PORT OF SAN DIEGO

FINAL HEAVY-DUTY ZERO EMISSION TRUCK TRANSITION PLAN

Version 1.0

PORT of SAN DIEGO
Waterfront of Opportunity

Final
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TABLE OF CONTENTS

APPENDICES

TABLES

FIGURES

ACRONYMS

Acronym	Description
AB 617	Assembly Bill 617
AC	Alternating Current
ACF	Advanced Clean Fleets
ALPR	Automated License Plate Reader
BET	Battery-Electric Truck
CaaS	Charging As A Service
CARB	California Air Resources Board
CCS	Combined Charging System
CEQA	California Environmental Quality Act
CERP	Community Emission Reduction Plan
CNG	Compressed Natural Gas
CO	Carbon Monoxide
CO_2e	Carbon Dioxide Equivalent
CSC	Community Steering Committee
DC	Direct Current
dHET	Diesel-hybrid
EMFAC	CARB Emission Factor Model
FCEB	Fuel Cell Electric Bus
FCET	Fuel Cell Electric Truck
g/mile	Grams Per Mile
GH2	Gaseous Hydrogen
GHG	Greenhouse Gas
GREET	Greenhouse Gases, Regulated Emissions, and Energy Use in Technologies
HVAC	Heating, ventilation, and air conditioning
HVIP	Hybrid and Zero emission Truck and Bus Voucher Incentive Program
ICET	Internal Combustion Engine Truck
kg	Kilogram
kW	kilowatt
kWh	Kilowatt-Hour
LCFS	Low Carbon Fuel Standard
LH2	Liquid Hydrogen
MCAS	Maritime Clean Air Strategy

Acronym	Description
NCMT	National City Marine Terminal
NEVI	National Electric Vehicle Infrastructure
NO_X	Nitrogen Oxides
NZE	Near-Zero Emission
NZET	Near Zero emission Truck
OEM	Original Equipment Manufacturer
PM	Particulate Matter
RFI	Request for Information
RNG	Renewable Natural Gas
SANDAG	San Diego Association of Governments
SDCP	San Diego Community Power
SDG&E	San Diego Gas & Electric
SMR	Steam-Methane Reforming
SoC	State-of-Charge
TAMT	Tenth Avenue Marine Terminal
TCO	Total Cost of Ownership
TMD	Truck Movement Database
US	United States
ZE	Zero Emissions
ZET	Zero emission Truck
ZEV	Zero emission Vehicle

ES EXECUTIVE SUMMARY

ES.1 INTRODUCTION

In alignment with its vision of "Health Equity for All," the Board of Port Commissioners (Board) adopted the Port of San Diego's (Port) Maritime Clean Air Strategy (MCAS) on October 12, 2021. The MCAS established an aspirational goal to have no internal combustion engine trucks (ICETs) serving the Port's marine terminals by 2030. While the MCAS is not a regulation or a binding strategy document, to meet this goal, the Port aims to progressively increase the number of trips served by zero emission trucks (ZETs)—battery-electric or fuel cell electric—by 2030. The first milestone is in 2026, when the Port aspires to have 40% of all truck trips serving its marine terminals be conducted by ZETs, and the final milestone is in 2030, when the Port aims to have 100% of truck trips served by ZETs. To establish the framework for meeting these goals, the Port has partnered with WSP to develop the Heavy-Duty Zero Emission Truck Transition Plan (this report; referred to herein as the "Plan") to identify a viable pathway to meet the Port's goals and to develop the framework for subsequent stages of planning, design, and implementation.

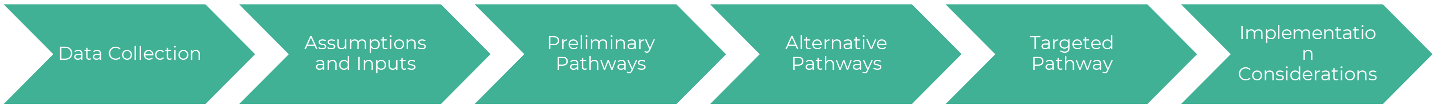
The Plan is intended to be a guiding document for the Port; however, the analysis and findings documented herein are derived from a limited period of data collection and are reflective of present-day operations. Given the constantly evolving landscape of freight movement operation, and zero emissions (ZE) technologies and policy, it is expected that the Plan will be updated over time to reflect new information that may yield different outcomes and results. As a result, the Port and its stakeholders should remain flexible to evolving technologies, emerging business models, and new strategies to progress the MCAS Truck goals.

ES.2 METHODOLOGY

Currently, the majority of Port-serving trips are provided by ICETs. Typically, ICETs have ranges in excess of 500 miles, are stored at privately owned lots, and can be fueled in a relatively short period of time at one of many diesel fueling stations. These operations will drastically change with the transition to ZETs. For example, battery-electric trucks (BETs) require several hours to charge, and their range capabilities are significantly less than those of ICETs. On the other hand, fuel cell electric trucks (FCETs) are not currently available on the market and the fueling network is sparse.

To determine the most feasible (or "Targeted") pathway to accomplish the Port's short-term (2026) and long-term (2030) goals, it is essential to model the existing fleet and duty cycles in conjunction with existing and forecasted ZE technologies. First, data were collected on the existing Port-serving truck fleet via surveys, MCAS data, and automated license plate reader data to develop a truck movement database. Next, various assumptions and inputs related to the useful life of trucks (mileage and age), expected BET and FCET performance and parameters, and other ZET characteristics were determined. Then, five initial "Preliminary Pathways" were identified and analyzed by modeling the fleet's range requirements in relation to existing ZE technology capabilities and whether or not trucks were eligible for replacement in advance of the 2026 and 2030 goals. The pathways that did not have any fatal flaws were refined and redefined as "Alternative Pathways." The Alternative Pathways analysis builds on the findings from the Preliminary Pathways and considers costs, emission reductions, and optimization strategies such as the impacts of replacing trucks before the end of their useful life (age and mileage). The Alternative Pathways were then refined to a single "Targeted Pathway" that is synthesized and found to be the most cost-effective and feasible approach at this time to accomplish its ZE truck goals and objectives, focusing on 2026 with an eye towards 2030. Figure ES-1 presents the approach.

Figure ES-1. Summary of Approach



Source: WSP

ES.3 PRELIMINARY PATHWAYS

The Preliminary Pathways were established to identify the initial viability of meeting the 2026 and 2030 goals. The Preliminary Pathways consist of five pathways for 2026 and 2030, respectively:

- Preliminary Pathway 1: All BETs (without opportunity charging)
  - Preliminary Pathway 1A: All BETs (with opportunity charging)
- Preliminary Pathway 2: All FCETs
- Preliminary Pathway 3: BETs and FCETs (without opportunity charging)
  - Preliminary Pathway 3A: BETs and FCETs (with opportunity charging)

The Preliminary Pathways analysis found that FCETs, while promising, are not yet available on the market and therefore should not be a priority technology in meeting the Port's immediate goal (40% ZET trips by 2026). While BETs do not have the same range capabilities as FCETs, it appears that they may be a viable solution to meet the 2026 goal if opportunity charging and other optimization strategies, such as early retirement, are considered.

At this time, the 2030 goal (100%) does not appear to be achievable, as it is contingent on several factors outside of the Port's control, including more aggressive ZE policies and funding, advancement of battery technologies, and availability of infrastructure for both battery and hydrogen. Many trucks that currently serve the Port also serve ports across the state, including the highly trafficked Ports of Los Angeles and Long Beach. In order for the Port to meet its 2030 goal, other ports will also need to have aggressive transition goals. It will also be essential for battery advancements to continue or exceed their current trajectories to better suit the duty cycles of Port-serving trucks. It is expected that the hydrogen industry (producers and vehicle original equipment manufacturers will ramp up production, and whether this happens will also impact the Port meeting its goal. Considering these uncertainties, the Port will continue to evaluate the market and coordinate with regional and state partners over the coming years to continue to advance steps toward meeting the 2030 goal.

For these reasons, Preliminary Pathway 1A (all BETs with opportunity charging) and Preliminary Pathway 3A (BETs and FCETs with opportunity charging) are the most suitable to help advance meeting the Port's short-term 2026 goal. Thus, these Preliminary Pathways are considered and further analyzed as Alternative Pathways.

ES.4 ALTERNATIVE PATHWAYS

The main purpose of the Alternative Pathways analysis is to identify the Targeted Pathway to meet the Port's near-term 2026 goal. The analysis expands on Preliminary Pathways 1A and 3A by providing further optimizations of the pathways to attain the 2026 goal, such as minimizing the number of trucks by prioritizing "frequent flyers" (trucks that frequently visit the Port) and the possibility of retiring or replacing trucks in advance of the end of their useful lives. A truck's age and mileage are both useful indicators when determining its useful life, and the Alternative Pathways include sensitivity analyses to determine the impacts of both. The Alternative Pathways analysis also includes a Near-Zero Emissions (NZE) Pathway that qualitatively assesses the use of NZE technologies for trucks that are exempt from the state's ZE regulations, such as unibody auto carriers. Lastly, the Alternative Pathways analysis provides rough order of magnitude costs and estimated emission reductions to provide a comprehensive picture of the impacts of the pathways to the Port and its stakeholders. The three Alternative Pathways analyzed are listed below:

— Alternative Pathway 1: All BETs (with opportunity charging)

— Alternative Pathway 2: BETs and FCETs (with opportunity charging)

— Alternative Pathway 3: Near-Zero Emissions Trucks (NZETs)

Based on the Alternative Pathways analysis, the 2026 goal may be achieved by BETs if combined with the early retirement of vehicles and a robust opportunity charging network.

FCETs in Alternative Pathway 2 are projected to have longer ranges than BETs. They may also reduce the initial capital costs burden on truck operators if hydrogen fueling stations were to become readily available. However, the feasibility of this pathway is contingent on the availability of trucks and infrastructure, which is not the current situation. Moreover, hydrogen production is presently more carbon-intensive than electricity production; thus, adding FCETs to the fleet will increase overall lifecycle greenhouse gas emissions compared to a BET-only fleet (Alternative Pathway 1). There are several ongoing efforts to increase the production of green hydrogen and FCETs, which make the technology's future promising. However, considering the Port's short-term goal, it is difficult to rely on FCETs as a component of the initial strategy.

For these reasons, Alternative Pathway 1 (all BETs with opportunity charging) is the most suitable and Targeted Pathway to most effectively advance the Port's short-term 2026 goal. The Targeted Pathway focusing on replacing the most frequent diesel truck trips with ZET trips is the most reasonable option because of the relatively low number of trucks and financial resources required to meet the goal. As FCETs come to market, the increased range of these trucks may assist the Port to achieve its goals and should be considered as a substitute for BETs when appropriate. Special consideration for use of NZETs may also be considered in those instances where a ZET may not be available and emission reduction is needed.

ES.5 TARGETED PATHWAY

The Port's Targeted Pathway (all BETs with opportunity charging) prioritizes the replacement of diesel trucks that perform the most frequent truck trips. Based on the analysis of retirement schedules, BET range capabilities, and trip frequency, approximately 86 to 153 trucks are needed to achieve the 2026 goal. This pathway has the lowest overall cost ($49 to $87 million) to transition to ZETs, given the lower number of vehicles and chargers required. However, not all of these trucks may have reached their useful lives. These costs are inclusive of the residual costs of the number of trucks that may need to be retired before the end of their useful lives. As detailed later, it should be noted that these costs are based on unit costs and estimates that do not factor in contingencies, such as the cost of construction, design, utility enhancements, warranties, charge management subscription fees, and customizations. Table ES-1 summarizes the characteristics of the trucks, profiles, costs, and emissions associated with the Targeted Pathway.

Table ES-1. Targeted Pathway Summary

Category	Metric
Truck Profile	
Number of Trucks	86–153
Median Daily Mileage	250–275
Median of Annual Port Trips	192–327
Number of Early Retired Trucks	25–89
Number of Trucks Needing Opportunity Chargers	47–60
Costs and Emissions	
Costs (vehicle, charger, and residual of diesel trucks)	$49–$87 million
GHG Emission Reduction in 2026 (metric tons of CO2e)	16,711–33,864 (-79% reduction)
NO_X Emission Reduction in 2026 (metric tons)	15.5–31.6
PM2.5 Emission Reduction in 2026 (kilograms)	185.2–375.4
PM10 Emission Reduction in 2026 (kilograms)	193.6–392.4
Total Cost of Port-Provided Subsidy	
Option 1: $45 thousand/BET	$4–7 million
Option 2: $120 thousand/BET	$10–18 million

Source: WSP
Key: BET = battery-electric truck; CO2e = carbon dioxide equivalent; GHG = greenhouse gas; NO_X = nitrogen oxides; PM10 = particles up to 10 microns in diameter; PM2.5 = particles up to 2.5 microns in diameter

ES.6 IMPLEMENTATION

Beginning implementation of the Targeted Pathway to advance progress towards the MCAS' short-term 2026 goal would involve focusing on the following as immediate next steps:

— Providing technical assistance to truck operators

— Developing and presenting a Short-Haul Zero Emission Truck Program for the Board's consideration by the end of 2022. In addition, pursuing funding opportunities to offer subsidies, with priority to trucks identified in the Targeted Pathway

— Assisting in the planning, design, and implementation of ZET-supporting infrastructure

— Supporting and promoting various strategic policy goals and initiatives to increase ZET adoption

Advancing progress towards the Port's long-term goal (2030) would involve the following framework:

- Developing a truck registry to track trips and monitor progress
- Conducting biennial updates to the Plan
- Collecting data for new leases and projects located at the marine terminals

1 INTRODUCTION

1.1 OVERVIEW

In alignment with its vision of "Health Equity for All," the Board of Port Commissioners (Board) adopted the Port of San Diego's (Port) Maritime Clean Air Strategy (MCAS) on October 12, 2021. The MCAS established an aspirational goal to have no internal combustion engine trucks (ICETs) serving the Port's marine terminals by 2030. While the MCAS is not a regulation or a binding strategy document, to meet this goal, the Port aims to progressively increase the number of trips served by zero emission trucks (ZETs)—battery-electric or fuel cell electric—by 2030. The first milestone is in 2026, when the Port aspires to have 40% of all truck trips serving its marine terminals be conducted by ZETs, and the final milestone is in 2030, when the Port aims to have 100% of truck trips served by ZETs. To establish the framework for meeting these goals, the Port has partnered with WSP to develop the Heavy-Duty Zero Emission Truck Transition Plan (this report; referred to herein as the "Plan") to identify a viable pathway to meet the Port's goals and to develop the framework for subsequent stages of planning, design, and implementation.

Commercial medium- and heavy-duty trucks, such as those that support freight and goods movement across the country, make up a mere 4% of the United States' (US) vehicle fleet. This relatively small fleet is responsible for 24% of all transportation-produced greenhouse gas (GHG) emissions in the US[1] and disproportionately contributes to fossil fuel consumption and resulting air pollution and climate repercussions. Emissions from the existing nationwide fleet include diesel particulate matter (DPM) and nitrogen oxides (NO_x), pollutants that are linked to long-term respiratory, cognitive, and immune impairment. Transitioning from internal combustion engine vehicles that are propelled by fossil fuel to those with electric motors with zero local emissions will yield several positive outcomes, including improving public health, reducing lifecycle GHG emissions, reducing local emissions, and reducing the reliance on fossil fuels to power vehicles. By transitioning to an all zero emission (ZE) medium- and heavy-duty truck fleet, neighborhoods and communities that are located adjacent to and within these corridors should experience more equitable environmental and health outcomes.[2]

It should be noted that the California Air Resources Board (CARB) has established several mandates and policies that aim to transition California's vehicle fleet (light-duty and heavy-duty) to ZE technologies. The Port's goals, while ambitious, are developed pursuant to those requirements and intended to ensure that the Port and its stakeholders are well prepared for these inevitable changes. Additionally, the goals are intended to better position the Port and its stakeholders to compete for federal and state funding for infrastructure and electrification.

1.2 PURPOSE AND APPROACH

The purpose of the Plan is to serve as a strategic planning document to establish the most viable "pathway" to achieve the MCAS' truck goals and objectives. First, five initial "Preliminary Pathways" were identified and analyzed by modeling the fleet's range requirements in relation to existing ZE technology capabilities and whether or not trucks were eligible

[1] U.S. Environmental Protection Agency. 2022. Fast Facts on Transportation Greenhouse Gas Emissions. https://www.epa.gov/greenvehicles/fast-facts-transportation-greenhouse-gas-emissions

[2] Zero-Emission Transportation Association (ZETA). 2022. Medium- and Heavy-Duty Electrification: Weighing the Opportunities and Barriers to Zero-emission Fleets. https://fs.hubspotusercontent00.net/hubfs/8829857/ZETA-WP-MHDV-Electrification_Opportunities-and-Barriers_Final3.pdf

for replacement in advance of the 2026 and 2030 goals. The pathways that did not have any fatal flaws were refined and redefined as "Alternative Pathways." The Alternative Pathways were then refined to a single "Targeted Pathway" that was found to be the most cost-effective and feasible approach at this time to accomplish its ZET goals and objectives, focusing on 2026 with an eye towards 2030. Finally, the Plan outlines various implementation-related opportunities and challenges that the Port, tenants, fleet and truck operators, and other stakeholders will encounter during the transition to ZETs, pursuant to the Targeted Pathway. The Plan is intended to be a guiding document for the Port; however, the analysis and findings documented herein are derived from the data available at the time of this writing. Given the constantly evolving landscape of freight movement operation, and ZE technologies and policy, it is expected that the Plan will be updated over time to reflect new information that may yield different outcomes and results.

Additionally, implementation of the Plan is subject to the Board of Port Commissioner's (Board) future direction and exercise of its legally delegated discretion, including environmental analysis under the California Environmental Quality Act (CEQA), mitigation measures, adoption of a CEQA project alternative, and Statement of Overriding Consideration, if applicable, as well as approval and potential conditioning of these implementation measures. Any project developed as a result of the Board's action or direction that requires the Port's or the Board's discretionary approval resulting in a physical change to the environment will be analyzed in accordance with CEQA prior to such approval. CEQA review may result in the Port, in its sole and absolute discretion, requiring implementation of mitigation measures, adopting an alternative, including without limitation, a "no project alternative," or adopting a Statement of Overriding Consideration, if required. The current Board direction in no way limits the exercise of this discretion. Moreover, like the MCAS, this Plan is non-binding, and consequently, no particular project is required to comply or be consistent with this Plan.

1.3 PLAN STRUCTURE

The Plan is organized into eight main sections:

1. Introduction – Provides an overview of the Heavy-Duty Zero emission Truck Transition Plan
2. Background – Provides background on the Port, its terminals, its community, and the MCAS
3. Market Conditions – Summarizes current ZET technologies and market offerings
4. Methodology and Inputs – Details the inputs, assumptions, and methodology applied in the analysis
5. Preliminary Pathways – Presents the Preliminary Pathways analysis, which is based on truck attrition and ZET capabilities, and identifies Alternative Pathways
6. Alternative Pathways – Presents the Alternative Pathways analysis, which considers the early replacement of trucks and identifies a Targeted Pathway
7. Implementation Strategies – Identifies the barriers and potential strategies to successfully achieve the Port's goal
8. Summary of Findings and Next Steps – Summarizes the findings of the report and identifies immediate next steps

PORT of SAN DIEGO

2 BACKGROUND

This section provides background on the Port, including its marine cargo terminal operations, the neighboring communities, and the MCAS goals for transition to ZET operations.

2.1 PORT OF SAN DIEGO

The Port of San Diego, the fourth largest port in the state, manages 34 miles of waterfront comprising over 14,000 acres of tidal and submerged lands in San Diego Bay. As an administrator of the state tidelands of San Diego Bay, the Port is charged with providing economic vitality and community benefit through a balanced approach to the maritime industry, tourism, water and land recreation, environmental stewardship, and public safety. As a result, the Port's jurisdiction consists of two maritime cargo terminals (the Tenth Avenue Marine Terminal [TAMT] and National City Marine Terminal [NCMT]), two cruise ship terminals, 22 public parks, a Harbor Police Department, visitor-serving facilities and businesses, and natural resources.

Central to the Port's administrative obligations is the support of maritime commerce in and around San Diego Bay. Figure 2-1 identifies the location of the two terminals in relation to the San Diego region, and the following subsections provide details regarding each terminal.

Figure 2-1. Tenth Avenue and National City Marine Terminals

Source: Port of San Diego

2.1.1 *TENTH AVENUE MARINE TERMINAL*

Located in the City of San Diego, TAMT primarily handles perishables and refrigerated commodities, fertilizer, cement, and breakbulk commodities. The terminal covers approximately 96 acres and has eight berths, a flexible mobile harbor crane (soon to be replaced by two heavy lift, electric mobile cranes), and an approximately 300,000-square-foot temperature-controlled warehouse. In 2019, approximately 38,000 truck trips occurred at this terminal. The number of truck trips fluctuates each year based on activity and throughput.

Table 2-1. Tenth Avenue Marine Terminal Cargo Summary

Cargo	Description	Truck Trip Classification[a]	Typical Destinations
Refrigerated Containers	Approximately 700 containers per week	Local	National City, CA
		Regional	Southern California
		Regional	Western US
Dry Bulk	Bauxite	Regional	Victorville, CA
		Regional	Tucson, Arizona
	Sugar	Local	Otay Mesa
	Fertilizer	Local	San Diego, CA
Break Bulk	Cargo includes steel for shipbuilding, wind turbine blades and tower pieces, military ordnance, and electrical gear	Local	Port of San Diego Waterfront
		Regional	Riverside, CA
		Regional	Tehachapi, CA
		Regional	Palm Springs, CA

Source: Port of San Diego

[a] Per the MCAS, activity for trucks trips is classified as 1) on-port moves (within terminal boundaries), 2) local-port moves (trips within San Diego County), and 3) regional-port moves (originate or end outside of San Diego County).

2.1.2 *NATIONAL CITY MARINE TERMINAL*

NCMT, located in the City of National City and operated by Pasha Automotive Services, primarily handles automobiles. NCMT covers approximately 135 acres and has four working berths. One out of every 10 new foreign cars shipped to the US is processed through NCMT—approximately 400,000 per year.

Vehicles are delivered from manufacturers to the terminal via ship or truck and then distributed across the nation via truck, train, and/or ship. The site is a confluence of ships, trains, and trucks that support the automotive supply chain. Trucks serving NCMT mainly consist of car carriers, along with some flatbeds and trailers to move general project cargo and other materials.

Currently there are three Class 8 ZETs being piloted at NCMT that are capable of hauling eight vehicles at a time. Conventional car carriers are often upfitted with a unibody construction and can often haul more than eight vehicles with over the cab of the truck.

2.2 TRUCK DRIVERS AND SHIPPERS

A large and diverse truck fleet serves the Port's marine terminals and tenants. As outlined in the MCAS and summarized in Section 4.2, trucks are typically owned by tenants or tenant subsidiaries, larger fleet operators, or individuals, or leased by individuals who operate on a contract basis with Port tenants, freight-forwarders, and/or other brokers to transport goods.

The truck drivers and shippers are an important part of the national and regional workforce, providing economic vitality to the San Diego region and countless communities across the US. As discussed in the implementation strategies in Section 7, understanding and promoting the interests of truckers and shippers—including providing financial support and other incentives—will be critical to achieving the Port's ZE goals.

2.3 NEIGHBORING COMMUNITY

The neighborhoods of Barrio Logan, West National City, Logan Heights, and Sherman Heights in San Diego – collectively make up an identified AB 617 community, further described below– and have a higher cumulative air pollution exposure burden, a significant number of sensitive receptors, and include census tracts that have been designated as disadvantaged communities.

Pursuant to Assembly Bill 617 (AB 617), a bill addressing air pollution impacts in environmental justice communities, CARB established the Community Air Protection Program in 2018, which tasks local air districts control districts to collaborate with communities to develop community-focused emission reduction programs. To incorporate community expertise and direction in the development of emission reduction initiatives, the San Diego Air Pollution Control District established a 26-member AB 617 Portside Community Steering Committee (CSC) in October 2018. The AB 617 CSC includes local area residents and members representing industry, non-profit organizations, public agencies, and a Port representative. In December 2019, CARB designated the Portside Community for a Community Emission Reduction Plan (CERP), and the AB 617 CSC began working on emission reduction planning shortly after.

The CERP (July 2021) and the MCAS (October 2021) were both guided by the AB 617 CSC. While both policy documents are non-regulatory, the aspirational goals, objectives, and emission reduction priorities were heavily influenced by local area residents and other local stakeholders that served on the committees and attended monthly meetings. The CERP acknowledges the importance of transitioning to ZETs in their second goal: "*Medium-Duty and Heavy-Duty trucks servicing the Portside Community to be 100% Zero Emission Vehicle (ZEV) five years ahead of the California state requirements.*" Similarly, the MCAS establishes several ZET objectives, which include having 40% of the heavy-duty truck trips that call to its two marine cargo terminals to be ZE by June 30, 2026. The MCAS also includes a long-term goal that 100% truck trips that call to its marine cargo terminals be ZE by the end of calendar year 2030. A summary of the MCAS, as well as an overview of its ZET goals, are discussed in more detail below.

2.4 MARITIME CLEAN AIR STRATEGY

On October 12, 2021, the Board approved the MCAS as a comprehensive update to the Port's 2007 Clean Air Program. The MCAS is a not a binding plan, regulation or rule but is a policy document intended to help the Port identify future projects and initiatives to improve health through cleaner air for all who live, work, and play on and around San Diego Bay, while also supporting efficient and modern maritime operations. The MCAS and its vision, "Health Equity for All," represent the Port's commitment to environmental justice and is more ambitious than any other clean air policy document of its kind in the state.

