transit service for

1.5 million

East Bay residents who populate our

364 SQUARE MILE SERVICE AREA

CONNECTS TO:

16 Other Public and Private Bus Systems

25 Bart Stations

6 Amtrak Stations

5 Ferry Terminals

ZERO EMISSION BUS PROGRAM

Zero Emission Miles:
5 Million

ZEB Workforce Training:
25,414
Hours

CO2 Emissions Eliminated:
12,831
Metric Tons

Industry Leader

- Advancing ZEB technology since 2000
- Implemented one of the nation's most comprehensive ZEB programs
- Started with H2 electric bus technology and expanded to include battery electric buses.

ZERO EMISSION BUS PROGRAM

U.S. Department of Transportation
Federal Transit Administration

STATE OF CALIFORNIA
CALIFORNIA TRANSPORTATION COMMISSION

ZEB Transition Guiding Principles

1. Replace the fleet per Federal Transit Administration (FTA) mandated Transit Asset Management (TAM) Plan Performance Targets
2. Prioritize ZEB deployment per the AC Transit Board adopted Clean Corridors Plan
3. Procure ZEB's based on vehicle and infrastructure technology capabilities to meet service requirements
4. Deploy ZEB technology that is most efficient and sustainable to operate
5. Meet the Federal and State Regulation goals of 2040

ZEB PROGRAM *Challenges & Opportunities*

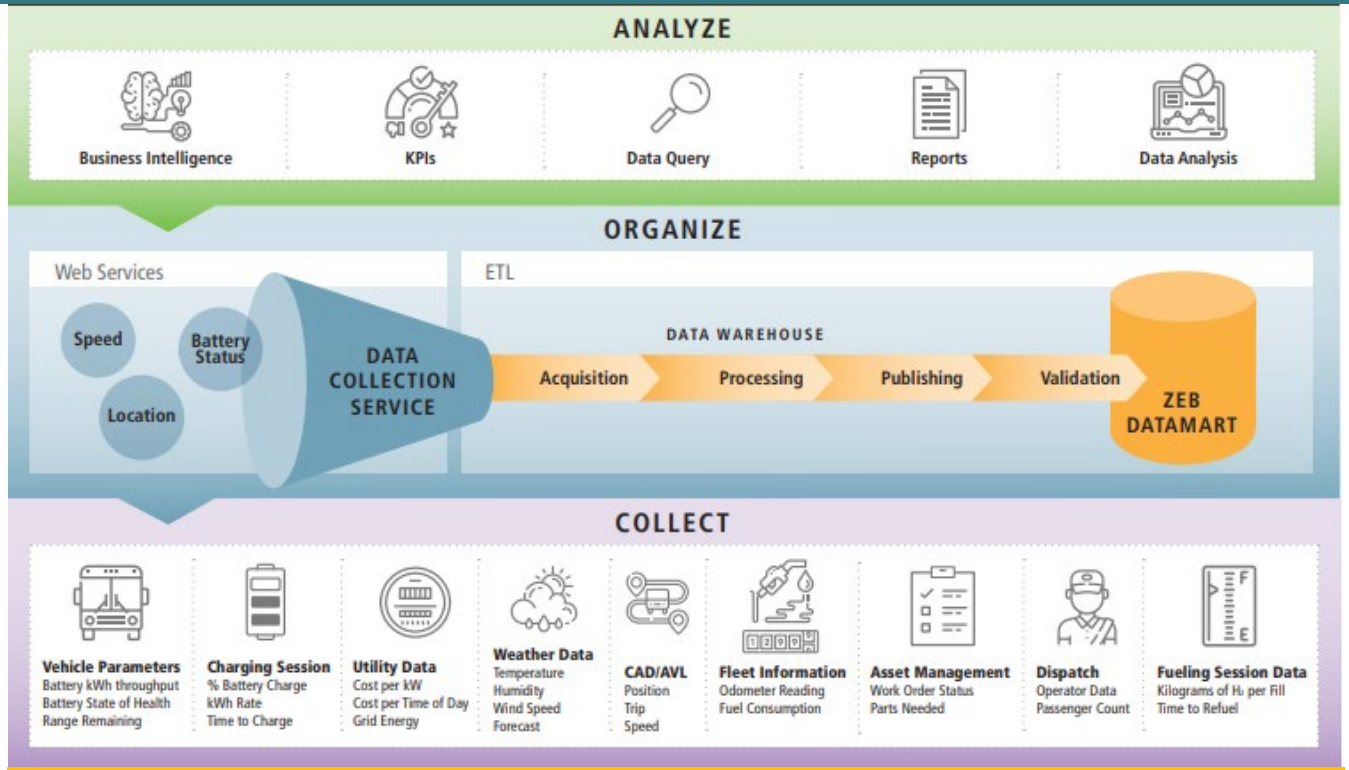
Partnership Coordination

- Local Agencies (Right-of-Way Ownership)
- Utility Companies (Prioritizations & Increased Grid Capacity)

Energy (Fuel) Challenges

- Diesel – Carbon Emissions
- Electricity – Increased fueling window, Managing Battery State-of-Charge
- Hydrogen – High Purchase Price, Limited Fuel Suppliers

ZEB PROGRAM *Data Infrastructure Model*



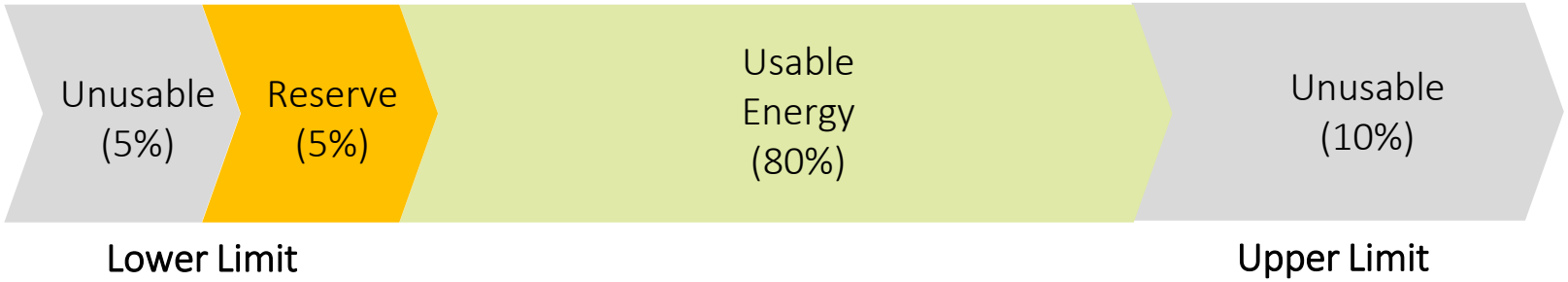
Network
(Connectivity and Cybersecurity)