Collectively, in conjunction with the near-term goals and objectives, the MCAS identifies approximately 34 potential projects, partnerships, initiatives, and studies for several emission sources. The MCAS identifies near-term objectives to be completed by June 30, 2026, that are intended to help reduce emissions associated with the five main sources of maritime-related mobile activity, including oceangoing vessels, commercial harbor craft, cargo handling equipment, heavy-duty trucks, and rail.[3] The MCAS not only demonstrates the Port's commitment to clean, modern, and sustainable maritime and goods movement operations, it also complements emission reduction efforts that are being advanced as part of the CERP, as discussed earlier. It is important to note that the MCAS goals and objectives for heavy-duty trucks are aspirational and go beyond what is currently required by the State of California.

2.4.1 *ZERO EMISSION TRUCK GOALS*

The MCAS includes several truck related goals and objectives to accelerate the transition to ZETs (summarized in Table 2-2). This Plan satisfies Truck Objective 1A.

[3] In addition to the five main maritime-related emission sources listed here, the Port's MCAS (October 2021) also identifies emission reduction strategies for its own on-road vehicle fleet as well as for shipyards.

Table 2-2. Summary of Maritime Clean Air Strategy Truck Goals and Objectives

Goal	Objective
1. Improve the air quality in the Portside Community by accelerating the implementation of ZE/NZE trucks.	1A: Prepare a heavy-duty truck transition plan by June 30, 2022, with ZE heavy-duty truck transition benchmarks of 40% of the Port's annual truck trips by June 30, 2026, and 100% by December 31, 2030, that includes the following: i. A compilation of all foreseeable tasks and their timelines, including charging infrastructure development, planning and implementation of a short-haul truck program, and creation of a truck registry. ii. Development of key policy concepts such as additional revenue source mechanisms and guidelines to utilize them, and new lease provisions for ZE truck requirements. This section should include the process required for consideration and adoption by the Board, as well as their projected hearing dates. iii. Compilation and analysis of truck data (e.g., truck ownership, delivery distances within San Diego region and beyond) needed to prepare the transition plan. iv. Preparation of a baseline of 100,000 truck trips consisting of heavy-duty diesel and natural gas truck trips to be utilized for projecting the transition of diesel and natural gas trucks to zero emissions per the transition benchmarks listed above.
	1B. By the end of 2022, Port staff will develop and present a short-haul, on-road, ZET program for the Board's consideration that includes at least one collaborating trucking company and that targets having the necessary charging infrastructure in place by 2024, in order to displace approximately 65,000 diesel vehicle miles traveled.
	1C. Coordinate with CARB as they continue to develop the Advanced Clean Fleet regulation regarding the transition to ZETs to better understand associated state forecasts and forthcoming rulemaking.
	1D. In collaboration with CARB, the Port will utilize a truck registry or other system to summarize annual truck trips to the Port's marine cargo terminals and measure progress to achieve the Port's goals.
	1E. Provide status report to the Board with recommendations on ZET technology, as well as an evaluation of potential impacts to small fleets and/or independent truck drivers, as part of biennial emissions reporting to better understand the transition to ZE truck technology.
2. Facilitate the deployment of infrastructure to support the transition to ZET trips to the Port's marine cargo terminals.	2A. Within fourth quarter of calendar year 2022, present a concept plan to the Board for its consideration that identifies four potential public-facing medium-duty/heavy-duty charging locations within the San Diego region to support deployment of ZETs, which may include locations in close proximity to or on TAMT and/or NCMT.
	2B. Collaborate and coordinate with community residents, stakeholders, and agencies to ensure that the medium-duty/heavy-duty ZET charging facilities identified in Objective 2A are aligned with and connect to the region's larger ZEV charging infrastructure system.
3. Support the designated truck route to avoid truck impacts to the local community.	3A. Work with partners to continue advancement of the connected and flexible freight and transit haul route concept to provide more efficient freeway access and encourage truck drivers to avoid residential neighborhoods by leveraging technology to support dedicated lanes and signal prioritization.

Source: Port of San Diego

3 MARKET CONDITIONS

The following section provides an overview of ZET technologies, market availability, utilities, and regulations.

3.1 ZERO EMISSION TECHNOLOGIES

A zero emission vehicle (ZEV) is an on-road vehicle with a drivetrain that produces zero exhaust emission of any criteria pollutant (or precursor pollutant) or GHG under any possible operational models or conditions. In the existing market, the two most prevalent ZEV technologies are battery-electric and fuel cell electric, both of which are propelled by an electric motor. To meet the Port's goals, it is assumed that existing ICETs that serve the Port would be replaced with one of these vehicle types. It should be noted that, while ZEVs have been produced and operated in other industries (such as transit) for some time, the trucking industry is still nascent in its deployment and operation of battery-electric trucks (BETs), and there are no commercially available fuel cell electric trucks (FCETs). That said, it is important to understand these technologies and characteristics. The following subsections provide an overview of each of these technologies.

3.1.1 *BATTERY-ELECTRIC TRUCKS*

BETs use onboard batteries to store and distribute energy to power an electric motor and other onboard systems. Like many other battery-powered products, BETs must be charged for a period of time to be operational.

BETs can be "depot-charged" at a storage facility when not in service, typically overnight or midday, or "opportunity-charged" while in service, typically at a trip endpoint, such as a port, warehouse, or rest stop. A depot charging strategy typically consists of trucks with high-capacity (kilowatt-hour [kWh]) battery packs that are charged for several hours in conjunction with "slow" chargers—usually rated with less than 150 kilowatts (kW). An opportunity charging strategy typically consists of trucks with low(er)-capacity battery packs that are charged for short periods of time with "fast" chargers—usually in excess of 150 kW.

BETs can be charged via several dispenser types (conductive and inductive) and orientations (overhead or ground-mounted). Figure 3-1 presents some methods to dispense electricity to a BET (from left to right): plug-in and inductive.

Figure 3-1. Battery-Electric Truck Charging Methods

Source: FreightWaves; Ideanomics

Under existing conditions, BETs cannot meet the ranges that ICETs can. Based on original equipment manufacturer (OEM) provided data, existing BETs can serve an average range of approximately 215 miles. The specific range is dictated by a myriad of factors, including temperature and heating, ventilation, and air conditioning (HVAC) usage, driving behavior, and topography. For this reason, if a duty cycle cannot be completed with BETs, other capital-intensive strategies must be considered to meet range requirements, including, but not limited to, additional BETs, opportunity charging infrastructure, operational changes, and/or a mixed-fleet strategy with the incorporation of FCETs. BETs, like other battery-based products, experience battery degradation over time, meaning that the usable capacity, and thus range, will be reduced over the lifecycle of the battery. Therefore, it is important to understand, plan for, and mitigate degradation and its impact on the overall range of the BET. For example, while a new BET may provide a range of 215 miles, over time, the same truck will not be able to travel the same distance. Accordingly, additional warranties (including battery replacement) or operational changes will need to be considered.

The cost of an individual BET varies based on several factors, including battery capacity, vehicle length, customizations (software/hardware, trimmings, etc.), warranties, and economies of scale. For these reasons, it can be difficult to accurately estimate costs until entering a contract with an OEM. At this time, OEMs on a wide scale have not publicly disclosed the estimated unit cost of BETs; however, it is assumed that, on average, they will cost three to four times the amount of a diesel truck.

To charge BETs sufficiently and safely, several components are required, including:

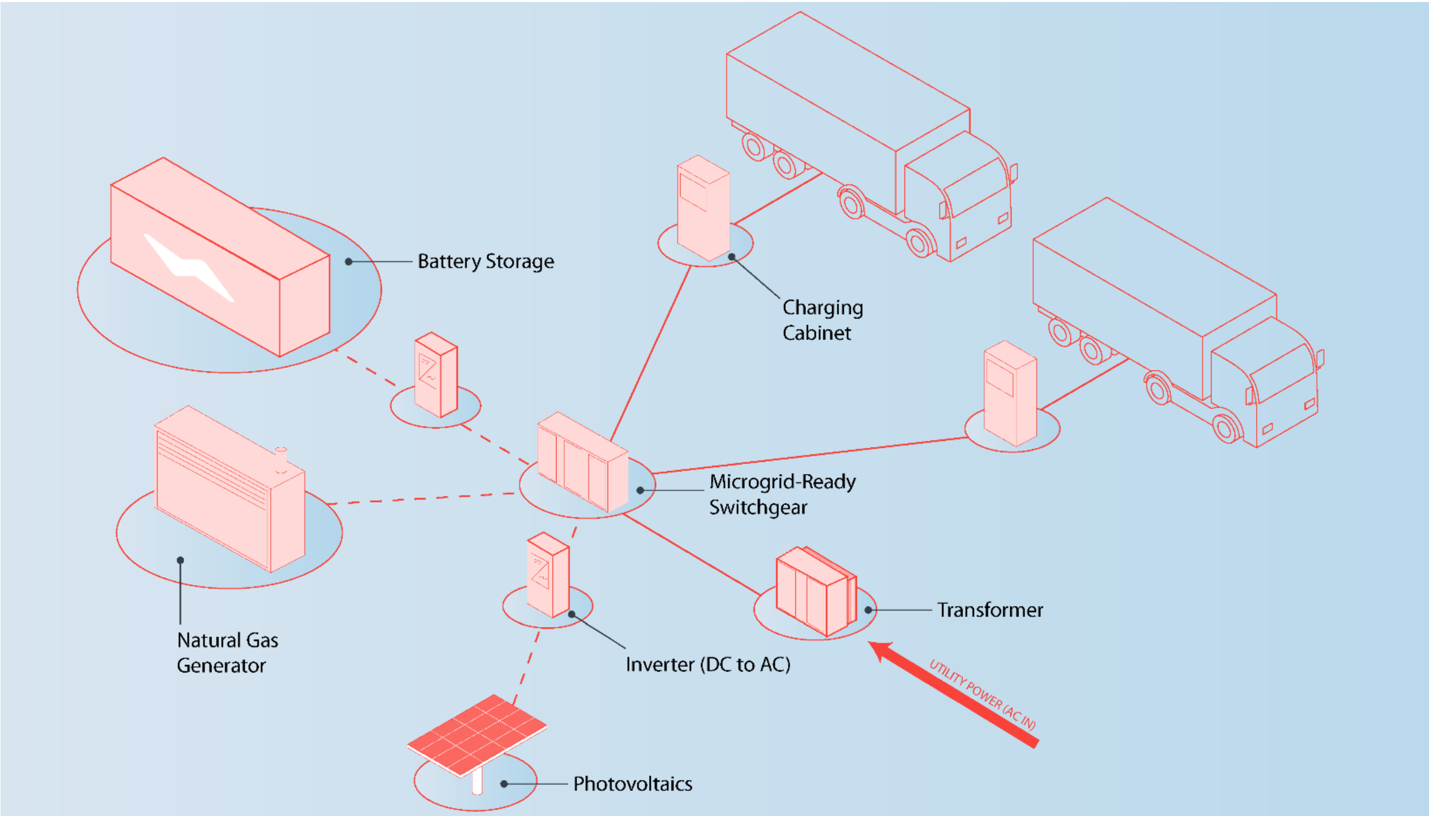
— Charging cabinet(s) – dispenses power and, in most cases, converts power from alternating current (AC) to direct current (DC)

— Transformer(s) – steps down electricity to a safe and suitable limit

— Switchgear(s) – allows for the isolation of power

Other components can also be considered, such as battery storage, photovoltaics (solar panels), and backup generators. Figure 3-2 illustrates the various components of a typical BET system.

Figure 3-2. Typical Battery-Electric Truck System



Source: WSP

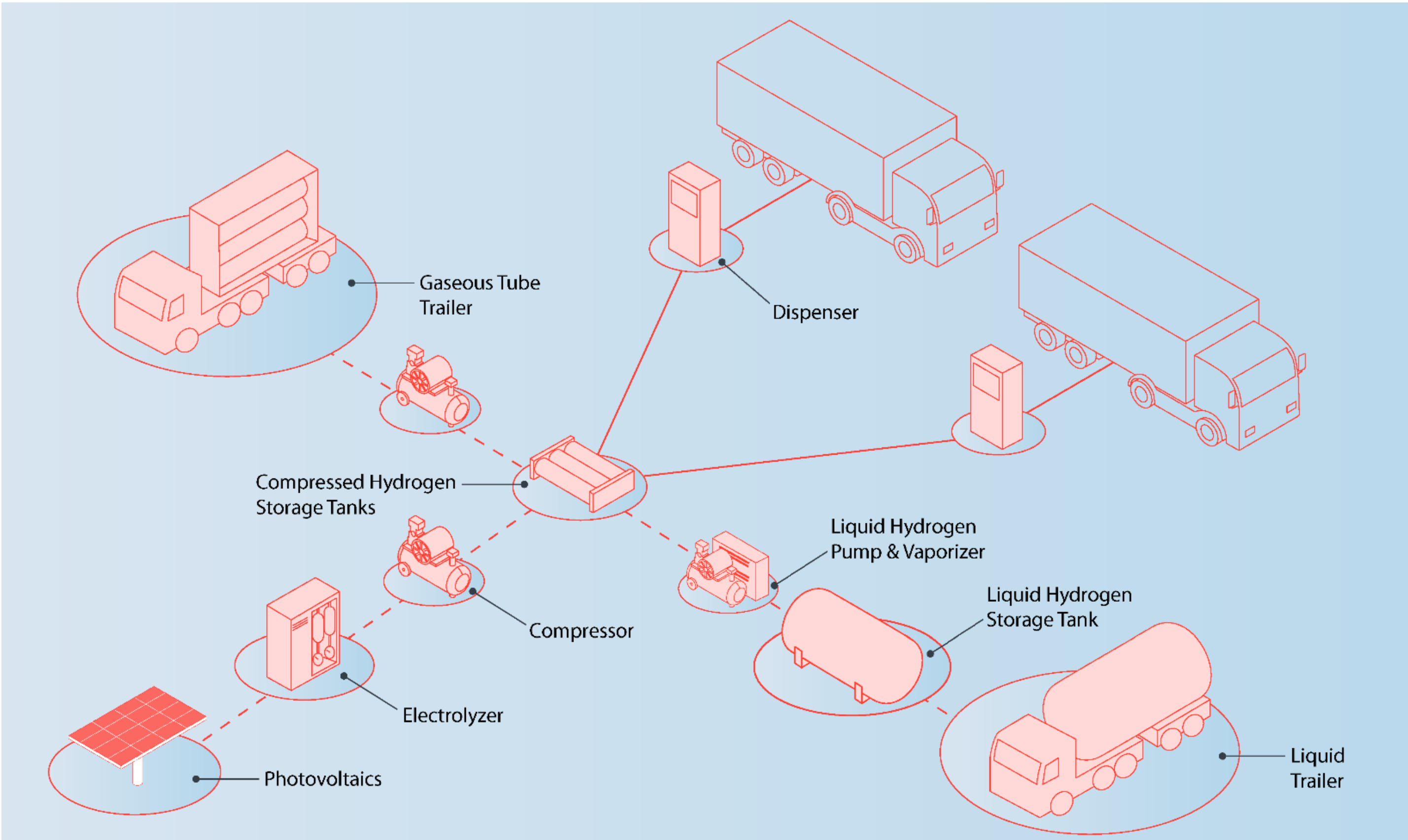
The equipment to support BETs can take up considerable space. Therefore, considerations of safety and reduction of impacts to existing operations must be carefully reviewed and assessed by the Port, tenants, and utility providers. Due to the potentially high power demand of charging several BETs at once, and the limited spare capacity available in existing circuits, expanded or new electrical service is usually required to support battery-electric vehicles.

3.1.2 *FUEL CELL ELECTRIC TRUCKS*

FCETs store compressed gaseous hydrogen (GH2) that is distributed to onboard fuel cells that combine the hydrogen and oxygen to produce electricity to power an electric motor and other onboard systems. The fuel cell is generally used in conjunction with a low(er)-capacity battery, which stores electricity and supplements the fuel cell's power during peak loads.

The process, operations, and equipment used for hydrogen vehicles are similar to "lighter-than-air" fuels such as compressed natural gas (CNG). Hydrogen is generated via steam-methane reforming (SMR) or electrolysis. SMR, the most common method of producing hydrogen, uses high-pressure steam to produce hydrogen from a methane source, such as natural gas. Electrolysis, on the other hand, uses an electric current to decompose water into hydrogen and oxygen. After the hydrogen is produced, it can be delivered to the site via pipeline, or as a gas or liquid by truck. Hydrogen is then stored, vaporized (if delivered as a liquid), compressed, and dispensed to the trucks on site. Depending on space availability and resources, some agencies can also produce hydrogen on site—most commonly via electrolysis. Figure 3-3 illustrates the various components and options for providing hydrogen to FCETs. Note, all of the presented equipment is assumed to be on site (with the exception of the delivery trailers).

Figure 3-3. Typical Fuel Cell Electric Truck System



Source: WSP

FCETs typically can replace ICETs at a 1:1 replacement ratio without significant changes to operations. However, one of the most pressing challenges for FCET operations is that the industry and market is still in its infancy, as there are currently no commercially available FCETs and the production of hydrogen is not scaled to support large fleets. Hydrogen operations also require ample space and high capital costs to isolate, compress, and store hydrogen, Also, if renewable natural gas (RNG)—such as methane capture from organic matter—is not used as an alternative to natural gas during SMR operations, there are concerns that FCETs may not be the most sustainable vehicle to achieve GHG emission reduction targets. Since electrolysis relies on an electric current, it offers the potential to provide fully renewable hydrogen, though on-site electrolysis presents challenges in high upfront costs, space requirements, and scalability. In short, implementation of hydrogen at a site presents new complexities that often require specific site and operations analyses to assess.

The capital costs associated with on-site hydrogen production is more expensive than the costs for delivered hydrogen; however, the hydrogen fuel savings (per kilogram) from on-site production may make it a more cost-effective solution than delivery over the long-term. The costs per kilogram of hydrogen for delivered hydrogen is more expensive as it has to be delivered and the generation costs are incurred by the producer. Transit agencies and other operators of fuel cell electric vehicles across the US are exploring the viability of scaling up from hydrogen delivery to on-site production (via an electrolyzer or SMR) to gradually ease into costly capital investments.

As with BETs, the cost of an individual FCET is still unclear, but is expected to be three to four times the amount of a diesel truck. In other Class 8 applications, such as public transit, hydrogen vehicles are more expensive than their battery-electric counterparts, so it is assumed that FCETs will be marginally more expensive than BETs. Currently, there are no available FCETs on the market, though there are pilot projects currently underway.

While both BETs and FCETs provide ZE benefits, the feasibility and viability of their application are largely based on duty cycles, vehicle availability, and costs.

3.2 MARKET AVAILABILITY

As of December 2021, approximately 1,215 ZETs (of all classes)[4] have been deployed in the US. These deployments have consisted of a wide range of vehicle types and applications, including medium- and heavy-duty trucks, cargo vans, yard tractors, and refuse trucks. Heavy-duty trucks represent only 4% of the ZET market—approximately 47 deployments.

While the ZE market in trucking is nascent, there are many indicators that the industry will rapidly expand in the next decade. Since several OEMs are coming to market at the same time, federal, state, and municipal governments are developing policy and funding mechanisms to support and encourage the adoption of ZETs. Meanwhile, private trucking fleets are placing large orders with OEMs to procure ZETs, largely as a result of corporate sustainability goals.[5,6]

California's Hybrid and Zero emission Voucher Incentive Program (HVIP), which is administered by CARB, has a catalog of available ZEVs that are eligible for vouchers. As of May 2022, there are eight Class 8 models that are available and eligible for between $120,000 and $150,000 in subsidies (Table 3-1).

Table 3-1. Vehicles Eligible for the Hybrid and Zero emission Voucher Incentive Program

OEM	Model	Type	Battery Capacity (kWh)
BYD	8TT	Battery-Electric	435
Freightliner	eCascadia	Battery-Electric	475
Kenworth	T680E	Battery-Electric	396
Lion Electric	Lion8T	Battery-Electric	653
Nikola	TRE	Battery-Electric	753
Peterbilt	579	Battery-Electric	396
SEA Electric	Cascadia EV[a]	Battery-Electric	220
Volvo	VNRe	Battery-Electric	375 OR 565

Source: California HVIP (https://californiahvip.org/) (May 2022)
[a] A SEA-Drive Power System built on a Freightliner Cascadia chassis.

[4] CALSTART. 2022. Zeroing in on Zero-Emission Trucks. https://calstart.org/wp-content/uploads/2022/02/ZIO-ZETs-Report_Updated-Final-II.pdf. The report addresses medium-duty trucks and step vans, cargo vans, yard tractors, refuse trucks, and heavy-duty trucks.

[5] Sysco. 2022. Sysco Transforming the Future of Foodservice Deliver: Announces Intent to Purchase up to 800 Battery Electric Freightliner eCascadia from Daimler Truck North America to Serve U.S. Customers. https://investors.sysco.com/annual-reports-and-sec-filings/news-releases/2022/05-19-2022-130905661

[6] Maersk. 2022. Maersk Orders 110 Volvo VNR Electric Trucks for North America. https://www.maersk.com/news/articles/2022/03/29/maersk-orders-110-volvo-vnr-electric-trucks-for-north-america

While the HVIP database is an indicator of market availability, it does not capture all vehicles, nor the vehicles that are anticipated to come to market. For example, there are many other OEMs that are currently developing (or have developed) BETs, including Mercedes-Benz, XOS, Rousche Clean Tech, and Tesla. FCET offerings are also expected to be available in the coming years by several OEMs, including Hyundai, Toyota, Nikola, and Kenworth.

3.2.2 *INFRASTRUCTURE*

As previously indicated, several components and interconnections are required to supply power to ZETs. For BETs, there are several charger OEMs that have products on the market, the vast majority comply with standards established by Society of Automotive Engineers to ensure interoperability between several vehicle types and OEMs. Each OEM may also provide specializations and other options, such as multiple dispensers, which allow a single charger to dispense energy to more than a single vehicle at a time—concurrently or sequentially—or "big box" chargers, which are a grouping of chargers in a single location to maximize space. Table 3-2 summarizes several DC charger OEMs and their offerings as of May 2021.

Table 3-2. Available Chargers in the US Market

OEM	Charging Type	Power (kW)
ABB	Plug-In combined charging system (CCS)	100–350
ChargePoint	Plug-In CCS	62.5–350
Hitachi - ABB	Plug-In CCS	50–150[b]
Heliox	Plug-In CCS	180
Momentum Dynamics	Inductive - Wireless	50–300
Siemens	Plug-In CCS	100–400
Tritium	Plug-In CCS	50–175[c]
Wave	Inductive - Wireless	350

Source: WSP, May 2021

[a] Dual port charging from ChargePoint's Express Plus has not yet been finalized

[b] Hitachi - ABB chargers are engineered solutions but include internal power modules with outputs of 50 kW, 100 kW, and 150 kW, which can be output to single or dual port CCS pedestals

[c] Tritium 350 kW DC fast charging (DCFC) is not yet available in North America

When operating an FCET fleet, hydrogen can be sourced one of several ways:

1. GH2 delivered via a high-pressure tube trailer or mobile refueler
2. Liquid hydrogen (LH2) delivery via a tanker
3. GH2 or LH2 delivered by pipeline
4. On-site production of GH2 via SMR or electrolysis

All forms of hydrogen, whether GH2 or LH2, must have adequate and safe on-site storage. Access to inexpensive hydrogen fuel remains a challenge for FCET operators, as the industry works to increase in scale. For this reason, the long-term costs of hydrogen sourcing should be carefully considered. In addition, resiliency should be considered for all technologies in case of equipment failure. Table 3-3 shows some of the national suppliers of hydrogen fuel and their distribution options.

Table 3-3. Distribution Options of National Hydrogen Fuel Suppliers

Supplier	LH2 or GH2 Deliveries	Pipeline	On-Site Production
Air Liquide	X	X	X
Air Products	X	X	X
Linde Gas	X	X	X
Messer	X		

Source: WSP

3.3 UTILITIES

Electricity service consists of two primary components: generation and transmission. In the San Diego region, two agencies provide electricity generation services:

— San Diego Gas & Electric (SDG&E) is a regulated, investor-owned public utility company that provides electricity and natural gas service to many cities in San Diego County and parts of southern Orange County.

— San Diego Community Power (SDCP) is a newly established Community Choice Aggregation electricity supplier that provides energy with higher renewable content than SDG&E to some cities in the San Diego region. In 2022, the City of San Diego stopped purchasing electricity generation services from SDG&E and instead contracted with SDCP to provide electricity generation via purchase agreements with renewable providers. Similarly, the City of National City has announced plans to change its generation services from SDG&E to SDCP in 2023.

For energy transmission to customers through public rights-of-way, SDG&E maintains franchise agreements with most local jurisdictions in the San Diego region—including both San Diego and National City—to operate and maintain the energy grid's physical infrastructure. Accordingly, any installation or modification of energy infrastructure in or near the Port's marine terminals likely would require detailed coordination with SDG&E.

As discussed in Section 3.4.1, below, SDG&E offers assistance with installation of ZE infrastructure, including incentive programs such as Power Your Drive for Fleets.

3.4 STATE REGULATIONS

As previously mentioned, the MCAS is a non-binding strategy that establishes an aspirational goal to achieve 40% ZET trips by the end of 2026 and 100% ZET trips by 2030. To meet these aspirational goals, the Port aims to progressively increase the number of trips served by ZETs. While the Port's goals are ambitious, the state has several mandates, as well as approved and proposed regulations, that also require and encourage the rapid adoption of ZETs within the same time period. Governor Newsom's Executive Order N-70-20[7] established goals to reach 100% medium- and heavy-duty ZEVs in California by 2045, for all operations where feasible, and by 2035 for drayage trucks that visit California seaports. CARB's

[7] Executive Department State of California. 2020. Executive Order N-79. https://www.gov.ca.gov/wp-content/uploads/2020/09/9.23.20-EO-N-79-20-Climate.pdf

Advanced Clean Fleet (ACF) is a regulation designed to align with the Executive Order's goal, which focuses on medium and heavy-duty electrification.