ZEB PROGRAM *Charge Management System*

Manage State of Charge

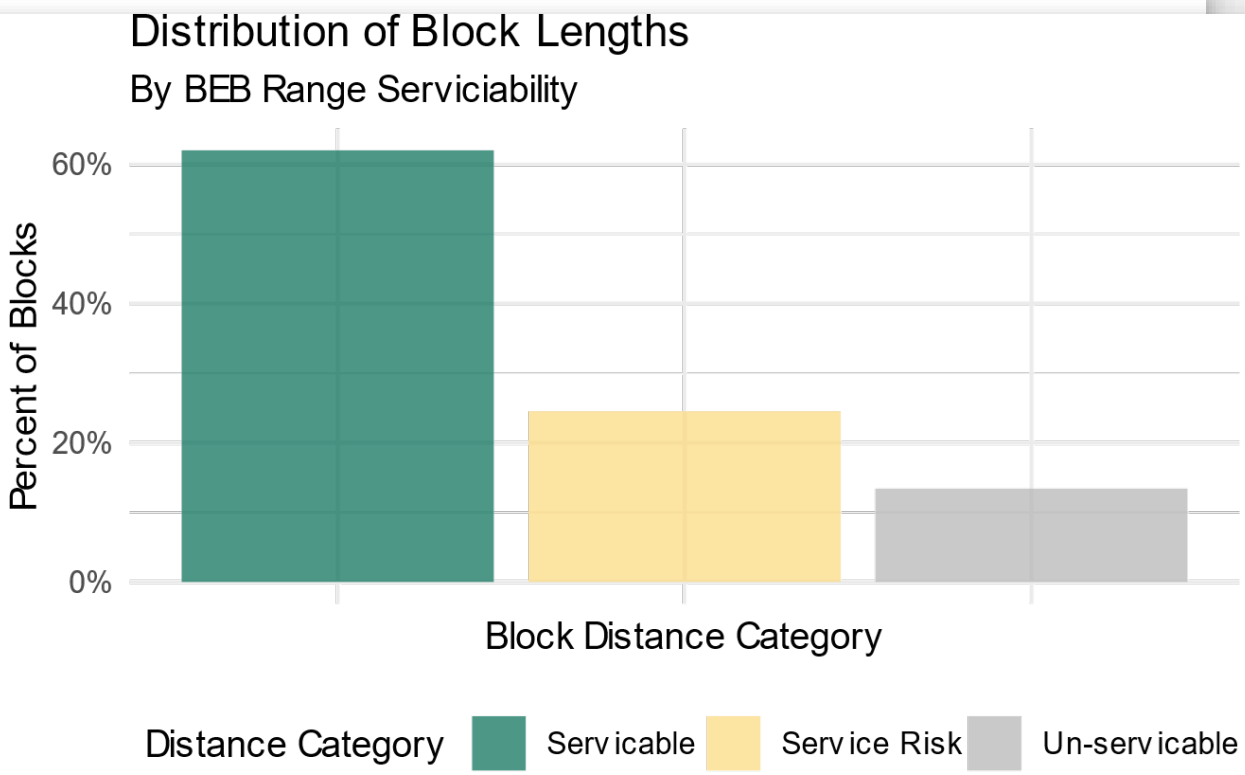
- ✓ Efficient Charging Time
  - Peak, Off-Peak, Super Off Peak Rates
- ✓ Maximize Usable Energy
  - OEM Upper/Lower Limits (10%)

Energy Storage System (100% SOC)