Table 3-4 summarizes the four state regulations that have been adopted, or are being considered for adoption, that align with the MCAS goals. Figure 3-4 illustrates a process in which truck operators can navigate to maintain compliance with both the CARB regulations and the MCAS.

Table 3-4. Summary of California Air Resources Board Regulations and Policies

<table>
<tr><th>Regulation</th><th>Purpose</th><th>Requirement</th></tr>
<tr><td>SB1: Truck and Bus regulation (2008)</td><td>To meet federal attainment standards, and reduce particulate matter (PM) and nitrogen oxide (NO_x) emissions.</td><td>By January 1, 2023, trucks and buses will be required to have 2010 or newer model year engines.
Starting January 1, 2020, only vehicles compliant with this regulation can be registered with the Department of Motor Vehicles.</td></tr>
<tr><td>Advanced Clean Truck (ACT) regulation (2021)</td><td>Accelerate a large-scale transition of ZE medium- and heavy-duty vehicles (Class 2b to Class 8).</td><td>OEMs that certify Class 2b-8 chassis or complete vehicles are required to sell ZETs as an increasing percentage of California annual sales from 2024 to 2035. By 2035, ZE sales need to be 55% of Class 2b-3, 75% of Class 4-8, and 40% of truck tractor sales.[a]</td></tr>
<tr><td rowspan="3">Advanced Clean Fleets (ACF) regulation (in progress)[b]</td><td rowspan="3">To achieve a medium- and heavy-duty ZE truck and bus fleet by 2045.</td><td>Drayage Regulation:
100% ZE drayage trucks by 2035. Unibody trucks (auto carriers, etc.) are exempted.
– Beginning in January 2024, all new drayage trucks in the CARB registry must be ZET.
– Beginning January 2025, all trucks that are past their useful lives will be removed from the CARB registry.</td></tr>
<tr><td>High Priority Fleet Regulation
For larger fleets with more than $50 million gross revenue or that manage/own more than 50 vehicles. Near-ZE trucks are counted toward compliance. Drayage trucks may need to comply with both the ACF Drayage regulation and the High Priority Fleet Regulation.
Two compliance pathways:
– Beginning January 2024, all new vehicles must be ZE, and all vehicles past useful life must be removed from the fleet; OR
– There is some flexibility in how fleets are managed as long as they meet the milestone requirements (percentage of ZEV in the fleet). There are different annual milestones for different vehicle types.</td></tr>
<tr><td>ZEV Sales Requirement
Starting from model year 2040, all medium- and heavy-duty vehicles sold in California must be ZE.</td></tr>
<tr><td>Heavy-Duty Omnibus Regulation (2021)</td><td>To achieve the maximum technologically feasible and cost-effective reductions in real-world NO_x.</td><td>– Revised NO_x and PM emission limits starting in model year 2024.
– Revised in-use on-road testing protocols and evaluation.
– New low-load testing cycle starting in model year 2024.</td></tr>
</table>

Regulation	Purpose	Requirement
Heavy-Duty Inspection and Maintenance Regulation (2021)	To ensure vehicle emissions control systems are properly operating throughout the life of the vehicle.	– Requires testing, inspection, and reporting of on-board vehicle emission control systems twice a year. – Maintain/repair emission control systems as necessary. – Enhanced field inspection by CARB.

Source: WSP, May 2021

[a] Large employers are also required to report information about shipments and shuttle services. Fleet operators with 50 or more trucks are required to report about their existing fleet operations.

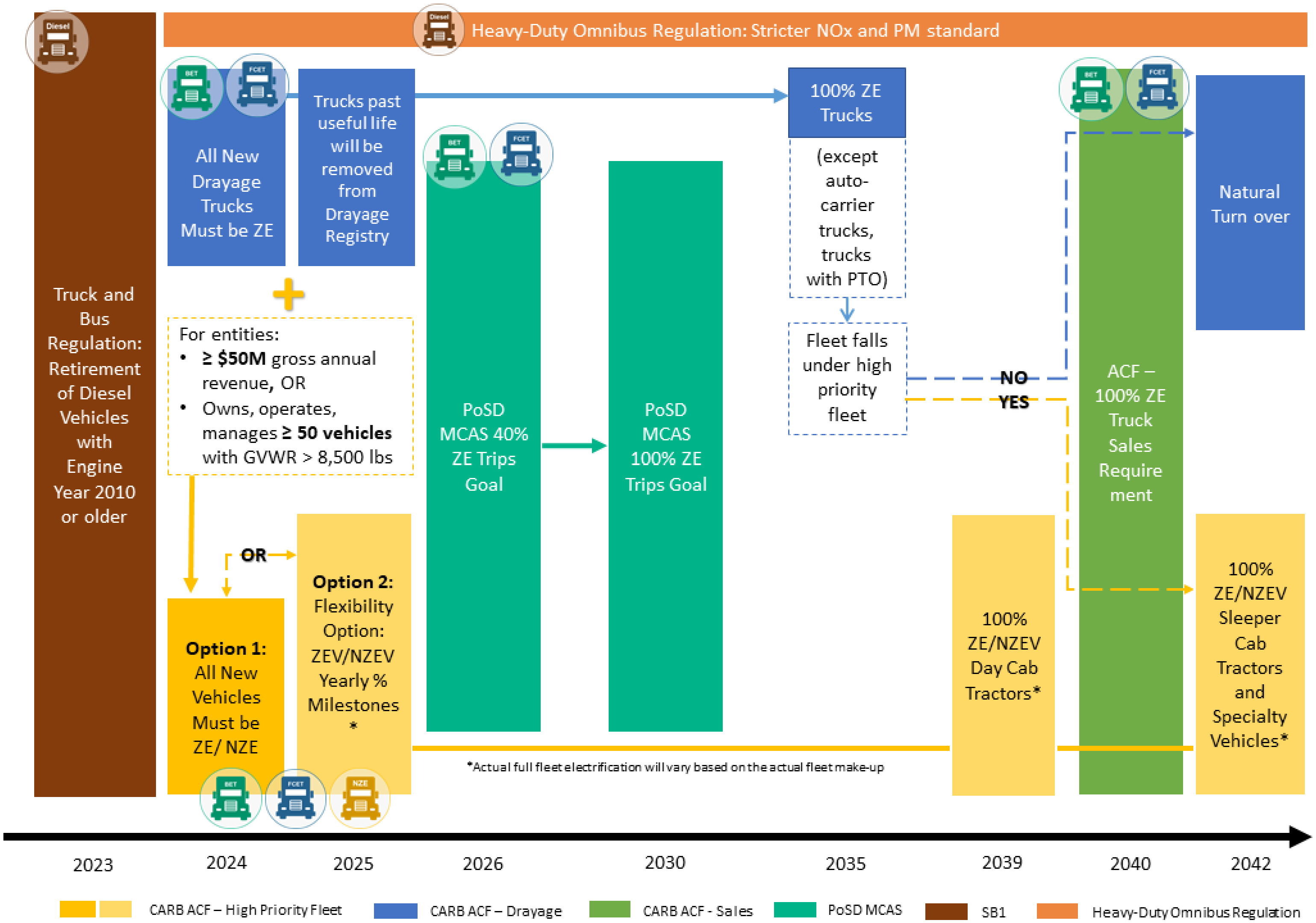
[b] California Air Resources Board. 2022. Advanced Clean Fleets. https://ww2.arb.ca.gov/our-work/programs/advanced-clean-fleets

There are also several non-ZE regulations that dictate the manner in which trucks can operate, including the length and composition of drivers' shifts, the routes and roads on which they can operate, and the gross vehicle weight rating. All of these elements have implications for ZET operations that will need to be mitigated. For example, with BETs, range limitations may impact where and how long trucks can travel, and the increased vehicle weights (due to additional weight of batteries) may encroach on the carrying capacity of trucks. Charging times for BETs are also significantly longer than conventionally fueled trucks, which will impact shifts and the operation of these trucks pursuant to the Federal Motor Carrier Safety Administration's Hours of Service Regulations.[8] Therefore, it is essential to understand all regulations, how they are interrelated, and the potential implications of each so that mitigation measures and strategies can be developed to ensure that any potential negative impacts to fleet operators are addressed.

[8] Federal Motor Carrier Safety Administration. 2022. Summary of Hours of Service Regulation. https://www.fmcsa.dot.gov/regulations/hours-service/summary-hours-service-regulations

PORT of SAN DIEGO

Figure 3-4. Drayage Truck Regulations



Source: WSP

3.4.1 *FEDERAL, STATE, AND SDG&E FUNDING OPPORTUNITIES*

Several funding sources are available to finance both capital and operational costs of ZE drayage trucks at the federal, state, and regional levels. Federal funding includes both formula and competitive grants. Formula grants are awarded to predetermined recipients. For instance, California is awarded $383 million from the National Electric Vehicle Infrastructure (NEVI) program. Meanwhile, competitive grants or discretionary funding are awarded based on a competitive process, which includes proposal selection based on merits.

Table 3-5 summarizes the available funding opportunities. The list provided is not exhaustive and must be reviewed periodically, considering the increasing requirement of greener drayage operations. The majority of the available funding focuses on initial capital costs, which currently pose the biggest barrier for BET adoption.

Table 3-5. Available Funding Opportunities for Drayage Fleets

Level	Funding	Amount	Applicable Use				Note
			Vehicle Costs	Charging Station	Fueling Station	Fuel Costs	
Federal	Bipartisan Infrastructure Bill (IIJA)	$383 million for California from the NEVI program[a]		X			Formula funding to build a charging station network along highway corridors.
		$2.25 billion from Port Infrastructure Development Program (PIDP)[b]	X	X	X		$684 million for fiscal year (FY) 2022. Competitive federal grants to improve the safety, efficiency, or reliability of the movement of goods into, out of, around, or within a port.
		$2.5 billion		X	X		Competitive federal grants.
State	Proposed 2022–2023 ZEV Packages[c]	Approx. $2.2 billion applicable for drayage trucks	X	X	X		From various fund sources over five years of funding. Potential programs[d] that are applicable to drayage trucks, including: – $475 million for drayage trucks and infrastructure – $1.1 billion for clean trucks, buses, and off-road equipment – $400 million for ports – $200 million for emerging opportunities (i.e., demonstration and pilot projects in high carbon-emitting sectors)
	Low Carbon Fuel Standard (LCFS) Credits[e]	Dependent on market demand				X	A credit is awarded for every metric ton of CO_2 saved compared to the baseline diesel emission. The credit can be sold, and the price depends on market demand.

Level	Funding	Amount	Applicable Use				Note
			Vehicle Costs	Charging Station	Fueling Station	Fuel Costs	
	California's Hybrid and Zero emission Truck and Bus Voucher Incentive Project (HVIP)[f]	$75 million in FY 2021/2022 for drayage. Maximum $150 thousand per truck.	X				First-come, first-served.
	California VW Program for Zero emission Class 8 Freight and Port Drayage Trucks	$27 million in FY 2021/2022. Maximum $200 thousand per truck.	X				
Other	SDG&E Electric Power Your Drive for Fleet Program (EnergIIZE Make Ready Program)[g]	Varies		X		X	Lower electric vehicle charging rate. Options for SDG&E-owned electrical infrastructure (up to the charging station) with no installation costs. Additional charger rebate (up to $75 thousand) in disadvantaged communities.

Source: WSP

[a] U.S. Department of Transportation, Federal Highway Program. 2022. Fact Sheets. National Electric Vehicle Infrastructure Formula Program. https://www.fhwa.dot.gov/bipartisan-infrastructure-law/nevi_formula_program.cfm

[b] U.S. Department of Transportation, Maritime Administration. 2022. About Port Infrastructure Development Grants. https://www.maritime.dot.gov/PIDPgrants

[c] Legislative Analyst's Office. 2022. The 2022–23 Budget Zero Emission Vehicle Package. https://lao.ca.gov/Publications/Report/4561

[d] HVIP funding source might be included in the package.

[e] California Air Resources Board. 2022. Low Carbon Fuel Standard. https://ww2.arb.ca.gov/our-work/programs/low-carbon-fuel-standard

[f] California HVIP. Not dated. Hybrid and Zero emission Truck and Bus Voucher Incentive Project. https://californiahvip.org/

[g] SDG&E. 2022. Power Your Drive for Fleet Program. https://www.sdge.com/business/electric-vehicles/power-your-drive-for-fleets

4 METHODOLOGY

The following section provides an overview of the inputs and methodology used to develop the Preliminary Pathways, Alternative Pathways, and associated cost and emissions analyses.

4.1 OVERVIEW

Currently, the majority of Port-serving trips are provided by ICETs. Typically, ICETs have ranges in excess of 500 miles, are stored at privately owned lots, and can be fueled in a relatively short period of time at one of many diesel fueling stations. These operations will drastically change with the transition to ZETs. For example, BETs require several hours to charge, and range capabilities are significantly less than those of ICETs. On the other hand, FCETs are not currently available on the market and the fueling network is sparse.

To determine the most feasible (or "Targeted") pathway to accomplish the Port's short-term (2026) and long-term (2030) goals, it is essential to model the existing fleet and duty cycles in conjunction with existing and forecasted ZE technologies. A summary of the approach to accomplish this is presented in Figure 4-1 and detailed in the following sections.

Figure 4-1. Summary of Approach

Source: WSP

4.2 DATA COLLECTION

With no central database of the trucks or trips that serve the Port, the WSP team worked with Port staff to model an inventory of trucks and their respective characteristics such as vehicle type, age, mileage, and operating profile, known as the truck movement database (TMD). To develop the TMD – which is included in Appendix A with other materials described below – the project team collected data from the MCAS, two surveys, and an automated license plate reader (ALPR) at TAMT to provide a representative sample of Port-serving trucks and their associated trip profiles. It should be noted that the TMD does not capture all trucks or the specific non-Port movements of many trucks, which is the result of inherent data limitations (described below) and the proprietary nature of some shippers' operational details. The specific datasets used to develop the TMD were:

— **MCAS Data:** Port staff provided information on typical truck travel distances at both TAMT and NCMT that was developed during the MCAS planning process. These data estimate typical truck trips based on the type of cargo that was being transported and include the frequency of trips and typical destinations.

— **Surveys:** To supplement and corroborate the MCAS data, the project team administered surveys between January and February 2022 to the Port's tenants and truck operators. Samples of the provided surveys and summary results are in Appendix A. The surveys included questions and inquiries to determine the truck type, make, model, year, odometer mileage, typical daily mileage, and typical time spent parked or idling. To broaden the data collected via survey, the team administered two types of surveys:

— **Fleet Manager Survey:** Distributed through Port tenants to fleet operators and requested information on their truck inventories and typical operations.

— **Driver Survey:** Provided to truck drivers at security gates upon entrance to TAMT and NCMT and requested information on their current trucks and typical operations, with a small prize drawing to incentivize responses.

— **ALPR (TAMT Only):** The ALPR provided a year's worth of entry scans at TAMT from January to December 2021. CARB staff first analyzed the dataset against its internal truck database. This yielded approximately 13,255 unique license plates from 108,667 ALPR entry records. However, only 6,917 of those 13,255 license plates had matches in CARB's heavy duty truck database, including 3,206 vehicles identified as Class 7 or Class 8 trucks. CARB's resulting output for those 3,206 trucks also contained substantial missing data, which the project team further screened to eliminate entries that lacked critical information on vehicle make, model, year, or frequency of visits. This provided a clean, internally consistent dataset of 667 unique Class 7 and Class 8 vehicles that made a total of 44,414 trips to TAMT in 2021 – a sum broadly consistent with the annual trip volume documented in the MCAS. To further validate the data, the consultant team from WSP also separately analyzed the ALPR dataset using custom software to query a public license plate database. The project team then reviewed the two analyses and found them to be broadly consistent.

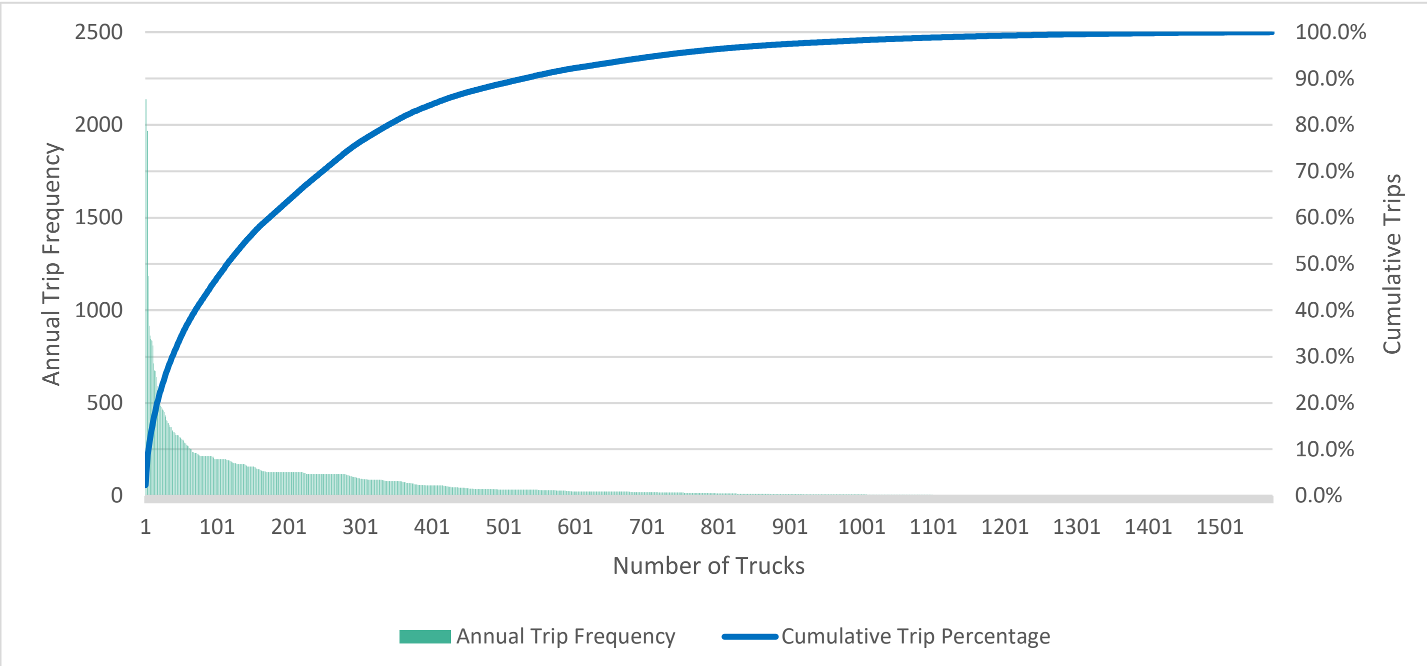
While the ALPR dataset was the most comprehensive record of truck activity at TAMT, it only provided information on truck makes, models, years, and frequency of visits to TAMT. Critically, ALPRs are unable to collect other information essential to developing ZET pathways, including odometer mileage, typical daily mileage, typical weight, typical time spent parked or idling, and specialty needs such as power take-off units.

Because each data source had limitations preventing it from accounting for the full breadth of information required to develop ZET pathways, the project team developed the TMD to serve as representative sample of all truck movements and trip profiles for both terminals, aggregating the best data available from all sources at the time of analysis.

As detailed in Appendix A, the combined data in the TMD resulted in a sample total of 1,574 trucks that annually make 92,641 truck trips to the Port. Of the 1,574 trucks in the sample, 666 and 908 trucks serve TAMT and NCMT, respectively. The data collected for both terminals indicate that most truck trips at the Port are served by a small number of trucks.

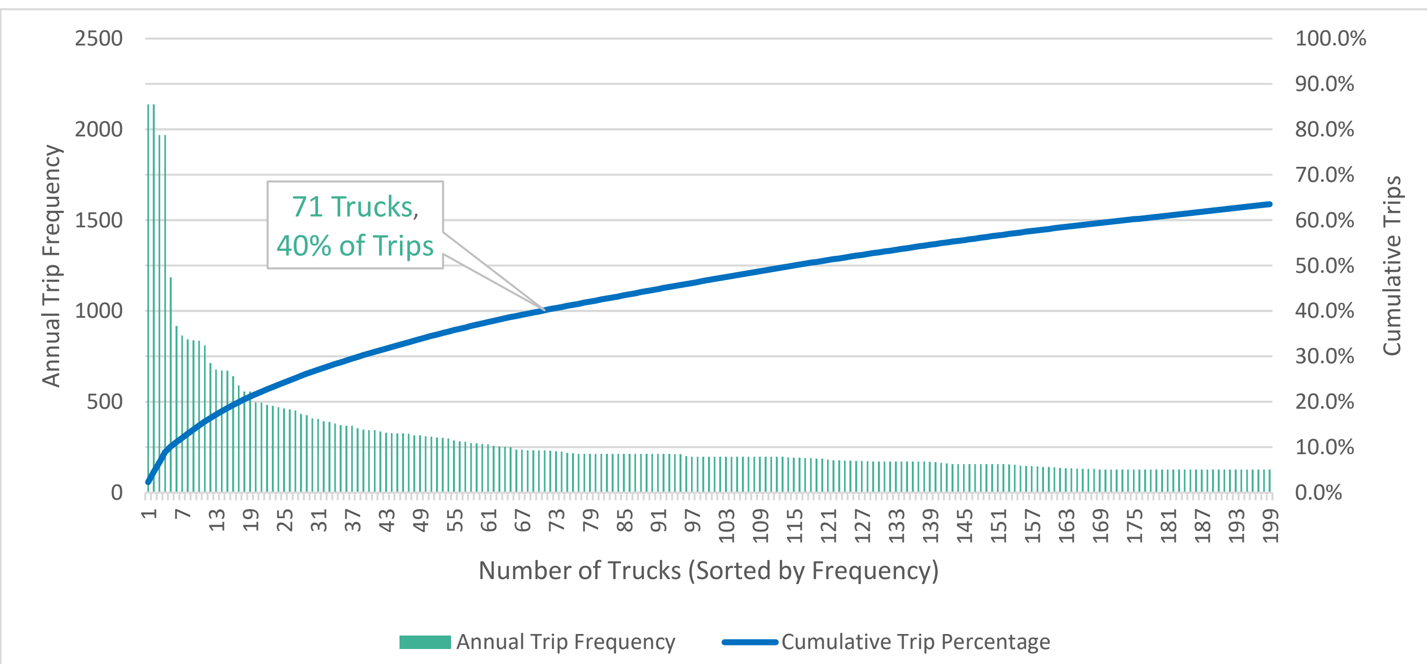
Figure 4-2 and Figure 4-3 illustrate trucks in the TMD organized by annual trip frequency relative to the cumulative trip percentage. The TMD dataset shows approximately 70 to 175 trucks make up roughly 40% to 60% of all truck trips.

Figure 4-2. Truck Movement Database: Annual Trip Frequency of Full Sample



Source: WSP

Figure 4-3. Truck Movement Database: Annual Trip Frequency – 200 Most Frequent Trucks



Source: WSP

4.3 ASSUMPTIONS AND INPUTS

Once the TMD was developed, the project team collaborated with Port staff to establish assumptions and inputs for fleet turnover and BET and FCET characteristics. These inputs were then applied to the TMD to determine if trucks and supported trips could be supported by a BET and/or FCET. Table 4-1 summarizes the assumptions/inputs that were used to model and predict the transition from ICETs to ZETs and develop the Preliminary and Alternative Pathways.

Table 4-1. Summary of Assumptions/Inputs

Category	Factor	Assumption/Input	Use and Description	Source
Vehicle Age	Vehicle Useful Life	– Preliminary Pathways: 800,000 miles or 18 years, whichever comes earlier. – Additional assumption for Alternative Pathways: A truck can be retained for a minimum of 13 years regardless of the mileage.	The useful life is used to determine when an ICET can be replaced by a ZET.	SB1 regulation
Vehicle Mileage	Annual Mileage	60,381 miles	The annual mileage was calculated using the median mileage from the TMD.	TMD
Battery-Electric Truck	State-of-Charge (SoC)	100% at the beginning of each trip.	The SoC is used to determine the energy available at the beginning of a trip.	Operational Assumption
	Vehicle Efficiency	2.4 kWh/mile (constant)	The vehicle efficiency is used to calculate the amount of energy (kWh) consumed per mile.	GNA, *California Heavy-Duty Fleet Electrification* for Schneider fleet[a]
	Advertised/Usable Battery Capacity	565/480 kWh	The advertised/usable battery capacity for a Volvo VNR was used as a baseline assumption for modeling. It was assumed that 85% of the advertised capacity (565 kWh) is usable.	Volvo VNR Electric (2022)[b]
	Battery Capacity Growth	Annual battery density growth of 7%	Based on comparable technologies for other electric vehicles, battery capacity is expected to grow over the years. Thus, the forecast of battery capacity growth is needed to assess the feasibility of future truck conversions to BETs.	BloombergNEF *Electric Vehicle Outlook 2021*[c]
	Charge Rate and Charge Curve	BETs' average charge acceptance rate of 225 kW.	The maximum charge acceptance rate of a vehicle is dictated by the battery's chemistry, infrastructure on the vehicle, and specification of the BET.	Market Average

Category	Factor	Assumption/Input	Use and Description	Source
			The opportunity charging is assumed to use 90% of the advertised charge rate power to account for these variations, meaning that 250 kW maximum charge rate will provide 225 kW of average power throughout the charge cycle.	
	Opportunity Charging	90 minutes of charging at the 225 kW rate will add approximately 337.5 kWh (141 miles)	For pathways that include opportunity charging, it is assumed that each truck will be able to charge between its daily duty cycle, outside of the scheduled depot charging, for a total of 90 minutes.	WSP, Port of San Diego
Fuel Cell Electric Truck	Range Growth	Range of 500 miles in 2023 with a linear growth to achieve 800 miles in 2030.	Currently, the FCET industry is still nascent; therefore, there is no historic data that can be obtained to forecast the range growth of FCET. However, it is assumed that the range will be comparable to a conventional diesel truck.	Hyundai

Source: WSP

(a) Gladstein, Neandross & Associates (GNA). 2021. California Heavy-Duty Fleet Electrification Summary Report. https://cdn.gladstein.org/pdfs/whitepapers/california-fleet-electrification-case-study.pdf

(b) Volvo. 2022. The Volvo VNR Electric. https://www.volvotrucks.us/trucks/vnr-electric/

(C) BloombergNEF. 2021. Electric Vehicle Outlook 2021. https://bnef.turtl.co/story/evo-2021/page/3/1 and BloombergNEF. 2021. Growing Optimism on Electric Trucks. https://about.bnef.com/blog/growing-optimism-on-electric-trucks/

(d) It is assumed that there is no weight limit to the battery capacity growth because the weight concern will be offset by the improvement of battery density (the amount of energy per kg of battery) to achieve the estimated range. Based on this analysis, the baseline range is 200 miles in 2022 and will grow to 344 by 2030. The usable capacity of 480 kWh will be 825 kWh by 2030.