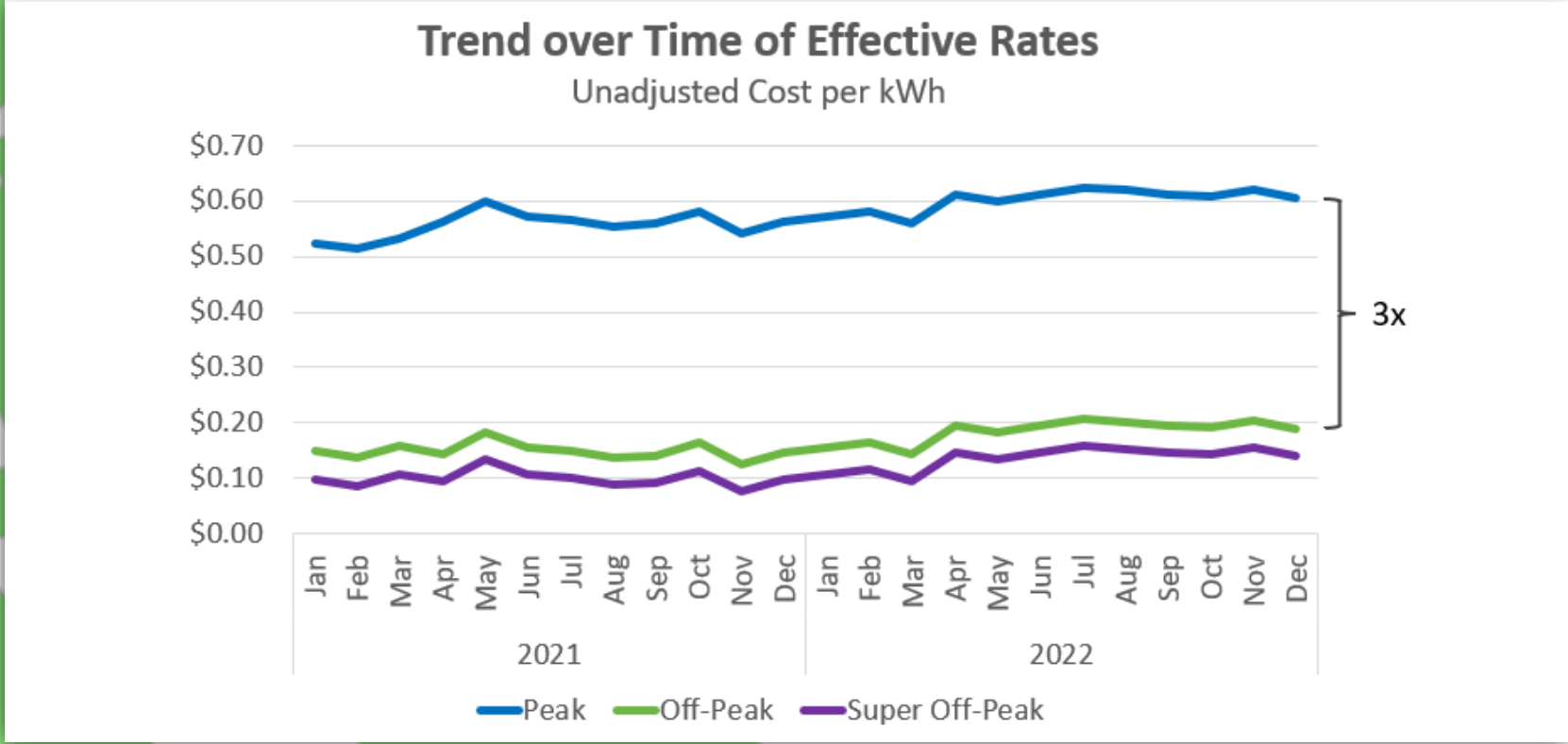


ZEB PROGRAM *Charge Management Systems*

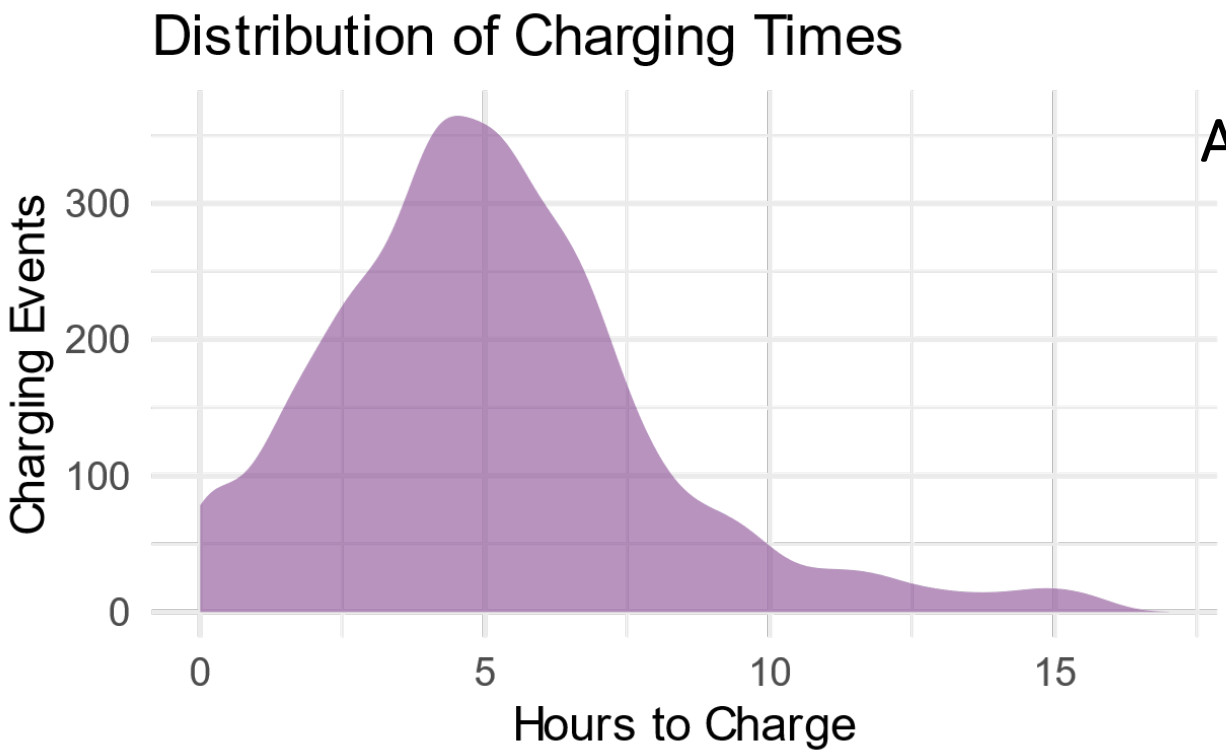
Serviceability on 60% of Block Assignments