While the analysis accurately captured many elements and characteristics of the fleet and ZETs, it should be noted that there were some inputs that were not captured in the analysis or applied due to ongoing analysis and/or uncertainty. Changing these assumptions and inputs, further described below, has the potential to drastically change the results of the analysis. These assumptions and inputs will need to be reevaluated in subsequent analyses and planning of the transition:

— **Opportunity Charging:** The specific location, number of chargers, and state-of-charge (SoC) of a truck are essential in understanding the outcomes of opportunity charging. Since these data were not available at the time of this analysis, 90-minute charging and 337.5 kWh replenishment were used.

— **Efficiencies:** A constant 2.4 kWh efficiency was applied to each truck. However, it is likely that trucks will have high (worse) efficiencies during loaded trips and low (better) efficiencies during unloaded trips. The specific performance of a truck will have to be further evaluated and extrapolated during a pilot or an implementation.

— **Battery Growth:** The battery growth rate is based on analysis from BloombergNEF; however, this is uncertain at this time and will have to be continuously monitored.

— **Battery Degradation:** Batteries degrade over time, effectively reducing the range. The rate of degradation varies based on usage, charge cycles, and battery SoC. For this reason, degradation was not included in this analysis; however, the included safety buffer may support some of the lost range from battery degradation as a BET enters the end of its warranty period. It is recommended that truck operators ensure that battery degradation safeguards are incorporated into vehicle warranties to mitigate impacts to range.

4.4 PATHWAY DEVELOPMENT

4.4.1 *PRELIMINARY PATHWAYS*

As previously indicated, the Preliminary Pathways assessed the initial feasibility of achieving 40% ZET trips by 2026 and 100% by 2030. The Preliminary Pathways only account for the natural vehicle turnover schedule developed from the TMD without consideration for the early retirement of trucks before the end of their useful life. Prioritization was based only on technology availability, operational feasibility, and the trucks' natural turnover schedule.

The following steps were taken to develop the Preliminary Pathways:

1. Conducted a market/technology assessment to develop technology-specific assumptions for BETs and FCETs.
2. Identified five Preliminary Pathways to be explored based on available ZE technology to replace the current ICETs, including a BET-only pathway (with and without opportunity charging), a FCET-only pathway, and a pathway with a mix of FCETs and BETs (with and without opportunity charging).
3. Estimated trucks' natural turnover schedule based on the useful life assumption.
4. Developed BET battery capacity and FCET range growth forecast.
5. Calculated the energy (kilowatt-hour/kWh) needed by each truck to complete its daily trip(s).
6. Developed BET battery capacity and FCET range growth forecasts.
7. Compared the energy needed (Step 4) with battery capacity growth (Step 5) to determine the earliest possible year of electrification.
8. Determined the most suitable technology to replace the truck:
    a. BET-suitable: if the natural turnover schedule (Step 3) occurs after a BET with sufficient battery capacity is available on the market.
    b. FCET-suitable: if the natural turnover schedule (Step 3) occurs after an FCET with sufficient range is available on the market.
    c. BET- and FCET-suitable: If a truck trip is both BET- and FCET-suitable, BET technology is prioritized.
    d. Non-ZET-suitable: if the natural turnover schedule (Step 3) occurs before any BET or FCET with sufficient range is available on the market.
9. For pathways that included opportunity charging, increased the battery capacity growth forecast (Step 5) by adding 337.5 kWh to the overall usable battery capacity. Reassessed the most suitable technology to replace the truck.
10. Summed the annual port trips made by the trucks that can be converted to ZETs.
11. Analyzed the impact of opportunity charging by adding an additional 337.5 kWh to overall usable battery capacity.
12. Assessed the feasibility of achieving the goals of 40% ZET trips by 2026 and 100% ZE trips by 2030, based on Step 9.
13. Provided preliminary recommendations about the Targeted Pathway and technology to achieve MCAS goals.

4.4.2 *ALTERNATIVE PATHWAYS*

The Alternative Pathways were developed based on direction provided by the Board and other stakeholders based on their review of the Preliminary Pathways. Alternative Pathways considered optimizations (or "scenarios") such as early retirement and analyzed the impact of a transition with the fewest number of trucks and/or the fewest costs. The possibility of a near-zero emission (NZE) pathway was also considered.

The following steps were taken to develop the Alternative Pathways:

1. For trucks that are supposed to be retired after 2026, assessed the possibility of early retirement.
   a. Trucks are suitable for early retirement if the natural turnover rate is later than the forecasted technology availability.
   b. Assumed that all early retirement happens in 2026 to maximize trucks' useful life before the first 2026 MCAS goal.
2. Re-prioritized the trucks in the database based on the total number of annual Port trips (including the early retirement trucks).
3. Determined the number of trucks to achieve exactly 40% ZET trips by 2026 by summing the annual Port trips of the sorted trucks. A set of threshold ages of trucks' early retirement (no threshold, retired within six years, three years, and a year before end of life) was analyzed.
4. Added sensitivity analysis regarding the assumed useful life of the vehicles. A truck's age and mileage are both useful indicators when determining its useful life, and the sensitivity analysis was done to determine the impacts of both.
   a. Miles-sensitive useful life: Truck operators will retire the trucks as soon as they reach 800,000 miles, regardless of the actual vehicle age.
   b. Age-sensitive useful life: Truck operators will keep operating trucks for a minimum of 13 years, regardless of the mileage. After 13 years, the vehicles will be retired as soon as they reach 800,000 miles or 18 years, whichever is earlier.
5. Calculated the costs of achieving the 40% goal based on the number of trucks converted.
6. Assessed the pathway(s) with the least amount of trucks and costs.
7. Considered the possibility of using NZE trucks as a contingency strategy, especially for trucks that are exempted from state regulations.

4.5 COSTS AND EMISSIONS

Other factors included in the alternatives analysis are the estimated costs of the transition and forecasted emission reductions. These two elements are essential in gauging the efficacy of each Alternative Pathway.

4.5.1 *COSTS*

The transition to BETs or FCETs will require both trucks and supporting infrastructure. Additionally, it is essential for the Port to understand the estimated costs for each pathway, so it may best advocate and pursue outside funding that reduces overall DPM from these sources. The cost analysis includes the overall capital cost calculation for all pathways and total cost of ownership (TCO) estimates focusing on BETs for financing and incentive recommendation purposes. For pathways with early retirement, the calculation also includes the residual value of the diesel trucks' capital costs that are underutilized due to the early retirement.

It should be noted that cost estimates are a rough order of magnitude and can be used to inform decisions, but more specific and accurate estimates will be made available upon future site-specific planning and discussions with individual truck operators.

Table 4-2 provides a summary of the cost assumptions used in the analysis.

Table 4-2. Summary of Cost Assumptions

Category	BET	FCET	Diesel	Note	Source
Capital Costs					
Vehicle Capital Cost	$375,000	$500,000	$125,000	Excludes taxes, customizations, and other fees.	Market Average
Charger Costs	$180,000	N/A	N/A	300 kW DC charger assumed for depot charging.	Approximated from Siemens 300kW charger price
	$400,000	N/A	N/A	500 kW DC charger with two dispensers assumed for opportunity charging at public charging stations.	Approximated from Heliox 450kW charger price
Hydrogen refueling station	N/A	$10,000,000	N/A	For 18,000-gallon LH2 storage.	Orange County Transportation Authority
Diesel fueling station	N/A	N/A	$0	Assuming no new diesel infrastructure is needed.	N/A
Early Retirement Cost	N/A	N/A	Varies based on remaining useful life	(Vehicle Cost/Expected Useful Life) × Remaining Useful Life.	N/A
TCO Assumptions (BET and Diesel Trucks Only)					
Vehicle Useful Life	13 years	N/A	13 years	Assuming 800,000 miles of useful life and 60,381 annual miles.	Market Average
Vehicle Taxes	9% sales tax + 12% federal excise tax			N/A	CARB ACF TCO Report[a]
Vehicle Down Payment	$37,500	N/A	$12,500	10% of vehicle cost.	Market Average
Financing	7% interest rate, amortized over 6 years			N/A	Market Average

Category	BET	FCET	Diesel	Note	Source
Charger Useful Life	10 years	N/A	N/A	Infrastructure costs are assumed to be amortized over five years, exclusive of tax and interests.	Market Average
Fuel Cost	$0.18/kWh	N/A	$4.22/gallon	Electricity costs can vary based on the demand charge.	SDG&E (Electricity), Three years average (diesel)
Maintenance Cost	$0.149/mile	N/A	$0.198/mile	Cost of labor and parts for routine and preventative maintenance.	CARB ACF TCO Report
Other Fees and/or Considerations	$1,898/year	N/A	$2,895/year	Registration and other vehicle fees.	CARB ACF TCO Report
Vehicle End-of-Lifetime Value	$75,000	N/A	$12,500	Represents the value of the vehicle at the point where the initial purchaser sells the vehicle to another party.	CARB ACF TCO Report, adjusted for diesel truck

Source: WSP

[a] California Air Resources Board. 2021. Draft Advanced Clean Fleets Total Cost of Ownership Discussion Document. https://ww2.arb.ca.gov/sites/default/files/2021-08/210909costdoc_ADA.pdf

4.5.2 *EMISSIONS*

The emission reduction analysis aims to assess the potential air pollutants and GHGs reduction of ZETs and near-zero emission trucks (NZETs) compared to ICETs.

The types and amounts of GHGs emitted during the production of fuel (upstream emissions) are based on the methods and regulations in the geography in which the fuel is generated. For example, California requires that all diesel used in the state comply with low sulfur requirements. Each regional power plant also uses a varying mix of renewable and non-renewable energy to generate electricity. Taking into consideration these nuances, the analysis uses the pathways sourced from the Argonne National Lab's Greenhouse Gases, Regulated Emissions, and Energy Use in Technologies (GREET) Model[9] to calculate the annual GHGs upstream emissions. Table 4-3 summarizes the assumptions used in the GREET model. It is assumed that fuel efficiency will remain constant.

Table 4-3. Emission Reduction Assumptions for GREET Model

Fuel	GREET Fuel Production Pathways	Fuel Efficiency (mpdge)[a]
Diesel	California Low Sulfur Diesel	6
Compressed Natural Gas (CNG)	North America CNG	6.22
Renewable Natural Gas (RNG)	CNG from Waste (Landfill Gas)	6.22
Electricity	California Grid Mix	15.4
Hydrogen	Natural Gas SMR; 100% Electrolysis from CA Grid Mix	12.6

Source: Argonne GREET Model, WSP

[9] Argonne National Laboratory. 2022. GREET® Model. https://greet.es.anl.gov/

[(a)] Miles per diesel gallon equivalent

The amount of tailpipe GHGs and air pollutants emitted from different fuel types are calculated by using the CARB's Emission Factor Model (EMFAC). The model takes into consideration California-specific regulations, which results in stricter NO_X and particulate matter (PM) regulations compared to other states.[10] The emissions from brake and tire wears are not included in the calculation. Table 4-4 summarizes the assumptions used in the EMFAC model. For more information on diesel PM related health risk, readers should refer to the Port's Health Risk Assessment (2022) that focuses on diesel PM at the District's marine cargo terminals.

Table 4-4. Emission Reduction Assumptions for EMFAC Model

Category	Selection
Model	EMFAC2021 v1.0.2
Region Type	County, San Diego
Vehicle Category	T7 Other Port Class 8 (Diesel)/T7 Public Class 8 (CNG)
Model Year	Aggregate
Speed	Aggregate
Other Operating Conditions	EMFAC Standard Inputs

Source: CARB EMFAC

The following steps were conducted to calculate emissions:

1. Identified the fuel production pathways to be analyzed for each type of fuel (i.e., electricity, hydrogen, and diesel).
2. Calculated the GHG emission factor (grams per mile [g/mile]) of fuel production using the GREET Model, using the assumed fuel efficiency.
3. Selected the fuel type and vehicle to be modeled in EMFAC.
4. Calculated both GHGs and air pollutants tailpipe emission factor (g/mile).
5. Added up the upstream and tailpipe emission factors (g/mile).
6. Multipied the emission factor with the annual vehicle miles (60,381 miles) to get total emissions.
7. Compared diesel truck emissions to those of ZETs or NZETs.

[10] The EMFAC includes several California-specific truck-related policies and regulations, such as the Heavy Duty Warranty regulation (phase 1), Amendments to HDV Inspection Program and Periodic Smoke Inspection Program, Advanced Clean Truck (ACT), and Heavy Duty Omnibus Regulation. Refer to the CARB EMFAC documentation (2021) for detailed assumptions.

5 PRELIMINARY PATHWAYS

The following section provides an overview of the Preliminary Pathways, the analysis, challenges, and strategies of each, a summary of findings, and an explanation of which Preliminary Pathways will be further evaluated in the Alternative Pathways analysis.

5.1 OVERVIEW

As previously mentioned, the Preliminary Pathways were established to identify the initial viability of meeting the 2026 and 2030 goals. The pathways and accompanying analysis are based on predictive modeling that is reliant upon the methodology, assumptions, and data presented in Section 4. The findings of the Preliminary Pathways are then used to inform the Alternative Pathways, including optimizations such as early retirement of vehicles. The Preliminary Pathways consist of five pathways for 2026 and 2030, respectively:

- **Preliminary Pathway 1: All BETs (without opportunity charging):** a transition to 2026 and 2030, respectively, with only BETs that are charged overnight (or midday) at their facilities.
  - **Preliminary Pathway 1A: All BETs (with opportunity charging):** a transition to 2026 and 2030, respectively, with BETs that will have overnight charging supplemented by charging in-service at opportunity charging sites.
- **Preliminary Pathway 2: All FCETs:** a transition to 2026 and 2030 with only FCETs.
- **Preliminary Pathway 3: BETs and FCETs (without opportunity charging):** a transition to 2026 and 2030, respectively, with BETs and FCETs, that prioritizes BETs. BETs are only charged overnight (or midday) at their facilities.
  - **Preliminary Pathway 3A: BETs and FCETs (with opportunity charging):** a transition to 2026 and 2030, respectively, with BETs and FCETs, that prioritizes BETs. BETs will have overnight charging supplemented by charging in-service at opportunity charging sites.

The following sections provide detailed analysis and takeaways from each analyzed Preliminary Pathway.

5.2 PRELIMINARY PATHWAY 1: ALL BETS (WITHOUT OPPORTUNITY CHARGING)

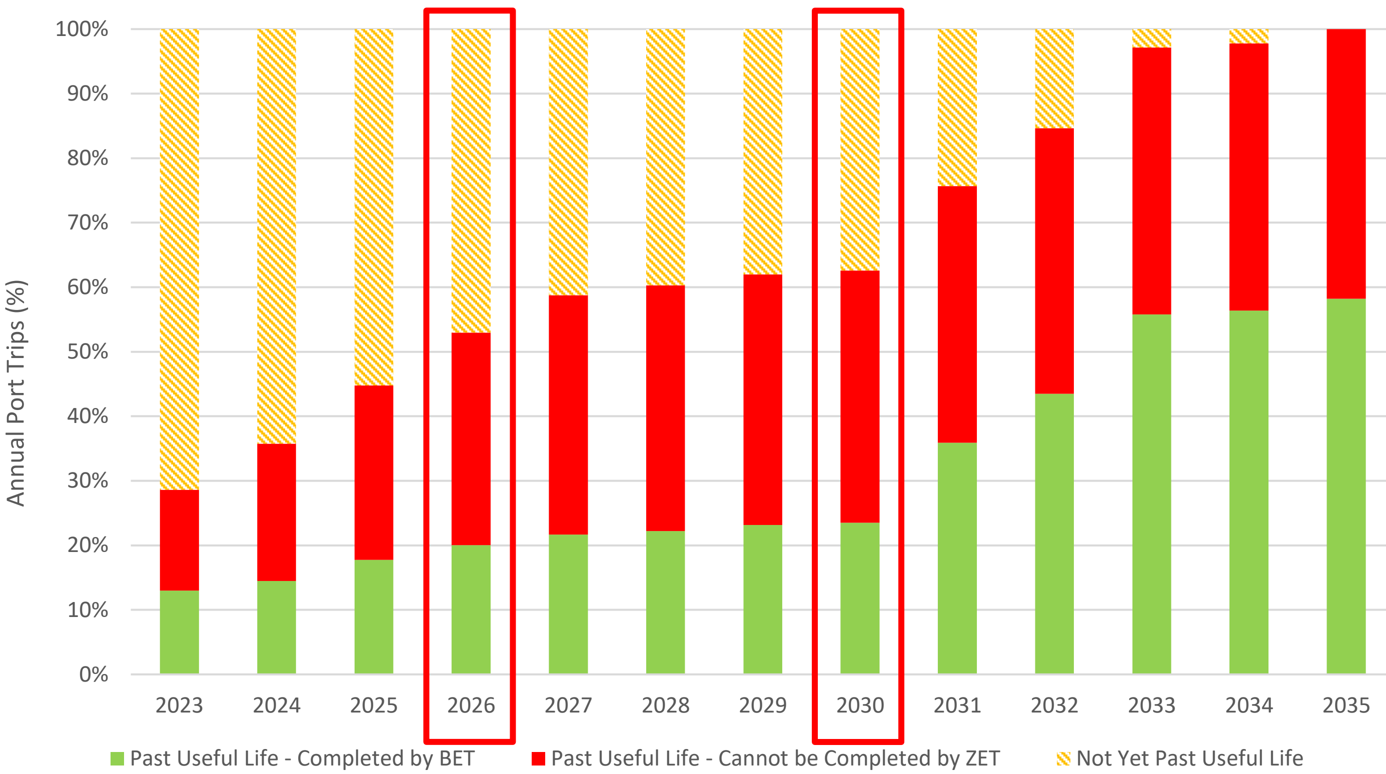
5.2.1 *ANALYSIS*

A ZET strategy using Preliminary Pathway 1, which does not include early retirement of diesel trucks, would fall short of meeting both the 2026 and 2030 goals. In 2026, approximately 20% of trips can be supported by 252 BETs, 20% short of the goal. In 2030, approximately 24% of trips can be supported by 355 trucks, 76% short of the goal.

The majority of trucks that are suitable to be replaced by BETs serve TAMT. In 2026, of the 252 trucks that are suitable to be operated and replaced with BETs, 176 serve TAMT, and 76 serve NCMT. In 2030, 355 trucks are suitable to be operated and replaced with BETs: 231 serve TAMT and 124 serve NCMT.

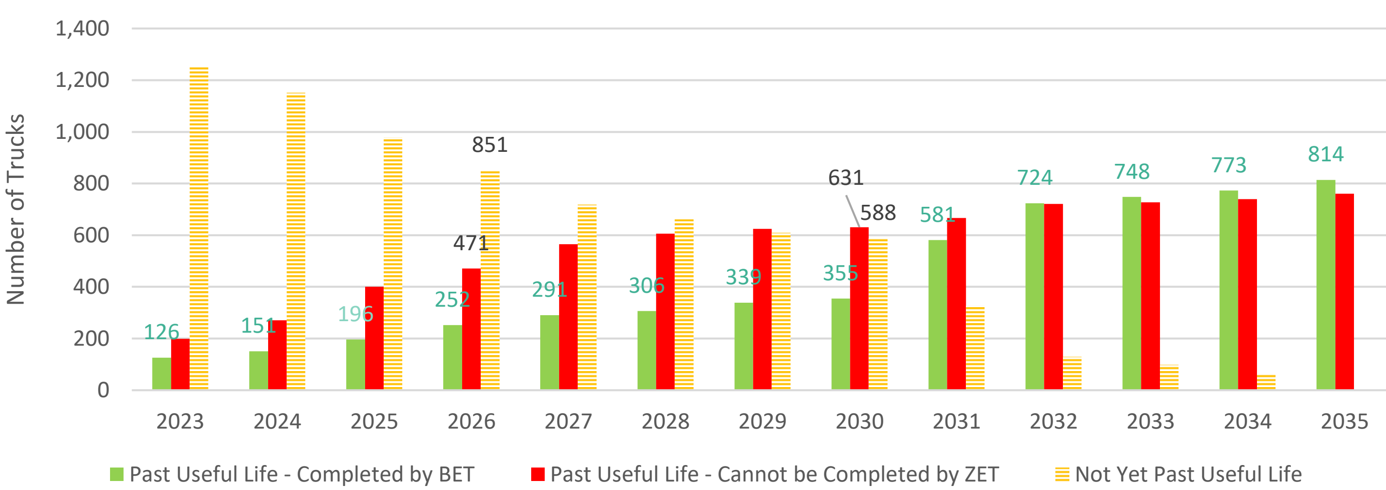
Figure 5-1 and Figure 5-2 illustrate the percentage of ZET trips and the number of ZETs, respectively. Figure 5-3 presents the composition of trucks and the percentage of trips by terminal.

Figure 5-1. Preliminary Pathway 1: Percentage of Port-serving Zero emission Trips, per year



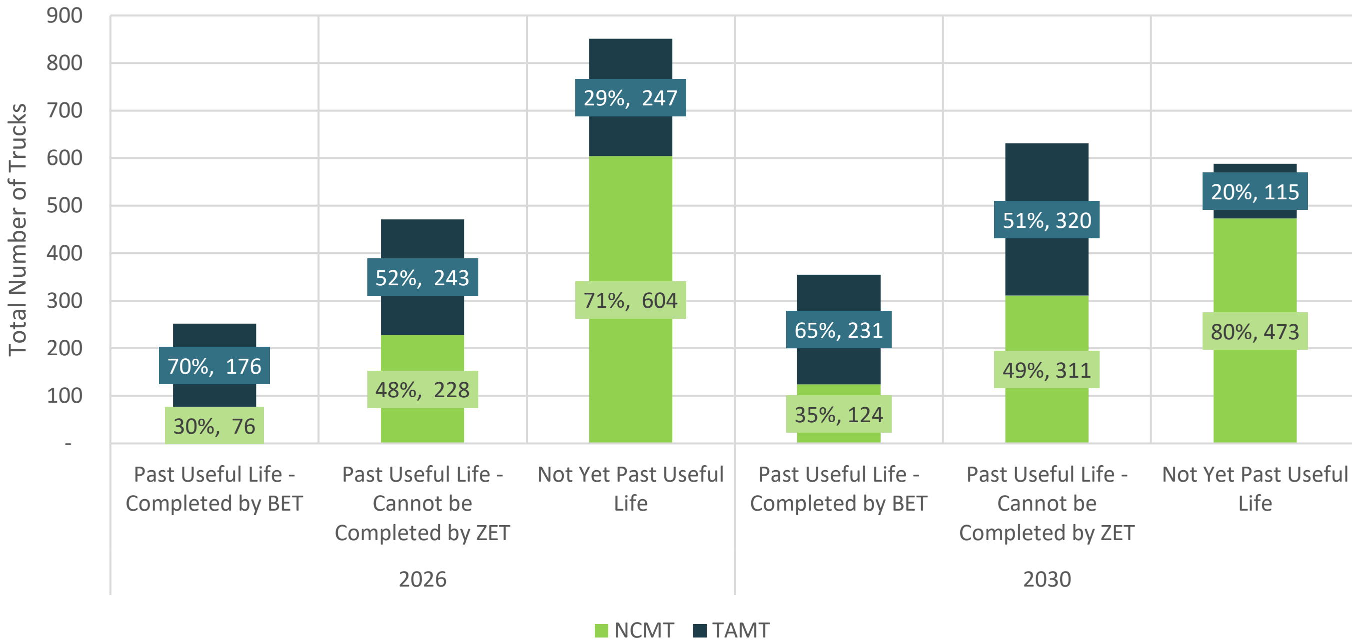
Source: WSP

Figure 5-2. Preliminary Pathway 1: Number of Zero emission Trucks serving the Port, per year



Source: WSP

Figure 5-3. Preliminary Pathway 1: Number of Trucks by Terminal



Source: WSP

Note: There are currently 18 existing BETs serving NCMT and two BETS serving TAMT.

5.2.2 *CHALLENGES TO MEETING GOALS*

To achieve the 2026 goal, the main challenge is that many trucks' duty cycles are too demanding for the current state of BET technology. There are 471 trucks (33% of port trips) that are eligible for retirement in 2026 with daily range exceeding the projected range of BETs at that time. On average, these trucks have a 443-mile daily mileage, which exceeds the forecasted 262-mile range that BETs can support in 2026. The majority of trucks that fit this profile serve TAMT. Based on the proposed ACF regulation, however, these trucks may be removed from operation at California seaports and forced to adopt logistical changes to meet the status of BET technology. Opportunity charger networks will be essential to minimize the logistical changes needed so the trucks can maintain their current duty cycles with BETs.

Conversely, there are several trucks that have duty cycles that can be supported by BET technology in 2026. However, they are not at the end of their useful lives. These trucks can potentially be converted to BETs if truck operators are willing to retire or supplement their fleet with an additional BET before the end of a diesel truck's useful life. The early retirement analysis is discussed further in Section 6.

To achieve the 2030 goal, the main challenge is the large number of trucks that will not have reached the end of their useful lives by 2030. Without consideration of ZE technology and constraints, only 63% of the total trucks that make up 63% of Port trips are eligible for retirement by 2030. The majority of trucks that have not reached the end of their useful lives in 2030 serve NCMT. All vehicles are expected to turn over naturally by 2035. Therefore, early retirement is key to achieving the 2030 goal.

In 2030, there will be 160 additional trucks, as compared to 2026, that are eligible for retirement but cannot be supported by BET technologies. These trucks have an average daily mileage of 506 miles, which exceeds the forecasted 344-mile range that BETs can support in 2030. If battery technology advances beyond the assumptions used in this analysis, more trucks may be able to convert to BETs by the end of the decade.

5.3 PRELIMINARY PATHWAY 1A: ALL BETS (WITH OPPORTUNITY CHARGING)

5.3.1 *ANALYSIS*

Preliminary Pathway 1A also considers only BETs, but it assumes that each BET will be able to charge for at least 90 minutes on its trips to increase its daily range. The 90 minutes of opportunity charging is estimated to provide an additional 337.5 kWh of energy and 141 miles of range.

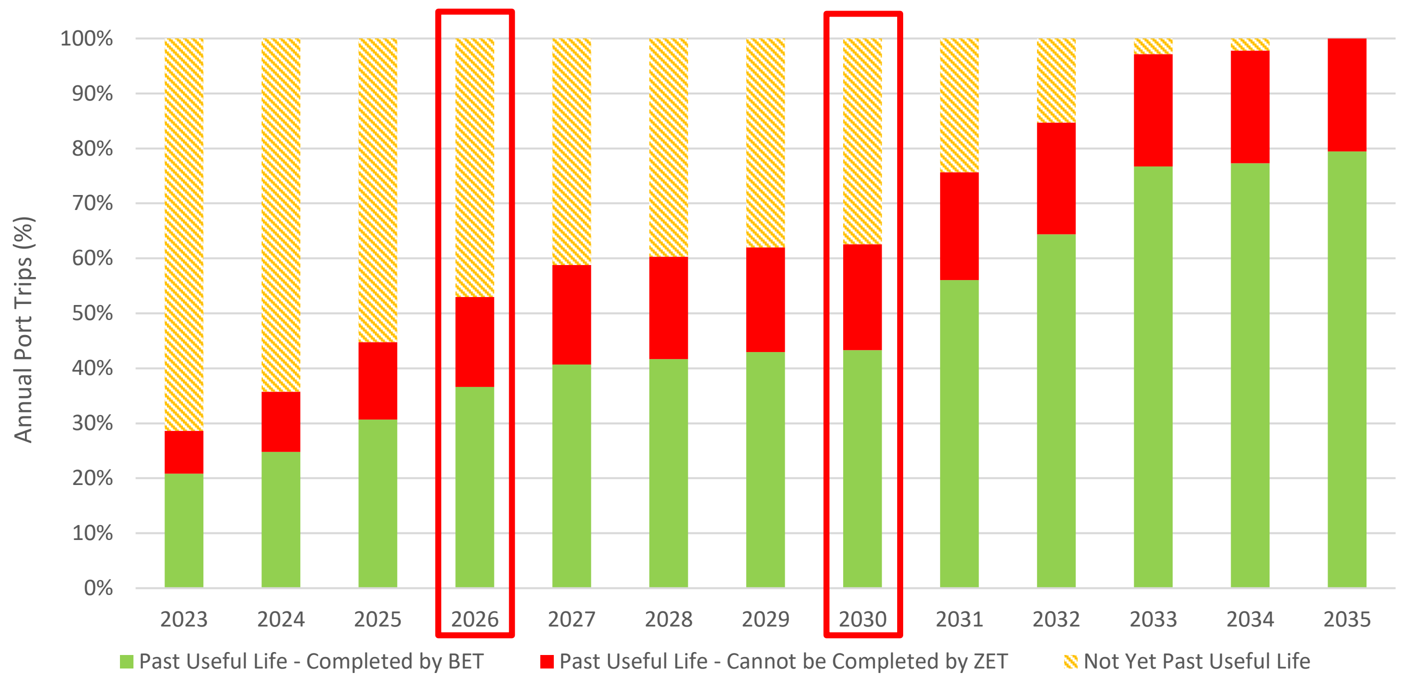
A ZET strategy using Preliminary Pathway 1A improves the results of all BETs without opportunity charging. However, it would still fall short of meeting both the 2026 and 2030 goals

In 2026, approximately 37% of trips can be supported by 428 BETs, 3% short of the goal. In 2030, approximately 43% of trips can be supported by 598 trucks, 67% short of the goal.

The majority of trucks that are suitable to be replaced by BETs serve TAMT. In 2026, of the 428 trucks that are suitable to be operated and replaced with BETs, 257 serve TAMT and 161 serve NCMT. In 2030, 598 trucks are suitable to be operated and replaced with BETs: 349 serve TAMT, and 249 serve NCMT.

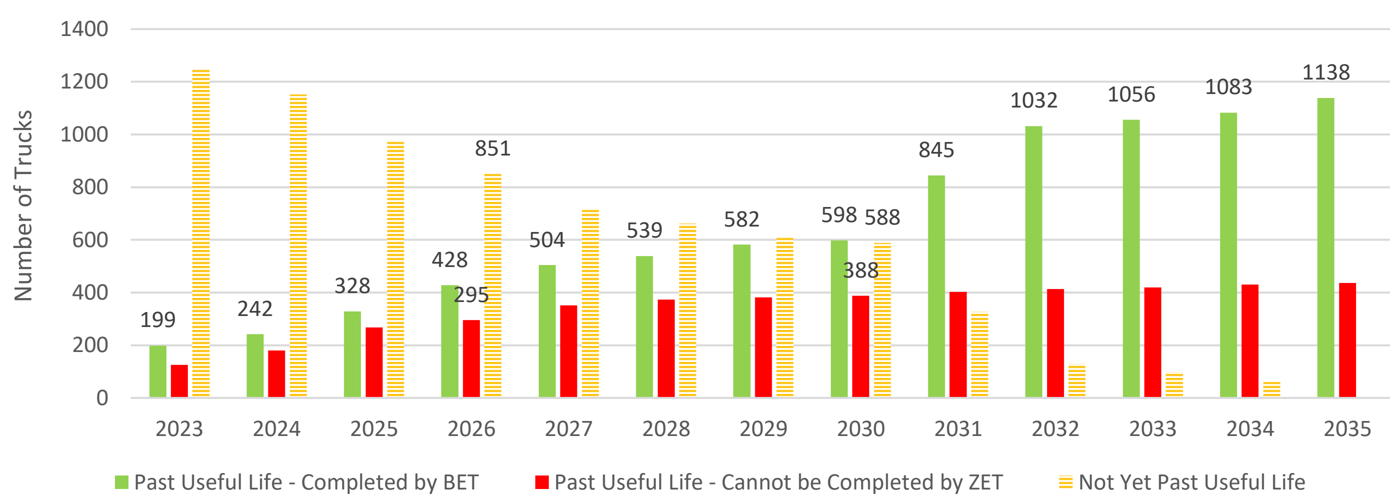
Figure 5-4 and Figure 5-5 illustrate the percentage of ZET trips and the number of ZETs, respectively. Figure 5-6 presents the composition of trucks and the percentage of trips by terminal.

Figure 5-4. Preliminary Pathway 1A: Percentage of Port-serving Zero emission Trips, per year



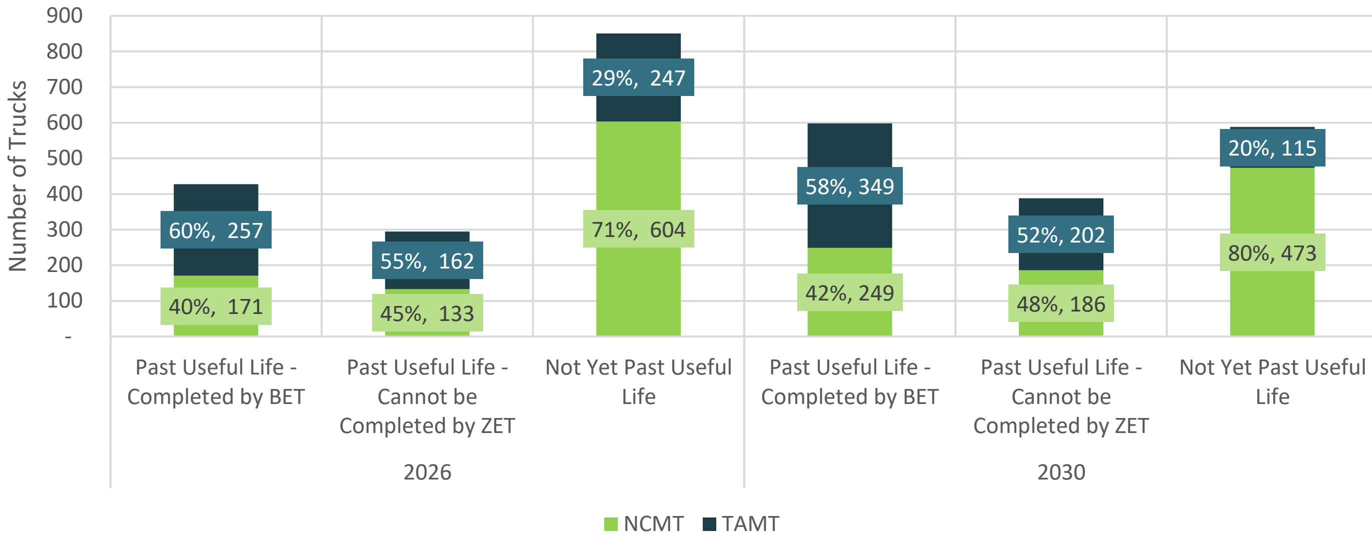
Source: WSP

Figure 5-5. Preliminary Pathway 1A: Number of Zero emission Trucks serving the Port, per year



Source: WSP

Figure 5-6. Preliminary Pathway 1A: Number of Trucks by Terminal



Source: WSP
Note: There are currently 18 existing BETs serving NCMT and two BETS serving TAMT.

5.3.2 *CHALLENGES TO MEETING GOALS*

In 2026, there are 295 trucks (16% of annual port trips) that will be eligible for retirement with duty cycle requirements exceeding the forecasted BET technology at that time. These trucks have an average daily mileage of 517 miles, which is longer than the forecasted 403-mile BET range with opportunity charging in 2026. The majority of trucks that cannot be replaced by BETs serve TAMT.

Based on the proposed ACF regulation, however, these trucks may be removed from operation at California seaports and forced to adopt logistical changes to align with BET technology. A longer period than 90 minutes of opportunity charging is needed if the trucks are to maintain current duty cycles using BETs. Changes to current truck operators' pay structure and hours of service may be needed to accommodate the longer opportunity charging duration (refer to Section 7.2).

In 2030, there will be 93 additional trucks, as compared to 2026, that are eligible for retirement but cannot be supported by BET technologies. These trucks have an average daily mileage of 602 miles, which exceeds the forecasted 484-mile range that BETs can support in 2030 (with opportunity charging).

5.4 PRELIMINARY PATHWAY 2: ALL FCETS

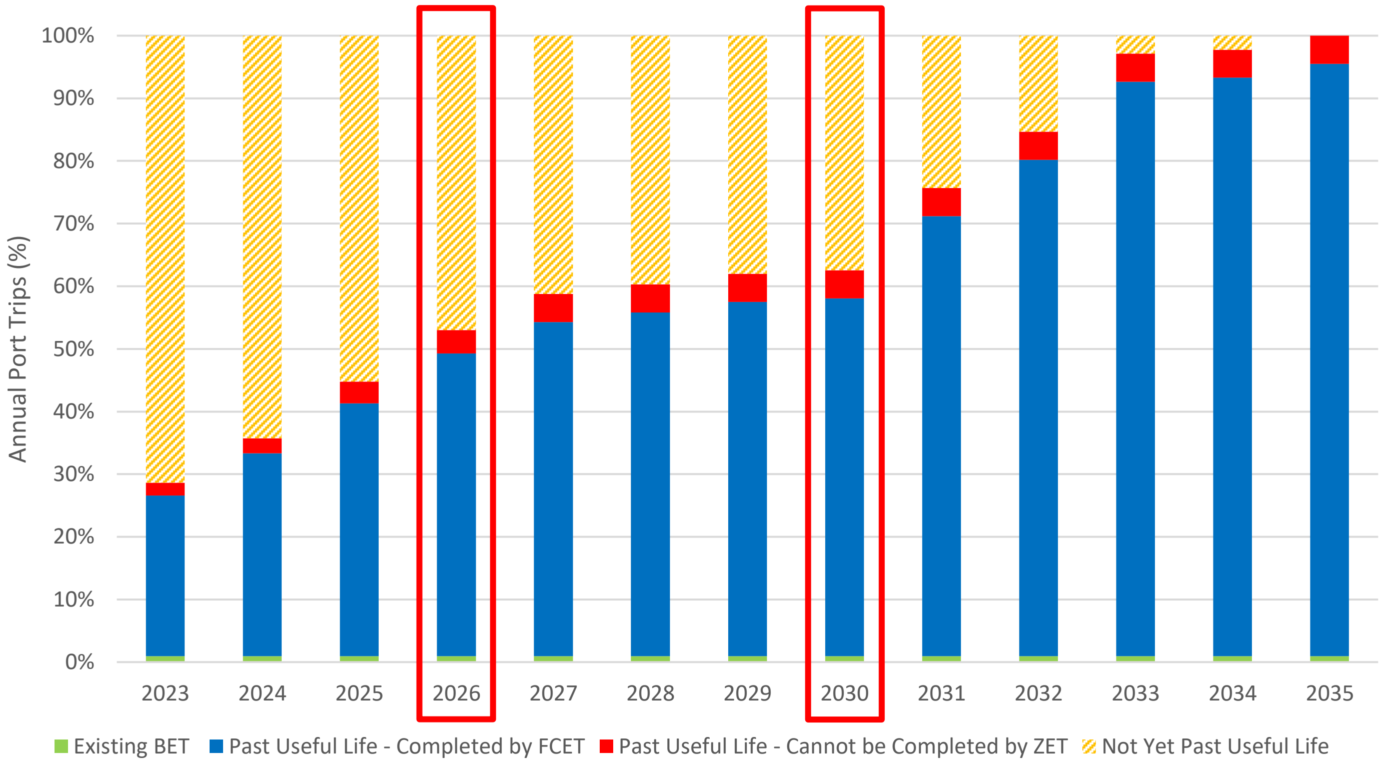
5.4.1 *ANALYSIS*

A ZET strategy using Preliminary Pathway 2 can achieve the 2026 goal but not the 2030 goal. In 2026, approximately 49% of trips can be supported by 611 FCETs. In 2030, approximately 58% of trips can be supported by 852 FCETs, 42% short of the goal.

The majority of trucks that are suitable to be replaced by FCETs serve TAMT. In 2026, of the 611 trucks that are suitable to be operated and replaced with BETs, 376 serve TAMT, and 244 serve NCMT. In 2030, 852 trucks are suitable to be operated and replaced with FCETs: 495 serve TAMT, and 357 serve NCMT.

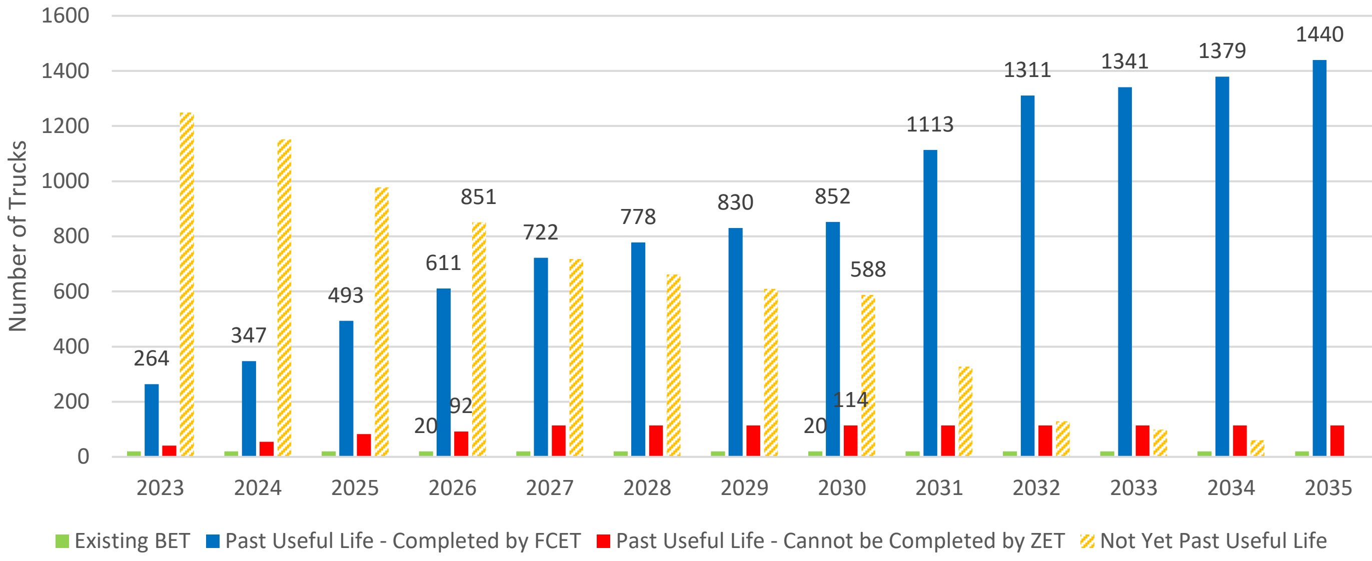
Figure 5-7 and Figure 5-8 illustrate the percentage of ZET trips and the number of ZETs, respectively. The red section indicates the number of trucks or trips that cannot be completed by an FCET without any refueling during the day. However, if hydrogen fueling stations are expanded along major freight corridors by 2030, FCETs should be capable of meeting all of the trips. Figure 5-9 presents the composition of trucks and the percentage of trips by terminal.

Figure 5-7. Preliminary Pathway 2: Percentage of Port-serving Zero emission Trips, per year



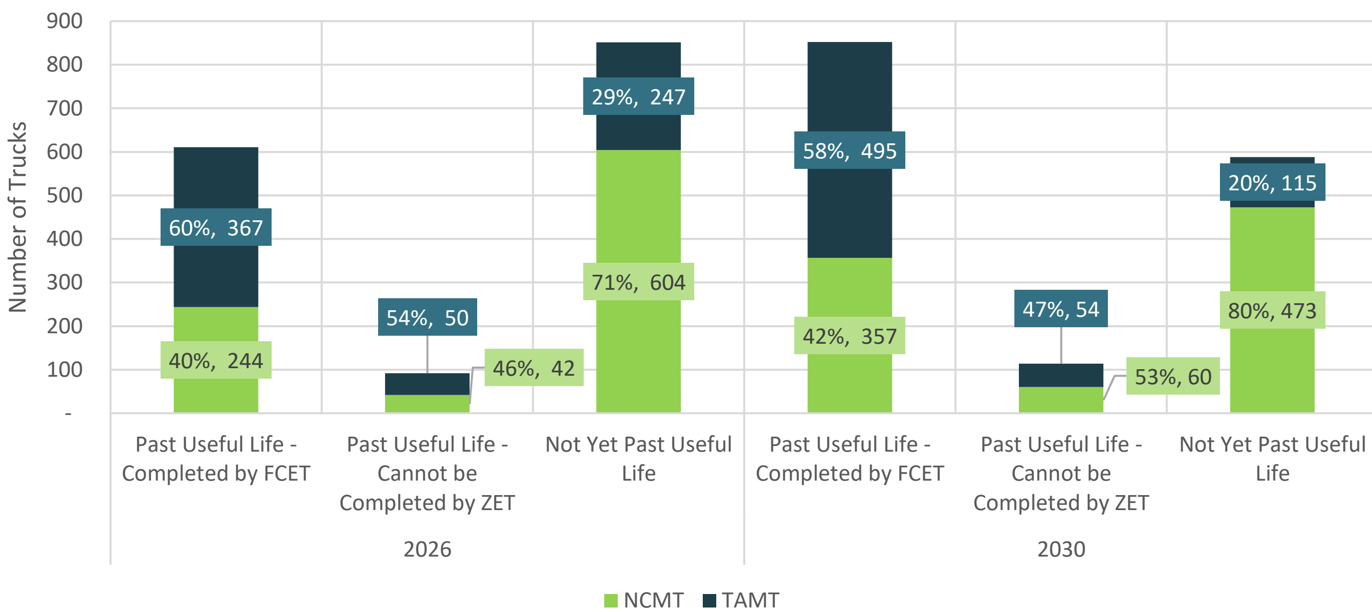
Source: WSP

Figure 5-8. Preliminary Pathway 2: Number of Zero emission Trucks serving the Port, per year



Source: WSP

Figure 5-9. Preliminary Pathway 2: Number of Trucks by Terminal



Source: WSP
Note: There are currently 18 existing BETs serving NCMT and two BETS serving TAMT.

5.4.2 *CHALLENGES TO MEETING GOALS*

The main challenge for Preliminary Pathway 2 to meet the short-term 2026 goal is technology availability. The first FCET in the US market is expected to be commercially available in 2023 or 2024. Secondly, there are few fueling stations available to the public—let alone stations with pressure and dispensers to support heavy-duty vehicles—and the kilogram price per mile is still higher than that of diesel. Increased vehicle availability, fueling station network expansion, and reduced hydrogen costs remain very limited today, and significant and rapid advancement would be needed to achieve the 2026 goal with all FCETs.

To achieve the 2030 goal, the main challenge is the large number of trucks that have not reached the end of their useful lives by 2030. Without consideration of ZE technology and constraints, only 63% of the total trucks that make up 63% of Port trips will be eligible for retirement by 2030. All vehicles are expected to turn over naturally by 2035. Moreover, 7% of the total trucks that serve the Port will need to refuel in the middle of their duty cycles to complete the daily trip requirement. Therefore, an increase in the number of hydrogen fueling stations is increasingly important to achieve 100% ZE port trips by 2030.

5.5 PRELIMINARY PATHWAY 3: BETS AND FCETS (WITHOUT OPPORTUNITY CHARGING)

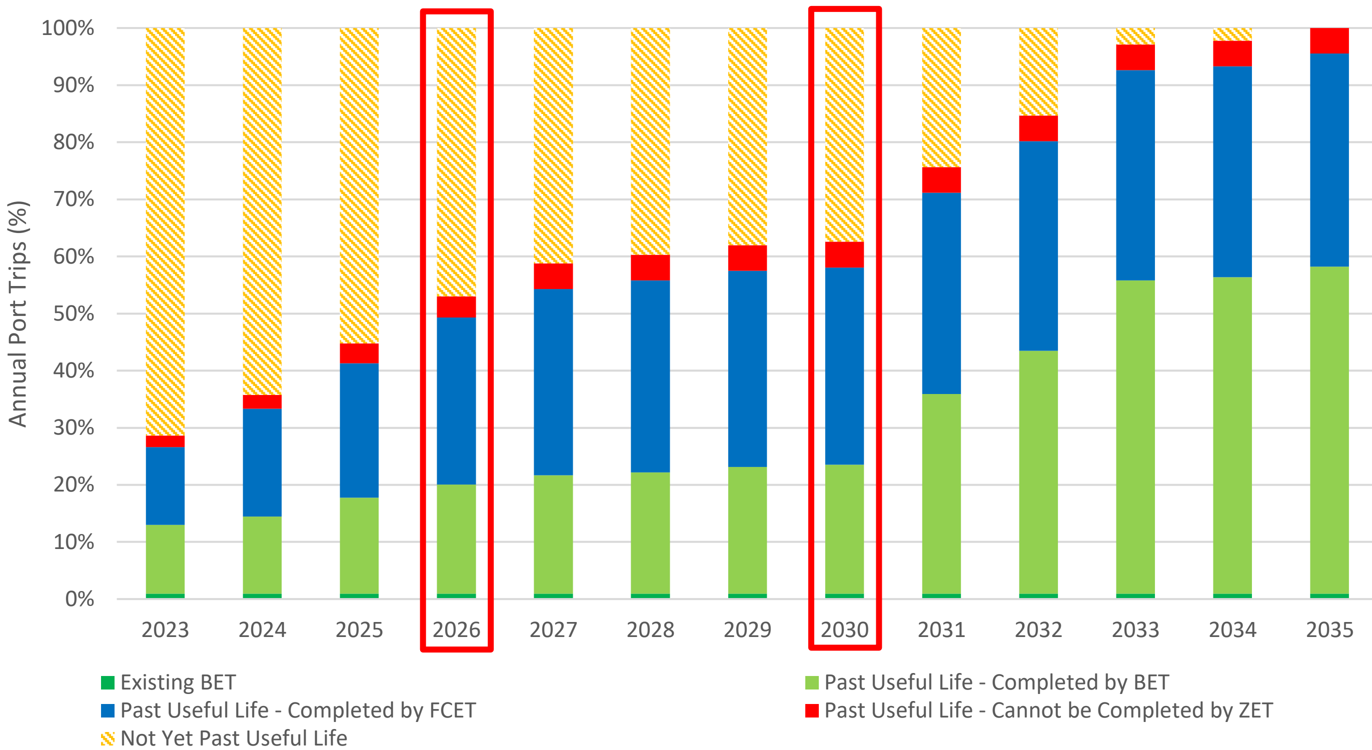
5.5.1 *ANALYSIS*

A ZET strategy using Preliminary Pathway 3 would achieve the 2026 goal but fail to achieve the 2030 target. In 2026, approximately 49% of trips can be supported by 650 ZETs (271 BETs and 379 FCETs). In 2030, approximately 58% of trips can be supported by 852 trucks (335 BETs and 517 FCETs), 42% short of the goal.