ZEB PROGRAM *Charge Management Systems*



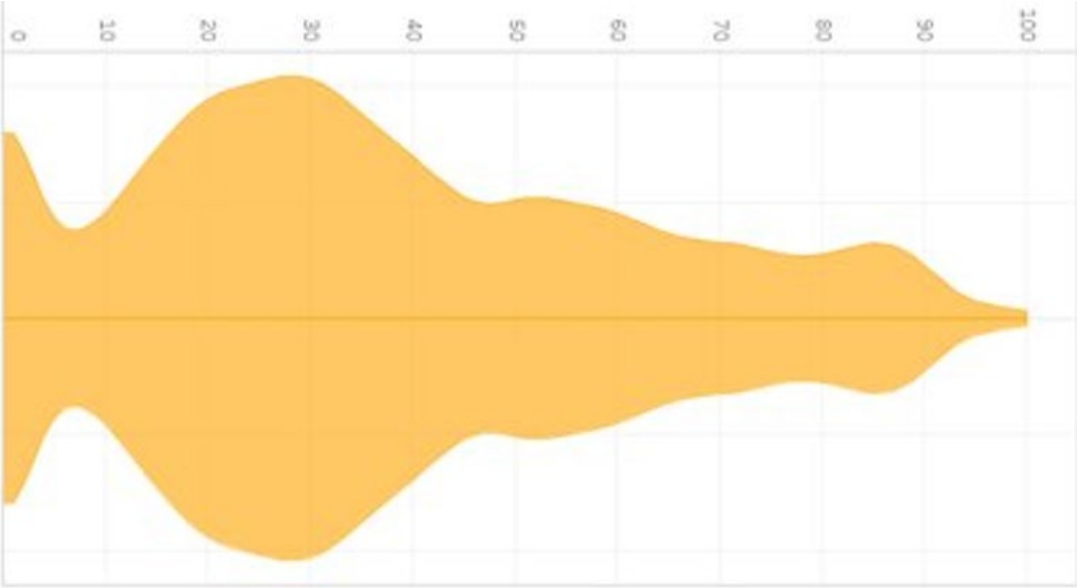
ZEB PROGRAM *Charge Management Systems*



Avg 3 to 7 Hours to Charge

ZEB PROGRAM *Charge Management Systems*

SOC Start of Charging:
Range 20% to 35%



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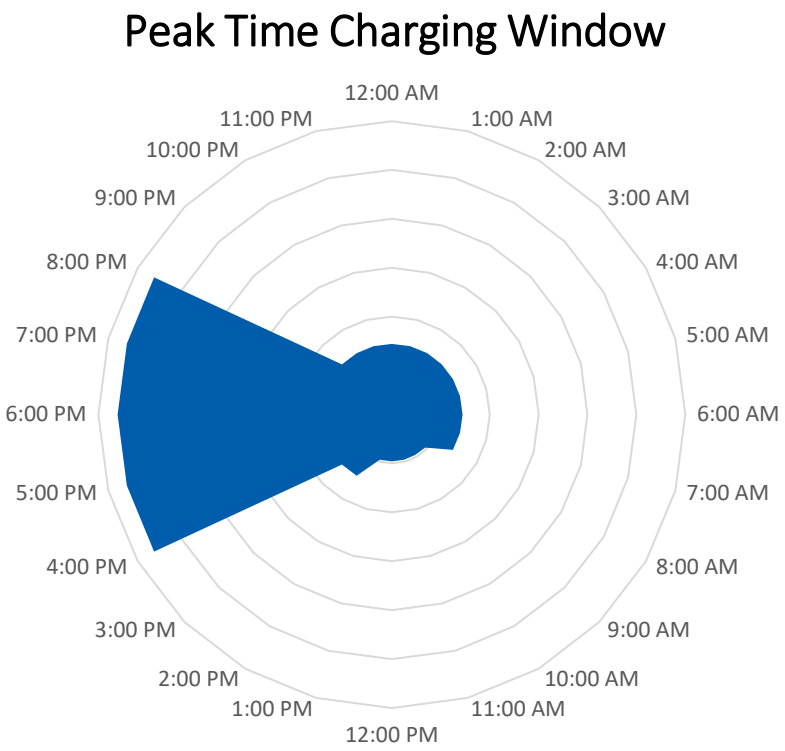