The majority of trucks that are suitable to be replaced by ZETs serve TAMT. Both terminals have a comparable number of trucks that can be replaced by FCETs. However, a greater number of TAMT-serving trucks than NCMT-serving trucks are suitable for a BET's duty cycle. A total of 244 trucks that serve NCMT and 367 trucks that serve TAMT can be replaced by ZETs in 2026. The number of ZET-suitable trucks will increase over the years, with a total of 357 NCMT-serving ZETs and 495 TAMT-serving BETs in 2030.

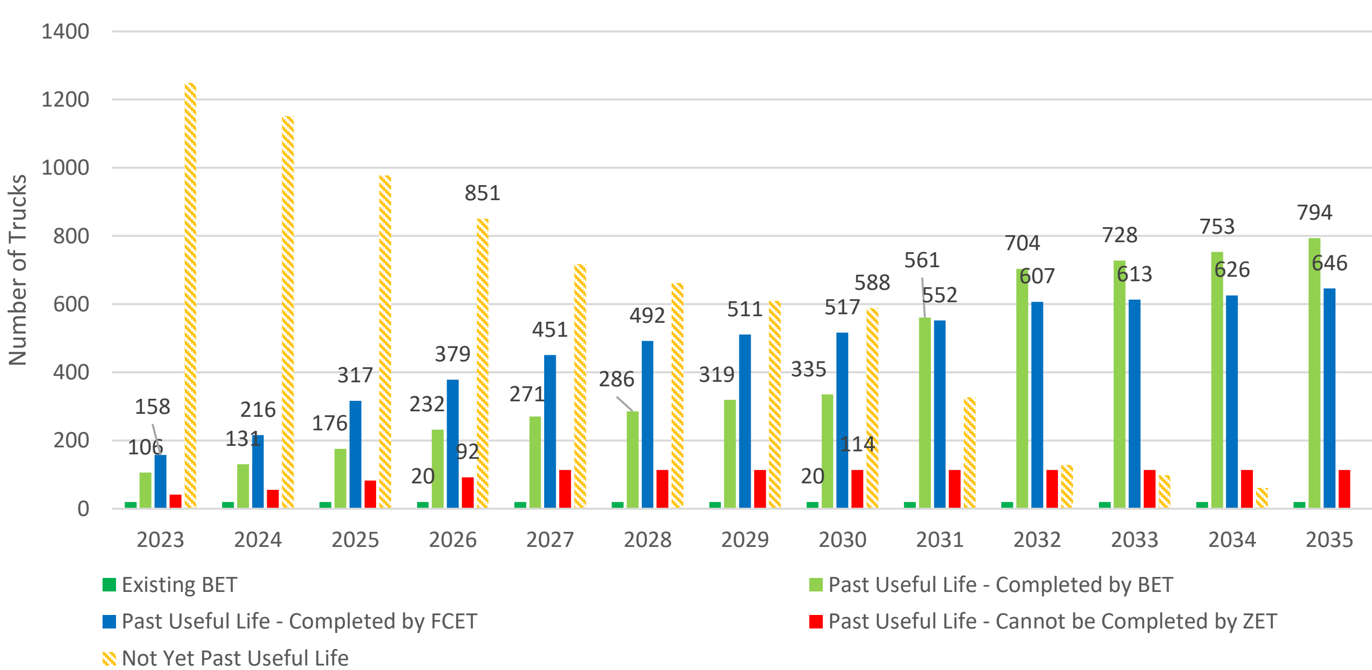
Figure 5-10 and Figure 5-11 illustrate the percentage of ZET trips and the number of ZETs, respectively. The red portions indicate the number of trucks or trips that cannot be completed by both technologies without refueling/charging during the day. If BETs cannot utilize opportunity charging during the day, most of the ZETs in 2026 and 2030 will consist of FCETs because of the longer ranges that they provide. Figure 5-12 presents the composition of trucks and the percentage of trips by terminal.

Figure 5-10. Preliminary Pathway 3: Percentage of Port-serving Zero emission Trips, per year



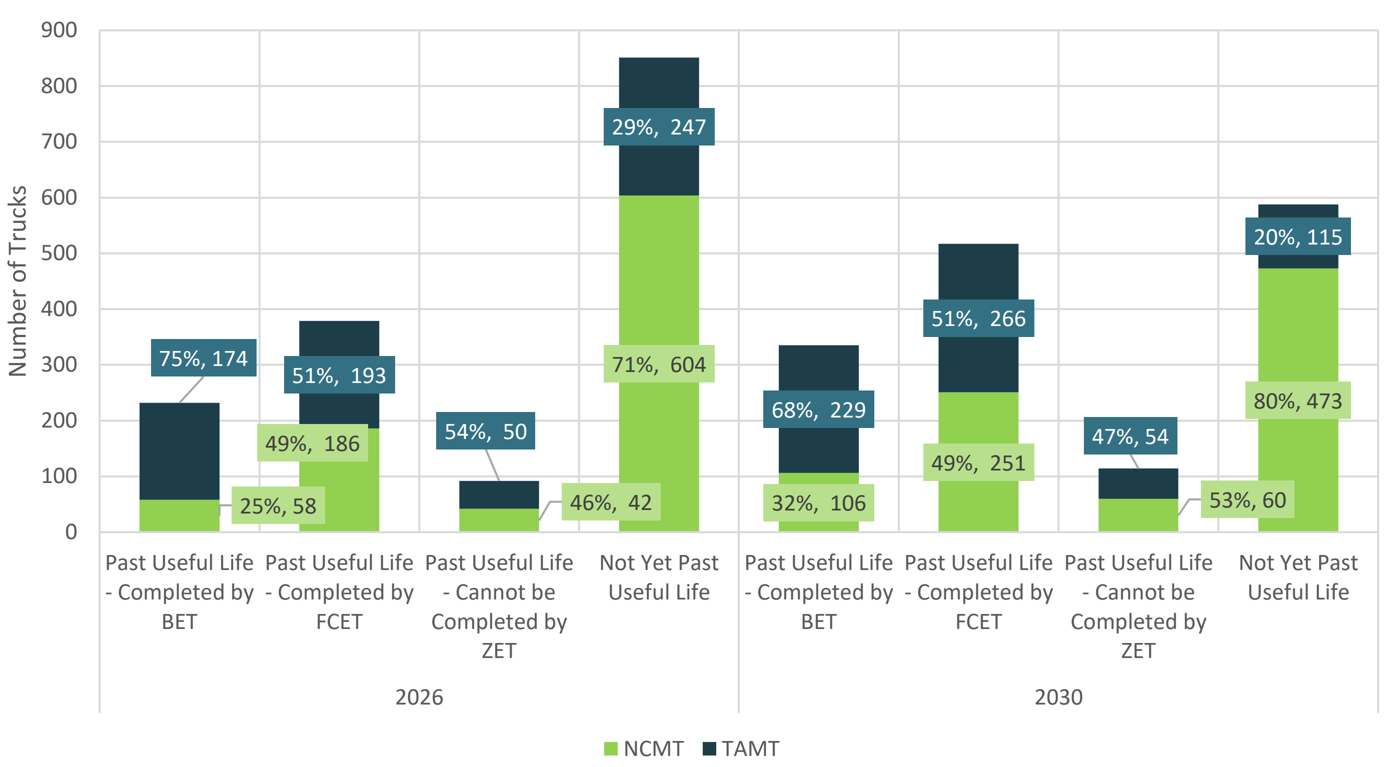
Source: WSP

Figure 5-11. Preliminary Pathway 3: Number of Zero emission Trucks serving the Port, per year



Source: WSP

Figure 5-12. Preliminary Pathway 3: Number of Trucks by Terminal



Source: WSP
Note: There are currently 18 existing BETs serving NCMT and two BETS serving TAMT.

5.5.2 *CHALLENGES TO MEETING GOALS*

As previously discussed in Section 5.4, the main challenge for FCETs to meet the short-term 2026 goal is technology availability. The first FCET in the US market is expected to be commercially available in 2023 or 2024. Moreover, there are few fueling stations available to the public—let alone stations with pressure and dispensers to support heavy-duty vehicles—and the kilogram price per mile is still higher than that of diesel. Increased vehicle availability, fueling station network expansion, and reduced hydrogen costs will be key to achieving the 2026 goal with all FCETs.

To achieve the 2030 goal, the main challenge is the large number of trucks that have not reached the end of their useful lives by 2030. Without consideration of ZE technology and constraints, only 63% of the total trucks that make up 63% of Port trips will be eligible for retirement by 2030. All vehicles are expected to turn over naturally by 2035. Moreover, 7% of the total trucks that serve the Port will need to refuel in the middle of their duty cycles to complete the daily trip requirement. Therefore, an increase in the number of hydrogen fueling stations is increasingly important to achieve 100% ZE port trips by 2030.

5.6 PRELIMINARY PATHWAY 3A: BETS AND FCETS (WITH OPPORTUNITY CHARGING)

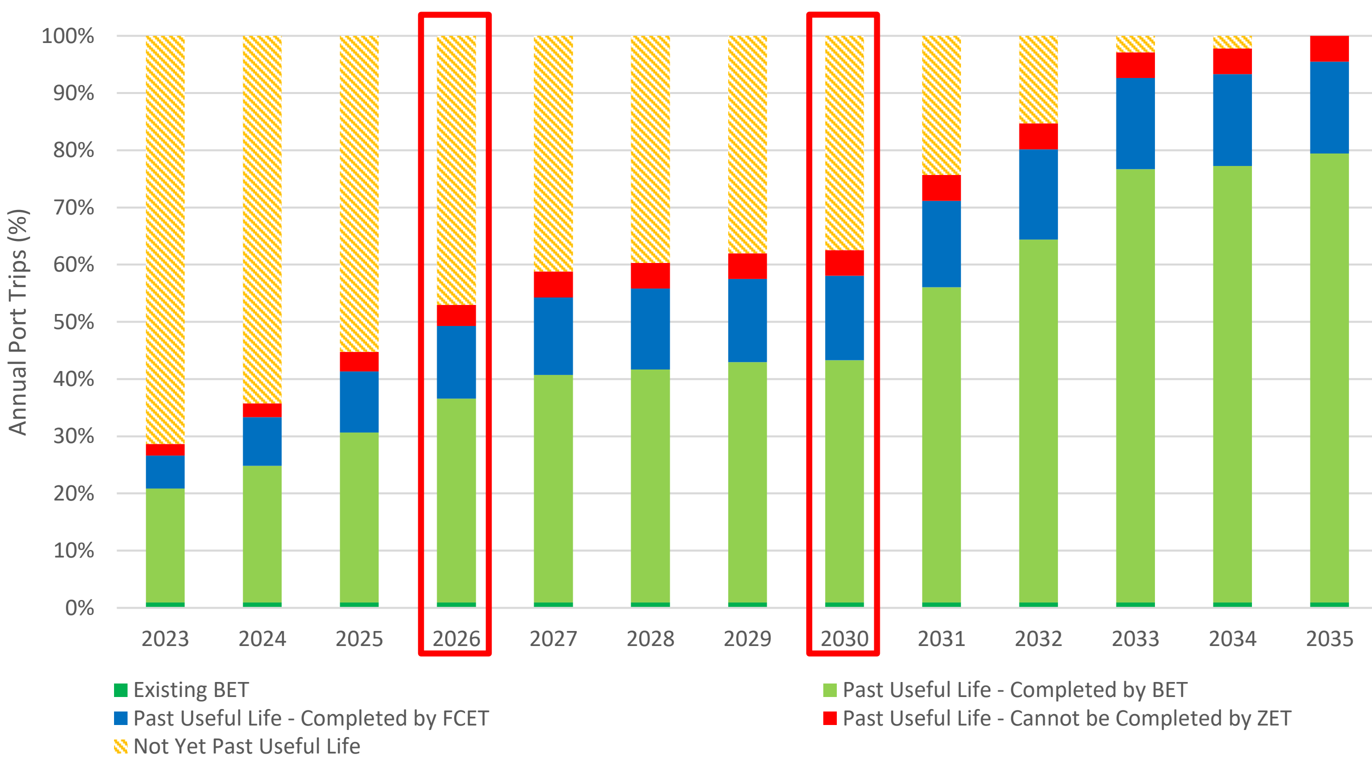
5.6.1 *ANALYSIS*

A ZET strategy using Preliminary Pathway 3A yields the same results as Preliminary Pathway 3 (it would achieve the 2026 goal but fail to achieve the 2030 target). However, a larger share of trips can be supported by BETs than by FCETs with consideration of opportunity charging. In 2026, approximately 49% of trips can be supported by 611 ZETs (408 BETs and 203 FCETs). In 2030, approximately 58% of trips can be supported by 852 trucks (335 BETs and 517 FCETs), 42% short of the goal.

Similar to other pathways, the majority of the trucks that can be replaced by any ZET technologies are serving TAMT. A total of 244 trucks that serve NCMT and 367 trucks that serve TAMT can be replaced by ZETs in 2026. The ZET-suitable trucks will increase over the years, with a total of 357 NCMT-serving ZETs and 495 TAMT-serving ZETs in 2030.

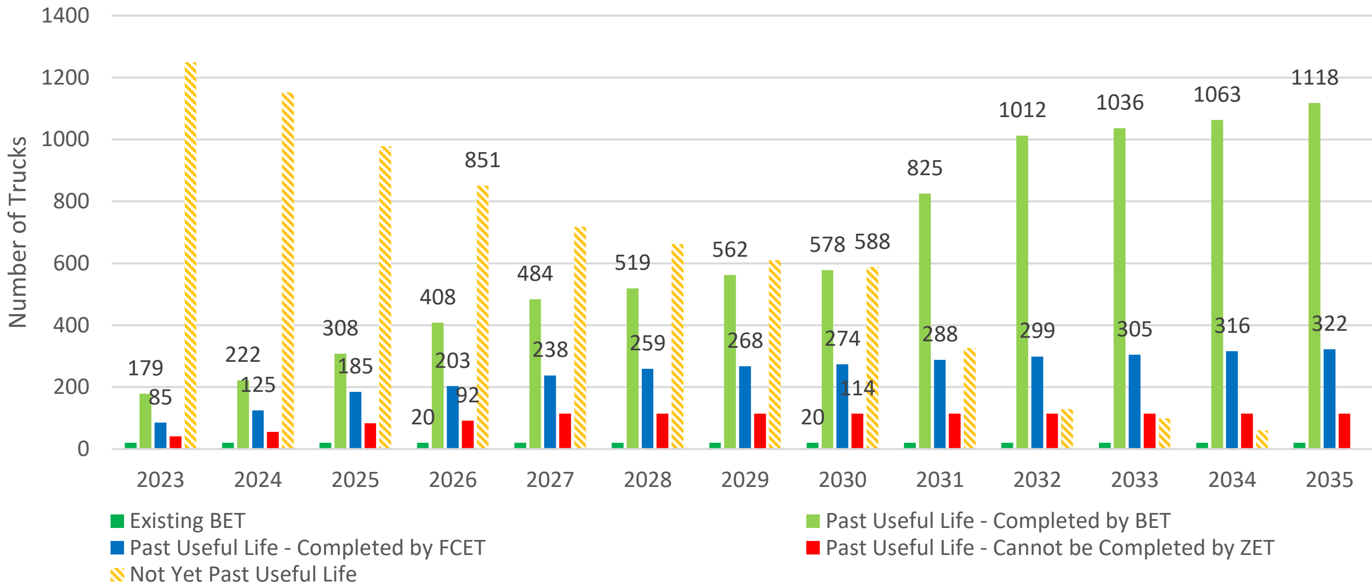
Figure 5-13 and Figure 5-14 illustrate the percentage of ZET trips and the number of ZET, respectively. The red portions indicate the number of trucks or trips that cannot be completed by both technologies without refueling during the day. Figure 5-15 presents the composition of trucks and the percentage of trips by terminal.

Figure 5-13. Preliminary Pathway 3A: Percentage of Port-serving Zero emission Trips, per year



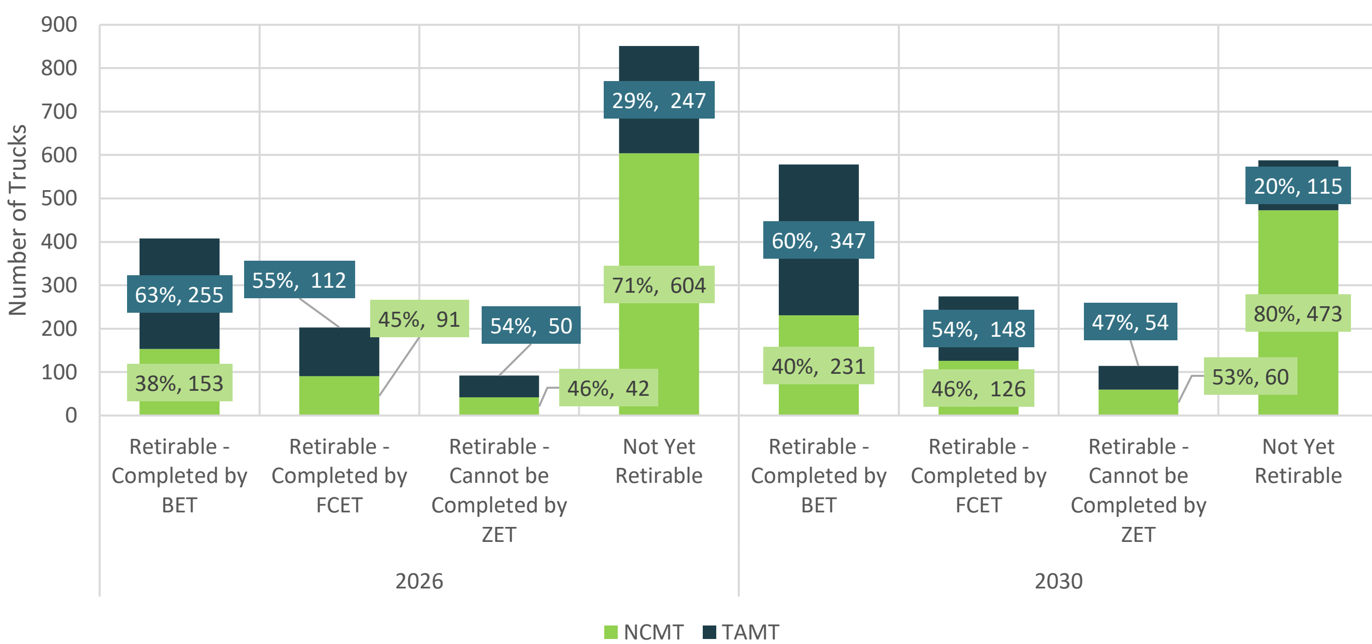
Source: WSP

Figure 5-14. Preliminary Pathway 3A: Number of Zero emission Trucks serving the Port, per year



Source: WSP

Figure 5-15. Preliminary Pathway 3A: Number of Trucks by Terminal



Source: WSP

Note: There are currently 18 existing BETs serving NCMT and two BETS serving TAMT.

5.6.2 *CHALLENGES TO MEETING GOALS*

To achieve the 2030 goal, the main challenge is the large number of trucks that have not reached the end of their useful lives by 2030. Without consideration of ZE technology and constraints, only 63% of the total trucks that make up 63% of Port trips are eligible for retirement by 2030. All vehicles are expected to turn over naturally by 2035. Moreover, 7% of the total trucks that serve the Port will need to refuel in the middle of their duty cycles to complete the daily trip requirement. Therefore, an increase in the number of hydrogen fueling stations is increasingly important to achieve 100% ZE Port trips by 2030.

5.7 PRELIMINARY PATHWAYS SUMMARY

When only considering the natural turnover schedule and useful life of trucks, the Preliminary Pathways (as defined), can only achieve the 2026 goal with a combination of FCET technologies. However, achieving the 2026 goal is contingent on FCET technology being readily available, and it currently is not. BETs, meanwhile, are market-available, but have range limitations. Opportunity charging, thus, is essential to increase the range and number of trips that can be completed by BETs. Other strategies such as longer opportunity charging, early retirement of vehicles, and adding additional BETs will be needed if the Port aims to achieve the 2026 goal with only BET technology.

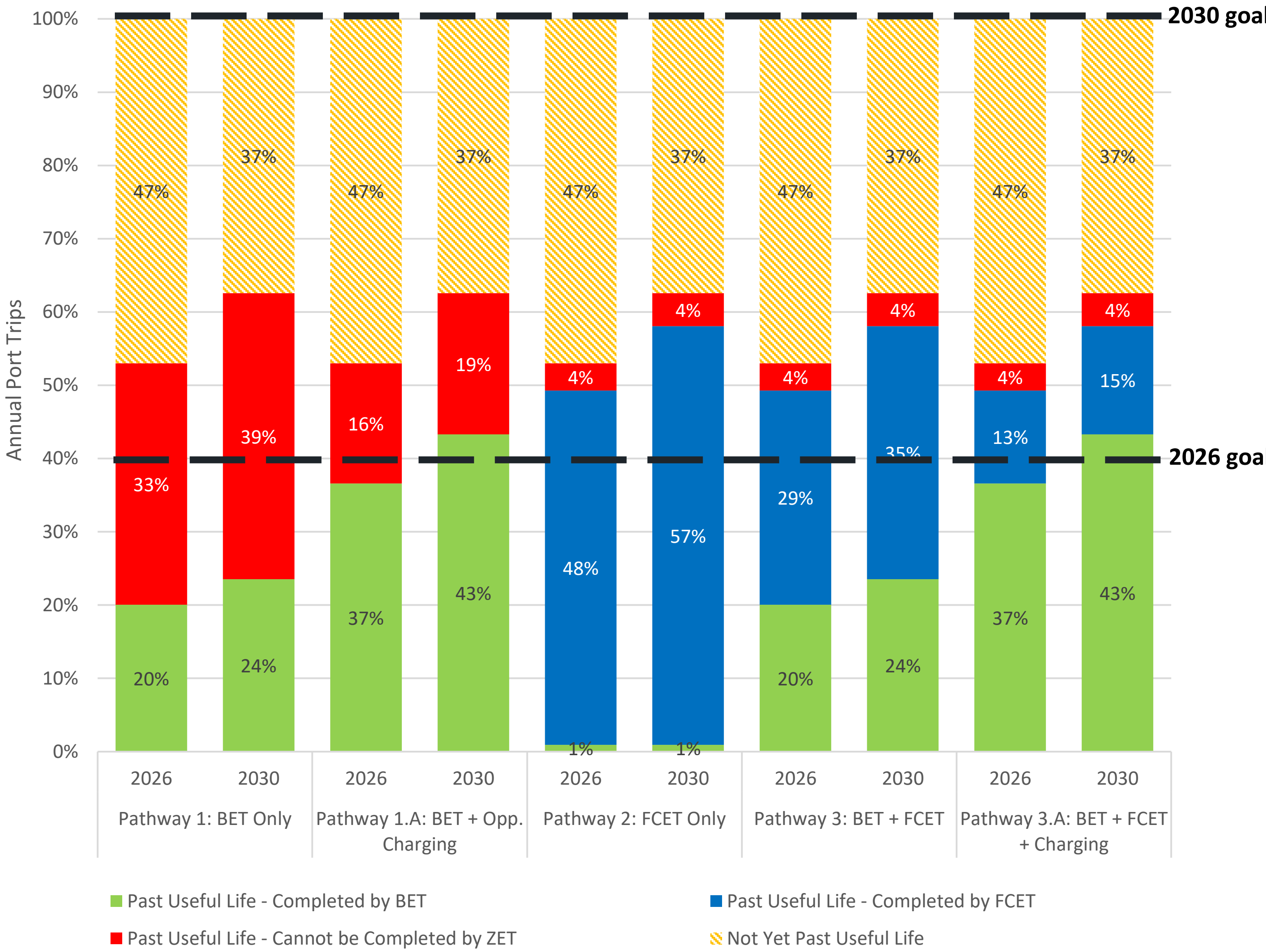
Currently, no pathways that rely only on trucks' natural turnover schedules will achieve 100% ZE trips by 2030. To achieve the 2030 goal, early retirement of the trucks is essential because 37% of trucks will not have reached the end of their useful lives by 2030. The availability of charging and refueling stations will also be key in the transition. Table 5-1 provides a summary of the Preliminary Pathways and their associated results, and Figure 5-16 illustrates the number of truck trips, by pathway.

Table 5-1. Preliminary Pathways Summary

Pathway	2026		2030	
	Estimated % ZET Trips	MCAS Goal Achieved?	Estimated % ZET Trips	MCAS Goal Achieved?
Preliminary Pathway 1: All BETs without Opportunity Charging	20%	NO	24%	NO
Preliminary Pathway 1A: All BETs with Opportunity Charging	37%	NO	43%	NO
Preliminary Pathway 2: All FCETs	49%	YES	58%	NO
Preliminary Pathway 3: All BETs and FCETs without Opportunity Charging	49%	YES	58%	NO
Preliminary Pathway 3A: All BETs and FCETs with Opportunity Charging	49%	YES	58%	NO

Source: WSP

Figure 5-16. Preliminary Pathways Summary



Source: WSP

Based on the Preliminary Pathway analysis, it is clear that FCETs, while promising, are not yet available on the market and therefore should not be a priority technology in meeting the Port's immediate goal (40% ZET trips by 2026). However, if FCETs become market-ready in advance of current projections, the Port may reevaluate its strategy.

While BETs do not have the same range capabilities as FCETs, it appears that they may be a viable solution to meet the 2026 goal if opportunity charging and other optimization strategies, such as early retirement are considered.

At this time, the 2030 goal (100%) does not appear to be achievable, as it is contingent on several factors outside of the Port's control, including more aggressive ZE policies and funding, advancement of battery technologies, and availability of infrastructure for both battery and hydrogen. Many trucks that currently serve the Port also serve ports across the state, including the highly trafficked Ports of Los Angeles and Long Beach. In order for the Port to meet its 2030 goal, other ports will also need to have aggressive transition goals. It will also be essential for battery advancements to continue or exceed their current trajectories to better suit the duty cycles of Port-serving trucks. It is expected that the hydrogen industry (producers and vehicle OEMs) will ramp up production, and whether this happens will also impact the Port meeting its goal. Considering these uncertainties, the Port will continue to evaluate the market and coordinate with regional and state partners over the coming years to continue to advance steps to meet the 2030 goal.

For these reasons, Preliminary Pathway 1A (all BETs with opportunity charging) and Preliminary Pathway 3A (BETs and FCETs with opportunity charging) are the most suitable to meet the Port's short-term 2026 goal and thus are considered and further analyzed as Alternative Pathways in the next section.

6 ALTERNATIVE PATHWAYS

This section provides an overview of the Alternative Pathways; the analysis, challenges, and strategies of each; a summary of findings; and an explanation of which Alternative Pathway will be further evaluated as the Port's Targeted Pathway.

6.1 OVERVIEW

Based on the availability of data developed in the TMD, the present state of ZET technology, and a dynamic regulatory and market environment, the Preliminary Pathways were analyzed in further detail to develop Alternative Pathways. The pathways and accompanying analysis are based on predictive modeling that is reliant upon the methodology, assumptions, and data presented in Section 4. The main purpose of the Alternative Pathways analysis is to identify the Targeted Pathway to meet the Port's near-term 2026 goal. The analysis expands on Preliminary Pathways 1A and 3A by providing further optimizations to attain the 2026 goal, such as minimizing the number of trucks by prioritizing "frequent flyers" (trucks that frequently visit the Port) and retiring or replacing trucks in advance of the end of their useful lives. A truck's age or mileage are both useful indicators when determining its useful life, and the Alternative Pathways include sensitivity analyses to determine the impacts of both. The Alternative Pathways analysis also includes a NZET Pathway that qualitatively assesses the use of NZE technologies for trucks that are exempt from the state's ZE regulations, such as unibody auto carriers. Lastly, the Alternative Pathways analysis provides rough order of magnitude costs and estimated emission reductions to provide a comprehensive picture of the impacts of the pathways to the Port and its stakeholders.

The Alternative Pathways analyzed are detailed below:

- **Alternative Pathway 1: All BETs (with opportunity charging):** Formerly Preliminary Pathway 1A. This pathway focuses on a strategy to achieve exactly 40% ZET trips by 2026 with all BETs. BETs will supplement overnight charging by also charging in-service at future to-be-determined opportunity charging sites.
- **Alternative Pathway 2: BETs and FCETs (with opportunity charging):** Formerly Preliminary Pathway 3A. This pathway focuses on the transition to achieve exactly 40% ZET trips by 2026 with BETs and FCETs—with BETs prioritized. BETs will supplement overnight charging by also charging in-service at future to-be-determined opportunity charging sites.
- **Alternative Pathway 3: Near-ZE Trucks (NZETs):** This is a qualitative analysis that focuses on a pathway that replaces trucks that are exempt from the state's ZE regulations with NZETs (refer to Section 3.4).

The following sections provide a detailed analysis and takeaways for each analyzed Alternative Pathway.

6.2 ALTERNATIVE PATHWAY 1: ALL BETS WITH OPPORTUNITY CHARGING

6.2.1 *ANALYSIS*

With consideration of the replacement of trucks that most frequent the Port (the "frequent flyers"), it is concluded that the 2026 goal can be achieved by Alternative Pathway 1 if part of the fleet is retired or replaced early—it is *not* achievable without early retirements. Based on the analysis, the 2026 goal is achievable with as few as 86 trucks and as many as 313 trucks, depending on the assumed threshold age for early retirement.

Having no minimum age threshold for retirement (i.e., prioritizing the early retirement of trucks) results in the fewest number of trucks (86 to 89) that need to be converted to BETs to achieve the 2026 goal. However, if age thresholds are considered, more trucks need to be replaced to meet the goal. Older age thresholds require a greater number of trucks to be replaced than younger age thresholds. For example, between 146 and 148 trucks need to be replaced if trucks are retired six years before the assumed useful life thresholds (approximately year 13 of 18 for the miles-sensitive scenario and year 8 of 13 for the age-sensitive scenario). However, between 258 and 313 trucks need to be replaced to meet the goal if trucks are retired within the last year of their expected useful life. The average daily mileage for trucks that can be replaced by BET in 2026 is 234 to 257 miles.

For the terminals to achieve the 2026 goal, more TAMT-serving trucks than NCMT-serving trucks will need to be converted to BETs in most scenarios. However, if early retirement only includes trucks that have fewer than six years to retirement, more NCMT-serving trucks will need to be replaced. The average daily mileage for trucks that can be replaced by ZETs in 2026 is 232 to 267 miles for trucks that visit NCMT and 225 to 247 miles for those that visit TAMT.

Table 6-1 summarizes the number of BETs needed to achieve the 40% goal by 2026, and Figure 6-1 presents the number of BETs required by each terminal.

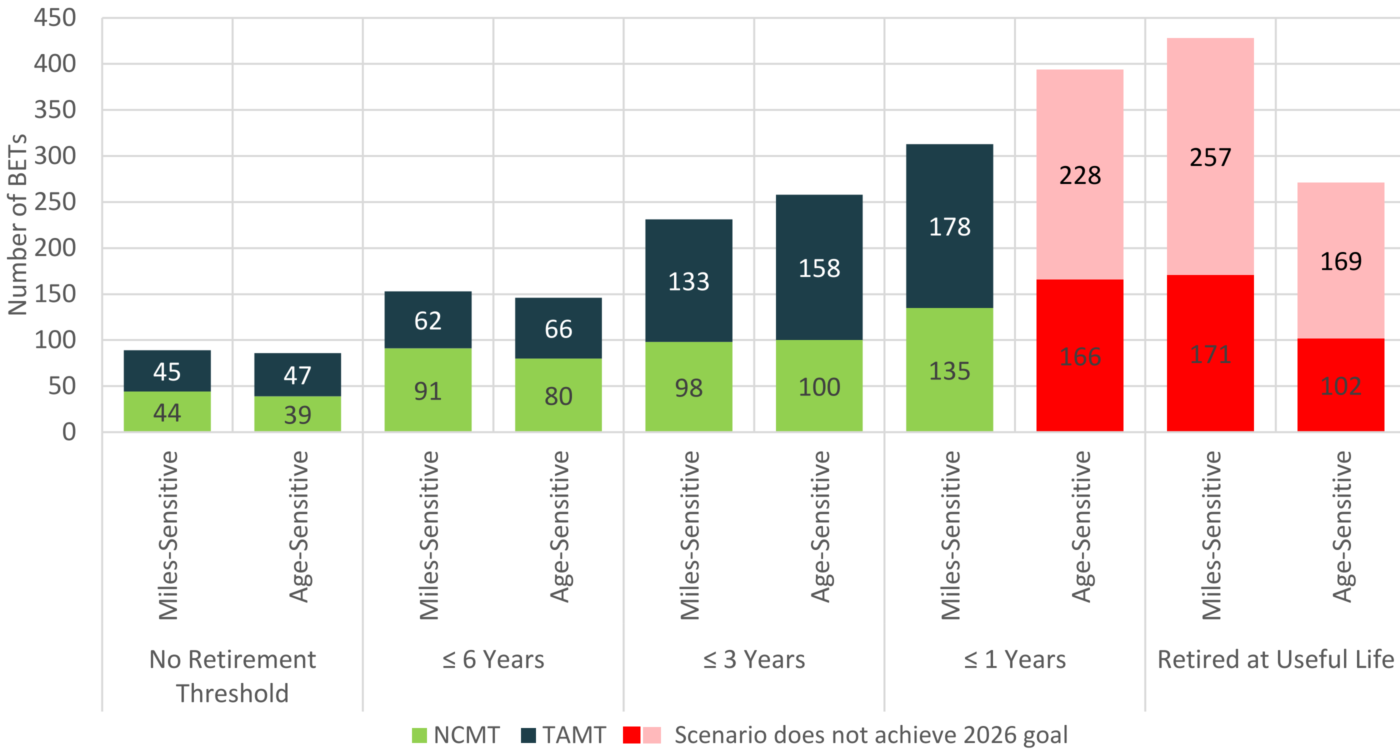
Table 6-1. Alternative Pathway 1: Number of Battery-Electric Trucks Required to Achieve 2026 Goal

Retirement Threshold	Goal Achieved?		Number of BETs Required by 2026	
	Miles-Sensitive	Age-Sensitive	Miles-Sensitive	Age-Sensitive
No retirement threshold	YES (40%)	YES (40%)	89	86
Retired within six years of end of useful life	YES (40%)	YES (40%)	153	146
Retired within three years of end of useful life	YES (40%)	YES (40%)	231	258
Retired within one year of end of useful life	YES (40%)	NO (33%)	313	394
Retired at end of useful life	NO (37%)	NO (25%)	428	271

Source: WSP

Notes: Red values indicate scenarios that will not achieve the 2026 goal. Green values indicate scenarios that will achieve the 2026 goal. Miles-Sensitive scenarios assume a maximum useful life of 800,000 miles; Age-Sensitive scenarios assume a minimum useful life of 13 years (refer to Section 4.4.2).

Figure 6-1. Alternative Pathway 1: Number of Battery-Electric Trucks Required to Achieve 2026 Goal, by Terminal



Source: WSP

6.2.2 *EARLY RETIREMENT PROFILE*

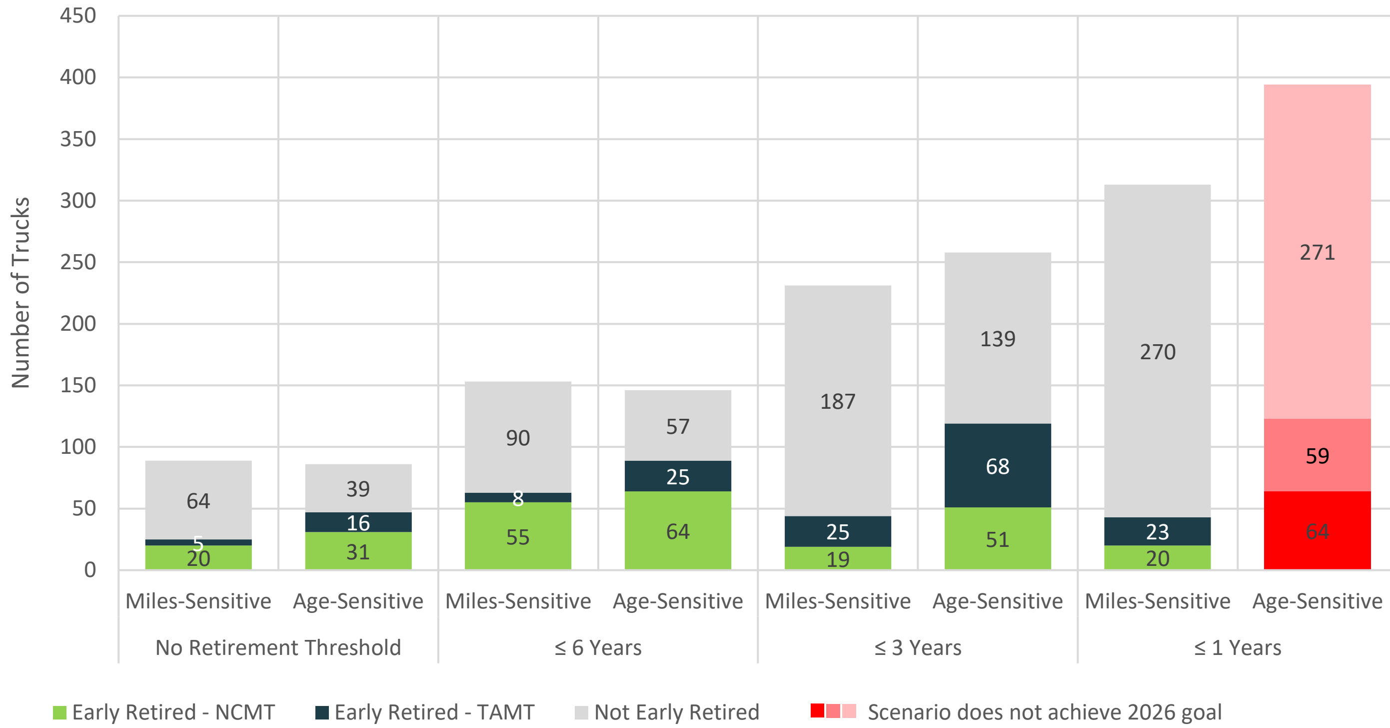
It is assumed that all early retirements will occur in 2026 to maximize the useful life of trucks before the MCAS milestone. In most cases, the majority of trucks do not need to be retired early. The number of trucks that need early retirements varies from 25 to 119, depending on the threshold age for early retirement.

If there is no requirement on the minimum threshold age for trucks' early retirement, most of the early retired trucks will be NCMT-serving trucks because they have shorter duty cycles and are relatively newer than TAMT-serving trucks. However, if only the relatively older trucks are considered for early retirement, most of them will be TAMT-serving trucks.

It is important to note that the NCMT-serving fleet includes auto carrier trucks, which currently have limited ZET replacement availability. Therefore, the early retirement of the NCMT fleet may be limited by truck type. Further study identifying the end of useful life by truck types will be needed to refine the early retirement analysis.

Figure 6-2 illustrates the share of trucks that need early retirements, for each scenario, and by terminal.

Figure 6-2. Alternative Pathway 1: Total Number of Early Retired Battery-Electric Trucks by 2026, by Terminal



Source: WSP

6.2.3 *FORECASTED EMISSIONS REDUCTION*

The GHG emissions reduction is calculated with the assumption that all early retirement will happen in 2026 to maximize trucks' useful lives. It reflects the *minimum* emissions reduction expected from each scenario, since it only accounts for the number of trucks that will achieve exactly 40% ZET trips. Additional trucks may potentially be converted to BETs, which would further reduce emissions. Because the amount of emissions depends on the number of trucks converted, sub-scenarios with the fewest trucks will result in the lowest total emission reduction (Table 6-2).

BETs emit zero tailpipe emissions but still have lifecycle emissions due to the upstream GHG emissions from the electricity generation process, which still relies on fossil fuels. As of 2022, the production of electricity is approximately 0.5 kilograms (kg) of carbon dioxide equivalent (CO_2e)/mile. However, as the share of power production from renewable sources (wind, solar, and water) increases, lifecycle GHG emissions for BETs are expected to rapidly improve (be reduced) in the future.

Additionally, BETs emit no tailpipe local criteria air pollutants. Thus, transitioning to BETs will result in 100% local criteria air pollutant emission reductions compared to diesel trucks. Table 6-3 presents the total amount of NO_X and PM emissions reduced in 2026.

Table 6-2. Alternative Pathway 1: Estimated Cumulative Greenhouse Gas Emission Reductions in 2026 (metric tons of CO_2e)

Retirement Threshold	Miles-Sensitive	Age-Sensitive
No retirement threshold	-22,800 (-79%)	-16,711 (-79%)
Retired within six years of end of useful life	-33,864 (-79%)	-25,784 (-79%)
Retired within three years of end of useful life	-57,208 (-79%)	-47,832 (-79%)
Retired within one year of end of useful life	-80,227 (-79%)	-82,246 (-79%)
Retired at end of useful life	-116,865 (-79%)	-69,464 (-79%)

Source: WSP

Notes: Red values indicate scenarios that will not achieve the 2026 goal. Green values indicate scenarios that will achieve the 2026 goal. Miles-Sensitive scenarios assume a maximum useful life of 800,000 miles; Age-Sensitive scenarios assume a minimum useful life of 13 years (refer to Section 4.4.2).

Table 6-3. Alternative Pathway 1: Cumulative NO_X and PM Emission Reductions in 2026

Retirement Threshold	NO_X (metric tons)	PM2.5 (kg)	PM10 (kg)
No retirement threshold	15.5–21.3	185.2–252.8	193.6–264.3
Retired within six years of end of useful life	23.9–31.6	285.7–375.4	298.6–392.4
Retired within three years of end of useful life	44.5–53.5	530.1–634.4	554.0–663.1
Retired within one year of end of useful life	75.1–76.7	889.7–911.7	929.9–952.9
Retired at end of useful life	65.1–109.5	770.4–1,296.1	805.2–1,354.8

Source: WSP

Notes: Ranges are reflective of miles- to age-sensitive reductions. Red values indicate scenarios that will not achieve the 2026 goal. Green values indicate scenarios that will achieve the 2026 goal.

kg = kilograms

PM2.5 = particulate matter up to 2.5 microns in diameter

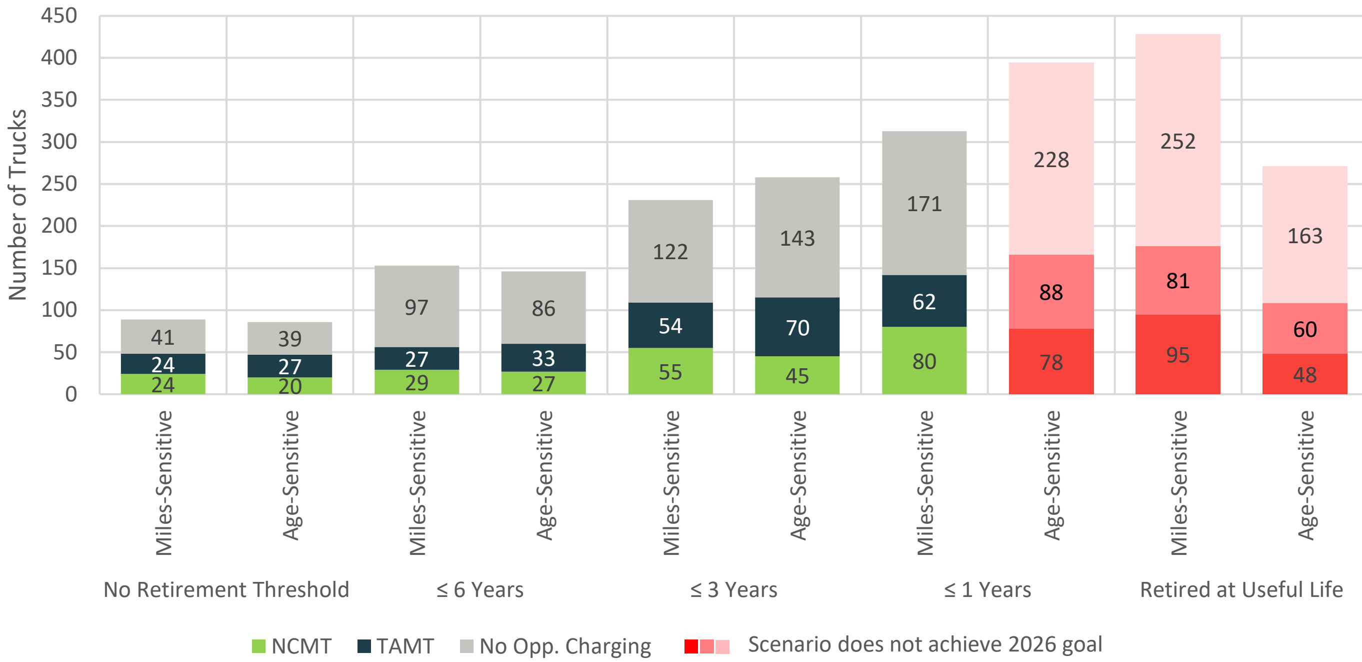
PM10 = particulate matter up to 10 microns in diameter

6.2.4 *INFRASTRUCTURE ASSESSMENT*

In most cases, less than half of the total number of BETs will require opportunity charging, except in the "no retirement threshold" scenario. In this scenario, about 54 to 55% of the BETs will need opportunity charging. Overall, 47 to 142 BETs will need opportunity charging. The average daily mileage for trucks that can be replaced by BET in 2026 is 166 to 181 miles for those that do not need opportunity charging, and 308 to 328 miles for those that need opportunity charging.

Figure 6-3 summarizes the number of trucks that will need opportunity charging to finish their duty cycles.

Figure 6-3. Alternative Pathway 1: Number of Trucks that Require Opportunity Charging



Source: WSP

Table 6-4 summarizes the number of opportunity chargers needed, assuming a 500 kW DC charger in a 1:2 orientation (one charger to two dispensers/trucks)—a 250 kW charge rate per truck. Approximately 10 to 40 opportunity chargers are needed for NCMT-serving BETs and 12 to 35 for TAMT-serving trucks, with a total of 24 to 71 chargers needed. These findings indicate that identifying locations where opportunity charging may occur is critical to successfully meeting the goals of the MCAS. MCAS Truck Objective 2B aims to identify up to four locations near the Port's marine cargo terminals or throughout the San Diego region. Accordingly, Port staff have recently issued a Request for Information (RFI) (May 2022), seeking information on design considerations and potential costs to develop publicly available charging stations. This analysis is currently ongoing and will be presented to the Board in late 2022.

Further analysis of specific duty cycles would be needed to understand the most optimal time and best locations for charging. The number of chargers needed would most likely be less than the number shown in the table, considering that trucks will not always need to be charged simultaneously.

Table 6-4. Alternative Pathway 1: Number of Opportunity Chargers Needed to Serve Each Terminal's Truck

Retirement Threshold	NCMT		TAMT		Total	
	Miles-Sensitive	Age-Sensitive	Miles-Sensitive	Age-Sensitive	Miles-Sensitive	Age-Sensitive
No retirement threshold	12	10	12	14	24	24
Retired within six years of end of useful life	15	14	14	17	29	31
Retired within three years of end of useful life	28	23	27	35	55	58
Retired within one year of end of useful life	40	39	31	44	71	83
Retired at end of useful life	48	24	41	30	89	54

Source: WSP
Notes: Red values indicate scenarios that will not achieve the 2026 goal. Green values indicate scenarios that will achieve the 2026 goal. Miles-Sensitive scenarios assume a maximum useful life of 800,000 miles; Age-Sensitive scenarios assume a minimum useful life of 13 years (refer to Section 4.4.2)

6.2.5 *ESTIMATED COSTS*

The estimated overall costs are based on initial capital expenditures to acquire trucks and chargers. They also include the residual value of the ICETs, if they are retired early. It should be noted that these costs are based on unit costs and estimates that do not factor in contingencies, such as the cost of construction, design, utility enhancements, warranties, charge management subscription fees, and customizations.

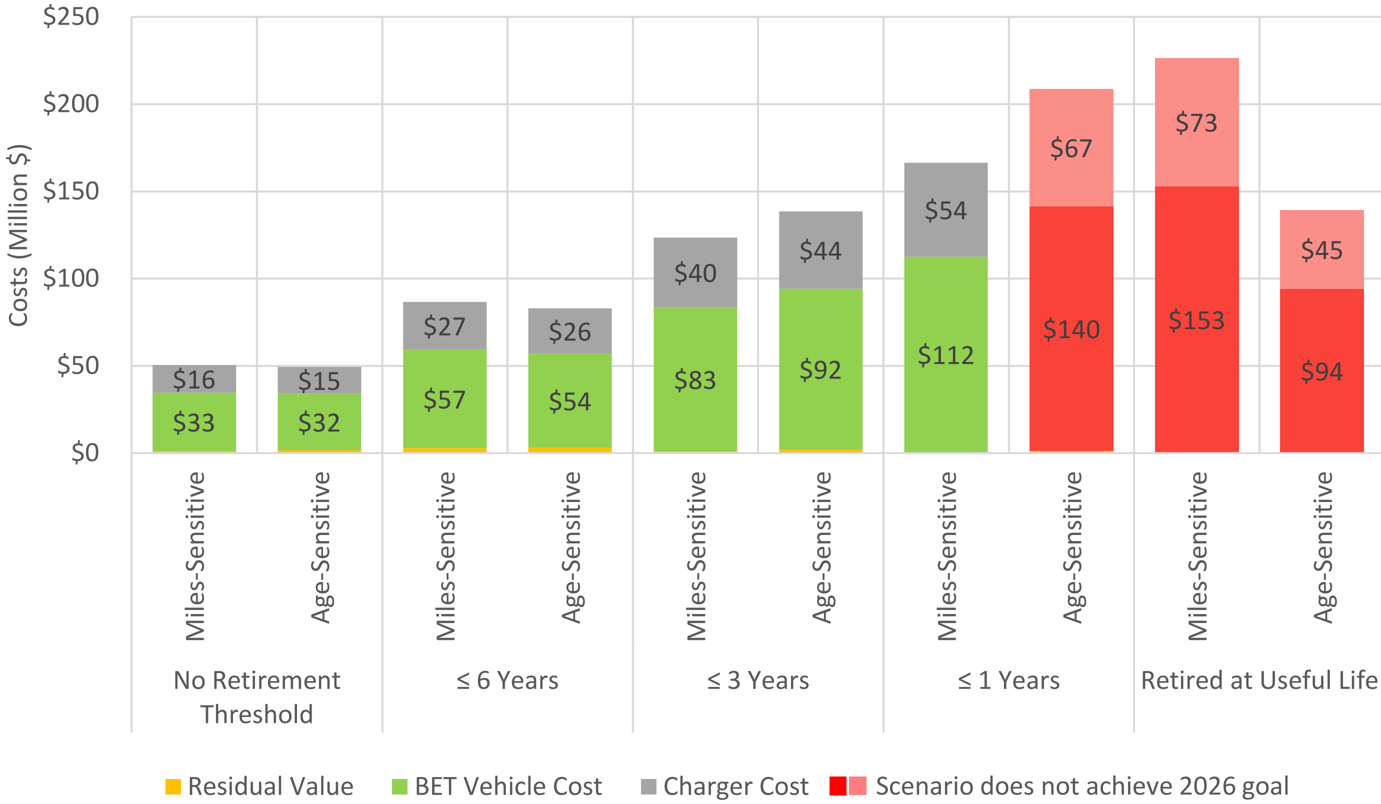
The scenario with no threshold for early retirement requires the fewest number of trucks and therefore has the lowest costs. In this scenario, the cost to achieve the 2026 goal is expected to be between $49 and $51 million (Table 6-5). The cost to achieve the 2026 goal in Alternative Pathway 1 varies based on the different sub-scenarios, with a maximum expected cost of $166 million. Figure 6-4 compares the detailed costs associated with each sub-scenario for Alternative Pathway 1.