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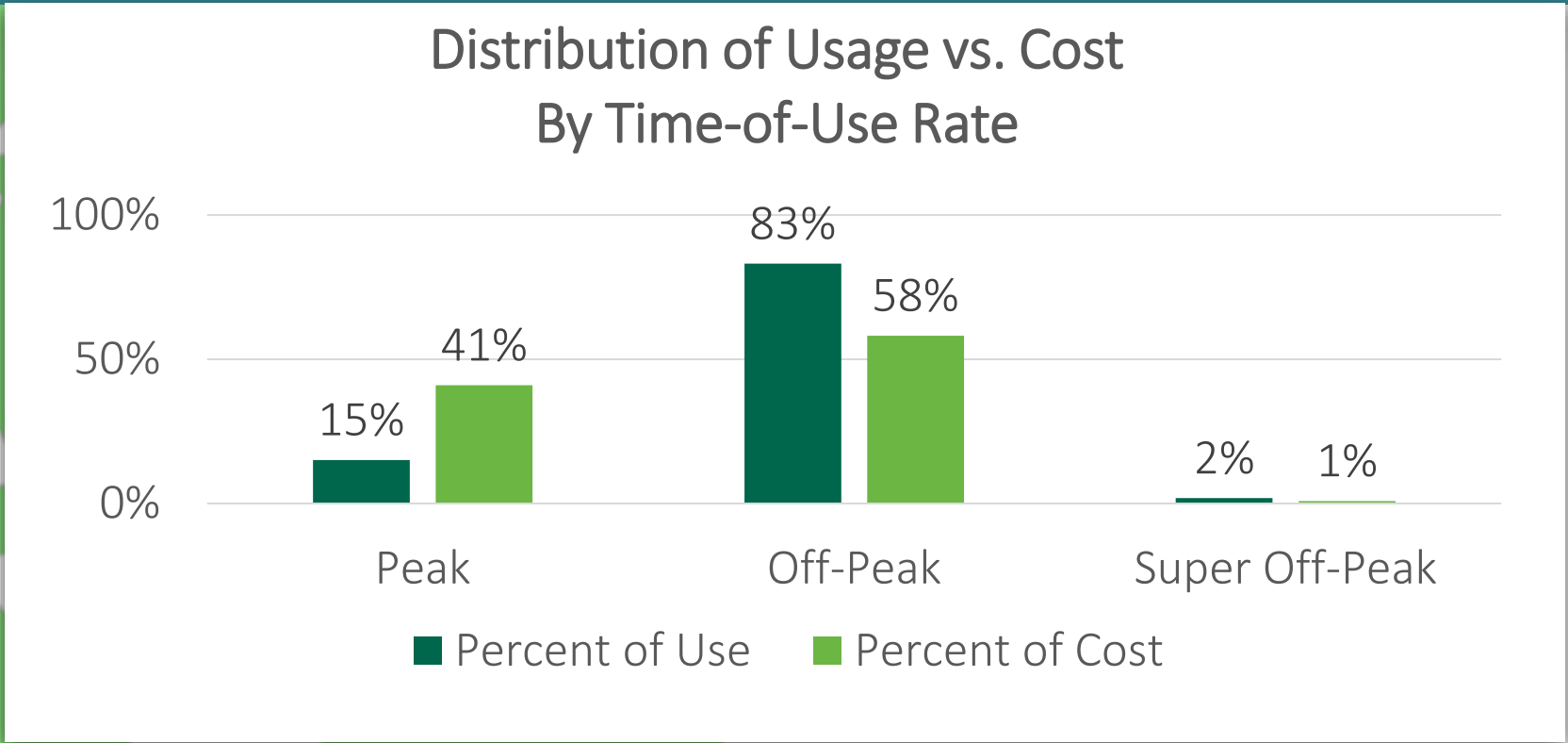
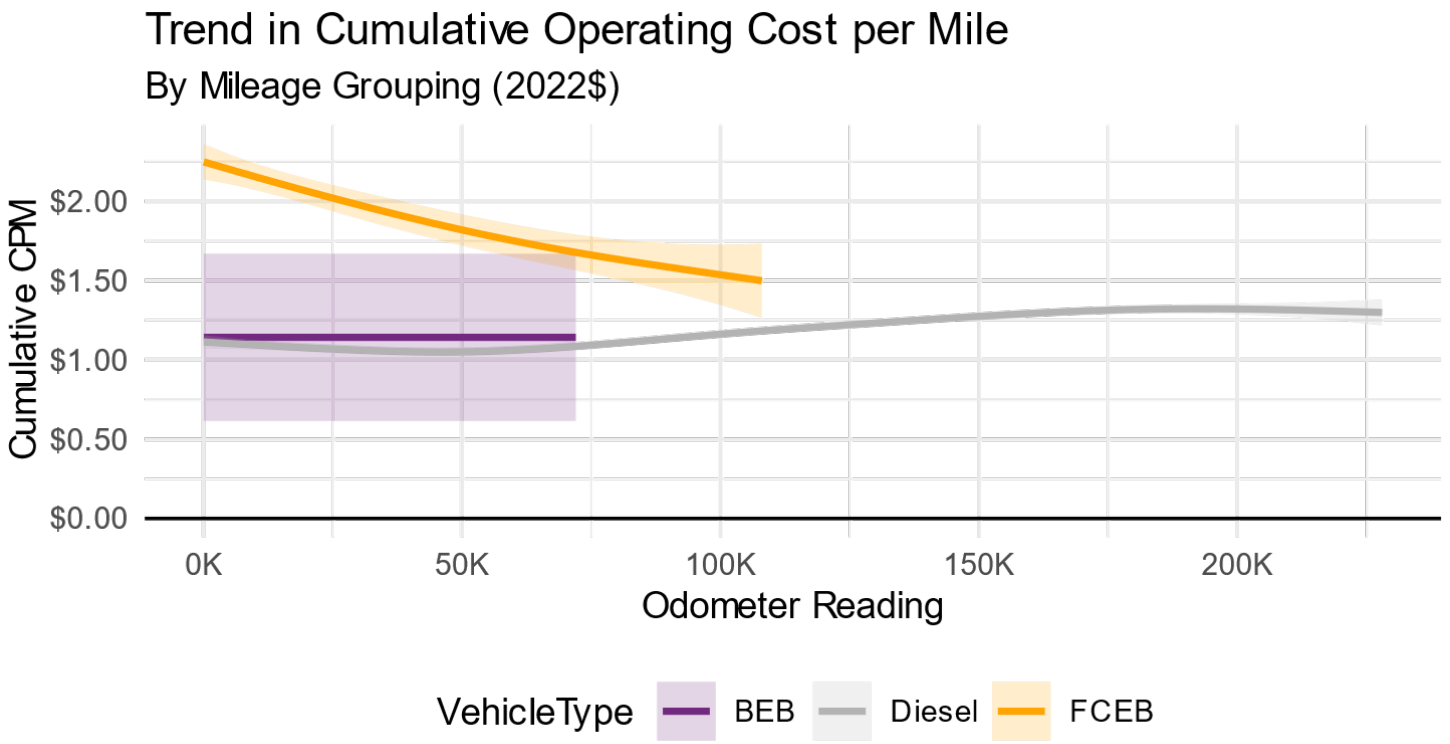


ZEB PROGRAM *Operating Cost/Mile*



ZEB 5X5 STUDY

ZERO EMISSION TRANSIT BUS TECHNOLOGY ANALYSIS

World's first comparison of Battery & Fuel Cell Buses

5 different bus types: Diesel, Hybrid, Battery Electric, Fuel Cell Electric, Legacy FC

Same routes, operating bus division, pool of Bus Operator

Same key performance indicators

BATTERY ELECTRIC BUS

FUEL CELL ELECTRIC BUS

Thank You!

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