Table 6-5. Alternative Pathway 1: Costs Summary

Retirement Threshold	Miles-Sensitive	Age-Sensitive
No retirement threshold	$51 million	$49 million
Retired within six years of end of useful life	$87 million	$83 million
Retired within three years of end of useful life	$123 million	$139 million
Retired within one year of end of useful life	$166 million	$209 million
Retired at end of useful life	$226 million	$139 million[a]

Source: WSP
Notes: Red values indicate scenarios that will not achieve the 2026 goal. Green values indicate scenarios that will achieve the 2026 goal. Miles-Sensitive scenarios assume a maximum useful life of 800,000 miles; Age-Sensitive scenarios assumes a minimum useful life of 13 years (refer to Section 4.4.2)
Values are rounded to the nearest million.
[a] The failing scenarios may have fewer trucks, and thus lower total costs compared to the scenarios that can achieve the 2026 goal.

Figure 6-4. Alternative Pathway 1: Detailed Costs to Achieve 40% Zero emission Truck Trips by 2026



Source: WSP

The costs for opportunity charging stations will vary based on the current electrical capacity of the sites, the required electrical upgrades, the type of chargers, charging configuration, and OEM. As a case study, based on a quote from a charger OEM, eight opportunity chargers will cost approximately $3.6 million for the chargers and installation, excluding utility enhancements. The West Coast Clean Transit Corridor Initiative Study[11] estimated that utility upgrade costs were $410 thousand for a site with similar total utility needs. The utility upgrade costs can vary significantly based on the site's existing infrastructure. Based on the case study, a charging location with eight opportunity chargers are estimated to cost approximately $4 million.

[11] West Coast Clean Transit Corridor Initiative. Note dated. https://westcoastcleantransit.com/

6.3 ALTERNATIVE PATHWAY 2: BETS AND FCETS WITH OPPORTUNITY CHARGING

6.3.1 *ANALYSIS*

With consideration of the replacement of trucks that most frequent the Port (the "frequent flyers"), it is concluded that the 2026 goal can be achieved by Alternative Pathway 2 if part of the fleet is retired or replaced early. The goal is *not* achievable without early retirements. Based on the analysis, the goal is achievable with as few as 72 trucks and as many as 225 trucks, depending on the assumed threshold age for early retirement.

Having no minimum age threshold for retirement (i.e., prioritizing the early retirement of trucks) results in the fewest number of trucks (72) that need to be converted to BETs to achieve the 2026 goal. However, if age thresholds are considered, a greater number of trucks needs to be replaced to meet the 2026 goal, and the number increases as the age threshold increases. For example, 115 trucks need to be replaced if trucks are retired six years before the expected retirement (approximately year 13 of 18 for the miles-sensitive scenario and year 8 of 13 for the age-sensitive scenario). However, between 123 and 225 trucks will be needed to meet the goal if trucks are retired within the last year of their expected useful life. In all scenarios, the majority of ZET replacements are BETs because of the assumed availability of opportunity charging. The average daily mileage for trucks that can be replaced by BET in 2026 is 277 to 307 miles.

For the terminals, more TAMT-serving trucks than NCMT-serving trucks will need to be converted to BETs in all scenarios to achieve the 2026 goal. The TAMT fleet will be a mix of BETs and FCETs, with the majority being BETs. Meanwhile, almost all NCMT-serving trucks will be BETs in most scenarios. Based on the truck database, the majority of NCMT trucks have shorter duty cycles, which makes them more suitable for BETs, without the need for FCETs. The average daily mileage for NCMT-serving trucks that can be replaced by ZET in 2026 is approximately 234 to 273 miles for BETs and 450 to 518 miles for FCETs. The average daily mileage for TAMT-serving ZETs is approximately 231 to 251 miles for BETs and 456 to 492 miles for FCETs.

Table 6-6 and Figure 6-5 summarize the number of BETs needed to achieve the 40% goal by 2026, and Figure 6-6 presents the number of BETs required by terminal.

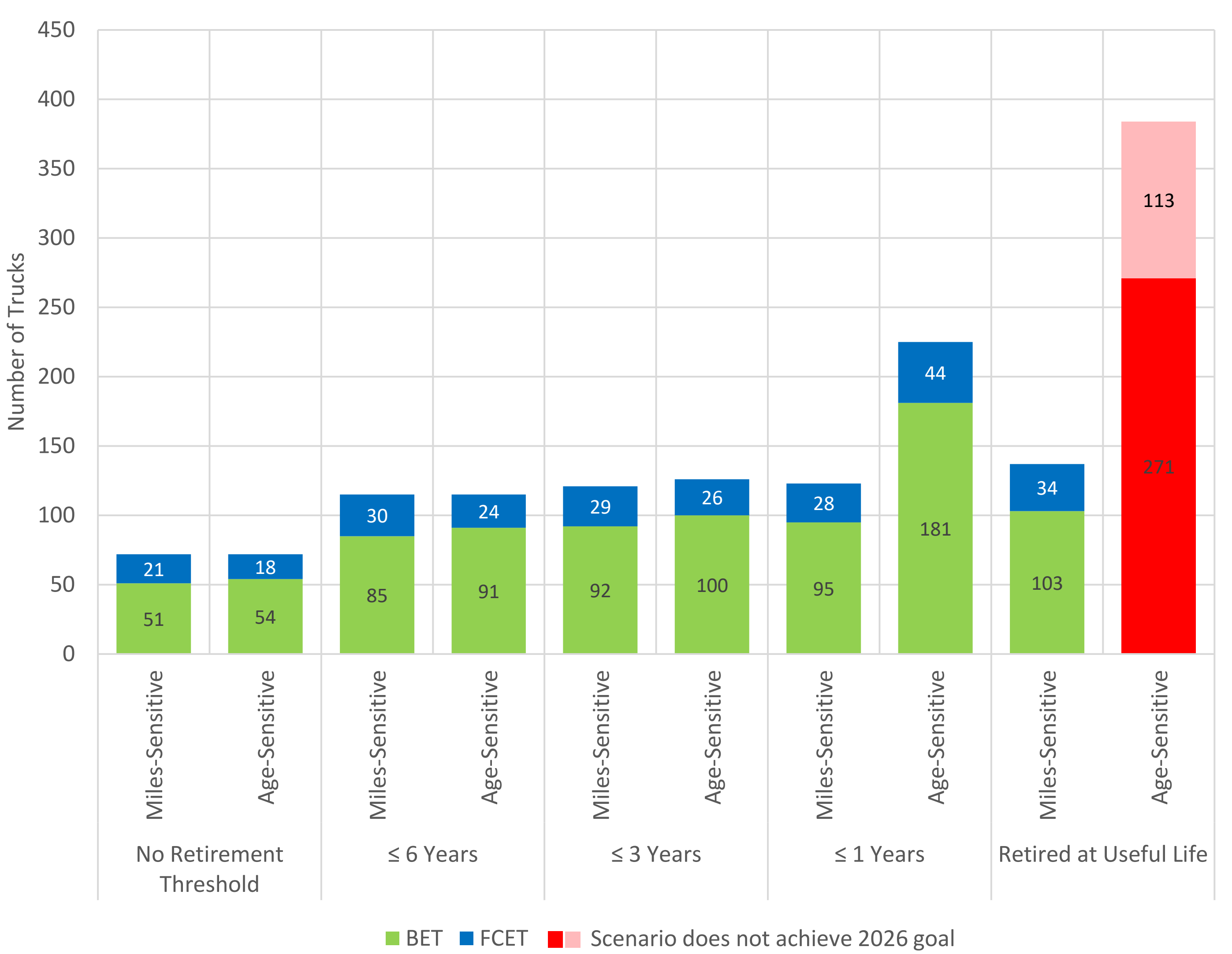
Table 6-6. Alternative Pathway 2: Number of Trucks Required to Achieve 2026 Goal

Retirement Threshold	Goal Achieved?		Number of BETs Required by 2026	
	Miles-Sensitive	Age-Sensitive	Miles-Sensitive	Age-Sensitive
No retirement threshold	YES (40%)	YES (40%)	72	72
Retired within six years of end of useful life	YES (40%)	YES (40%)	115	115
Retired within three years of end of useful life	YES (40%)	YES (40%)	121	126
Retired within one year of end of useful life	YES (40%)	YES (40%)	123	225
Retired at end of useful life	YES (40%)	NO (33%)	137	384

Source: WSP

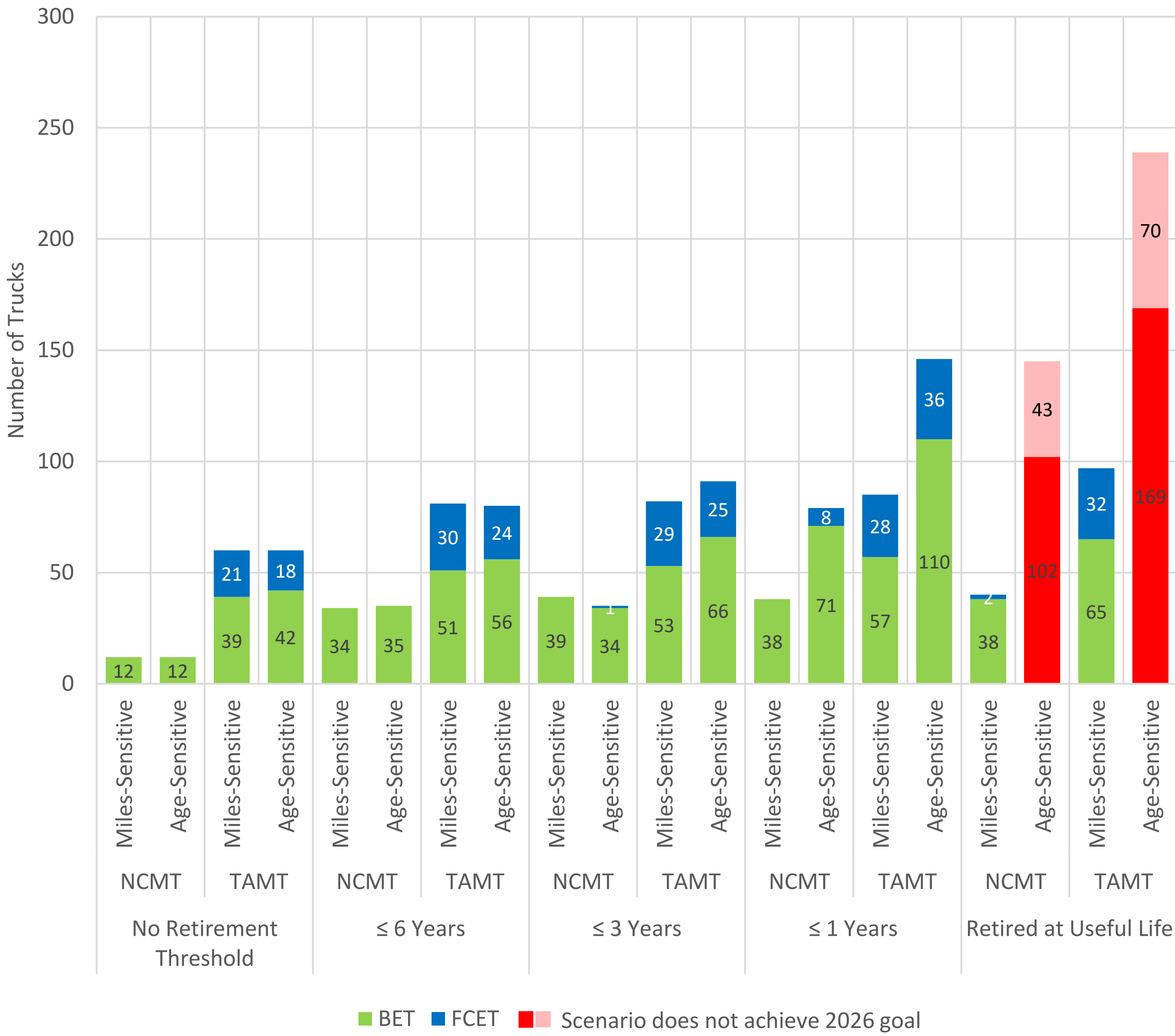
Notes: Red values indicate scenarios that will not achieve the 2026 goal. Green values indicate scenarios that will achieve the 2026 goal. Miles-Sensitive scenarios assume a maximum useful life of 800,000 miles; Age-Sensitive scenarios assume a minimum useful life of 13 years (refer to Section 4.4.2)

Figure 6-5. Alternative Pathway 2: Total Number of Battery-Electric Trucks and Fuel Cell Electric Trucks to Achieve 2026 Goal



Source: WSP

Figure 6-6. Alternative Pathway 2: Number of Battery-Electric Trucks Required to Achieve 2026 Goal, by Technology and Terminal



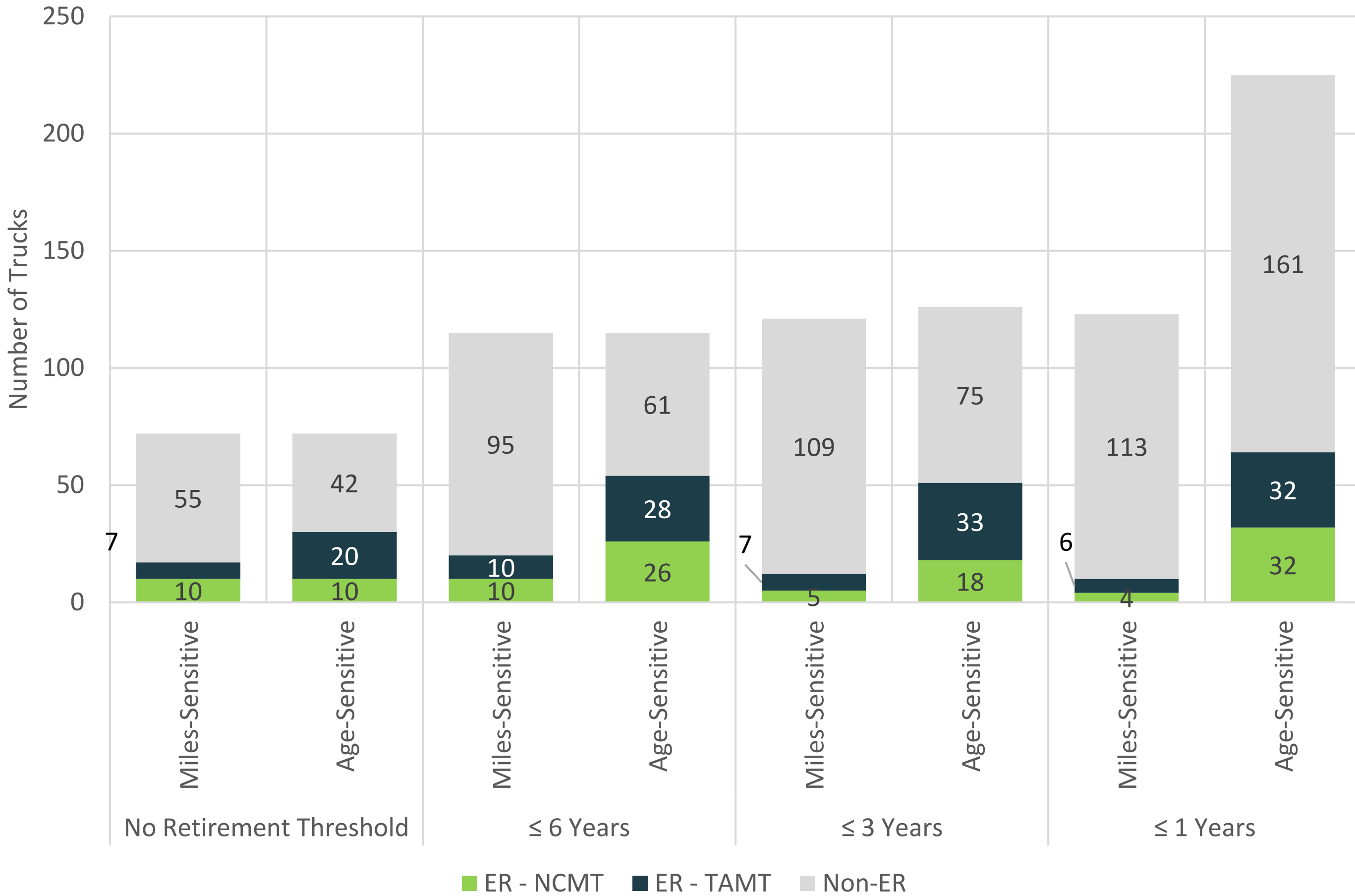
Source: WSP

6.3.2 *EARLY RETIREMENT PROFILE*

It is assumed that all early retirements will occur in 2026 to maximize the useful life of trucks before the MCAS milestone. In most cases, the majority of trucks do not need to be retired early. The number of trucks that need to retire early varies from 17 to 64, depending on the threshold age for early retirement. In most scenarios, the early retired trucks are TAMT-serving trucks.

Figure 6-7 illustrates the share of trucks that need to be retired early, for each early retirement scenario, by terminal.

Figure 6-7. Alternative Pathway 2: Total Number of Early Retired Trucks by 2026, by Terminal



Source: WSP

6.3.3 *FORECASTED EMISSIONS REDUCTION*

GHG emissions reduction is calculated with the assumption that all early retirement will happen in 2026 to maximize trucks' useful lives. It reflects the *minimum* emissions reduction expected from each sub-scenario, since it only accounts for the number of trucks that will achieve exactly 40% ZET trips. Additional trucks may potentially be converted to ZETs, which will further reduce emissions. The faster a truck is converted to a ZET, the greater the cumulative GHG emissions reduction. The magnitude of the emissions reduction depends on the number of trucks converted, and sub-scenarios with the fewest truck conversions will result in the lowest total emissions reduction (Table 6-7).

ZETs emit zero tailpipe emissions but still have lifecycle emissions due to the upstream GHG emissions from the electricity generation process, which still relies on fossil fuels. As of 2022, the GHG emissions resulting from electricity generation are approximately 0.5 kg CO_2e/mile and 1.2 kg CO2e/mile for hydrogen from natural gas. However, as a greater share of electricity is produced from renewable sources (wind, solar, and water), lifecycle GHG emissions for BETs are expected to rapidly improve (be reduced) in the future.

Table 6-7. Alternative Pathway 2: Cumulative Greenhouse Gas Emission Reductions in 2026 (metric tons of CO_2e)[(a)]

Retirement Threshold	Miles-Sensitive	Age-Sensitive
No retirement threshold	-17,595 (-68%)	-13,805 (-70%)
Retired within six years of end of useful life	-28,014 (-70%)	-21,064 (-71%)
Retired within three years of end of useful life	-31,378 (-71%)	-24,182 (-72%)
Retired within one year of end of useful life	-32,157 (-71%)	-44,305 (-72%)
Retired at end of useful life	-35,704 (-70%)	-87,799 (-68%)

Source: WSP
Notes: Red values indicate scenarios that will not achieve the 2026 goal. Green values indicate scenarios that will achieve the 2026 goal. Miles-Sensitive scenarios assume a maximum useful life of 800,000 miles; Age-Sensitive scenarios assume a minimum useful life of 13 years (refer to Section 4.4.2)
(a) Assuming hydrogen generation via natural gas SMR. Emissions can be reduced further by using greener hydrogen sources.

Additionally, BETs emit no tailpipe local criteria air pollutants. Thus, transitioning to BETs will result in 100% local criteria air pollutant emission reductions compared to diesel trucks. Table 6-8 presents the total amount of NO_X and PM emissions reduced in 2026.

Table 6-8. Alternative Pathway 2: Cumulative NO_X and PM Emission Reductions in 2026

Retirement Threshold	NOx (metric tons)	PM2.5 (kg)	PM10 (kg)
No retirement threshold	14.6–19.1	173.8–226.3	181.6–236.5
Retired within six years of end of useful life	21.8–29.8	259.3–352.7	271.1–368.7
Retired within three years of end of useful life	24.9 - 33.1	296.5–391.1	309.9–408.8
Retired within one year of end of useful life	33.8–45.3	399.3–538.8	417.3–563.1
Retired at end of useful life	37.8–96.2	446.9–1,138.3	467.1–1,189.8

Source: WSP
Note: Red values indicate scenarios that will not achieve the 2026 goal. Green values indicate scenarios that will achieve the 2026 goal.

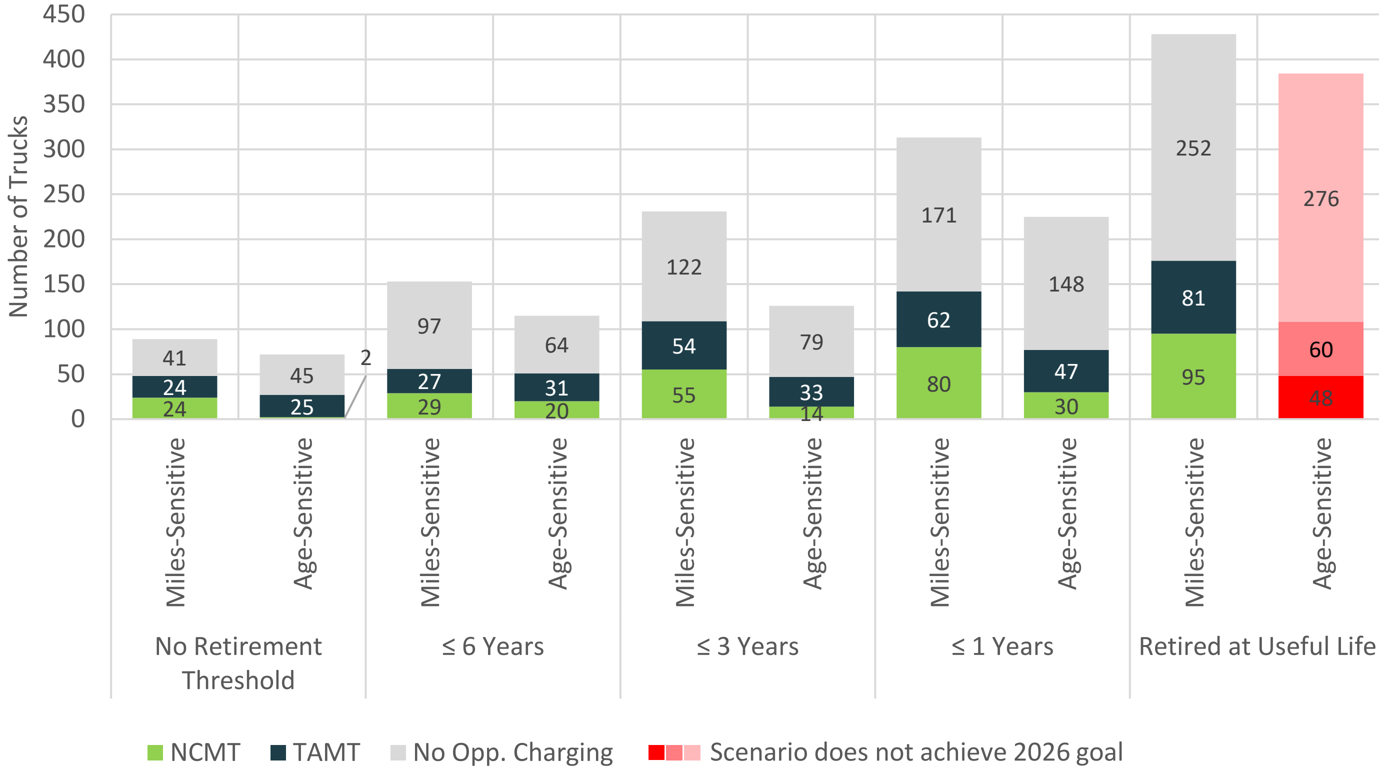
6.3.4 *INFRASTRUCTURE ASSESSMENT*

OPPORTUNITY CHARGING STATION

In most cases, less than half of the total number of BETs will require opportunity charging. In total, 27 to 176 BETs will need opportunity charging. The average daily mileages for trucks that can be replaced by BETs in 2026 are 164 to 174 miles for those that do not need opportunity charging and 308 to 324 miles for those that need opportunity charging.

Figure 6-8 summarizes the number of trucks that will need opportunity charging to finish their duty cycles.

Figure 6-8. Alternative Pathway 2: Number of Trucks that Require Opportunity Charging



Source: WSP

Table 6-9 summarizes the number of opportunity chargers needed, assuming a 500 kW DC charger in a 1:2 orientation (one charger to two dispensers/trucks)—a 250 kW charge rate per truck. Approximately 1 to 48 opportunity chargers are needed for NCMT-serving BETs and 12 to 41 for TAMT-serving trucks, with a total of 14 to 89 chargers required.

Further analysis of specific duty cycles would be needed to understand the most optimal time required for charging and the best locations for charging. The number of chargers would most likely be less than the number shown in the table, considering that trucks will not always need to be charged simultaneously.

Per MCAS Truck Objective 2B, Port staff are conducting a parallel analysis to determine optimal locations for opportunity charging sites near the marine cargo terminals as well as throughout the region. As such, Port staff recently issued an RFI (May 2022) seeking information on design considerations and potential costs to develop publicly available charging stations. Therefore, further information regarding the costs of deploying opportunity charging locations for trucks is forthcoming.

Table 6-9. Alternative Pathway 2: Number of Opportunity Chargers Needed to Serve Trucks from Each Terminal

Retirement Threshold	NCMT		TAMT		Total	
	Miles-Sensitive	Age-Sensitive	Miles-Sensitive	Age-Sensitive	Miles-Sensitive	Age-Sensitive
No retirement threshold	12	1	12	13	24	14
Retired within six years of end of useful life	15	10	14	16	29	26
Retired within three years of end of useful life	28	27	27	17	55	44
Retired within one year of end of useful life	40	15	31	24	71	39
Retired at end of useful life	48	24	41	30	89	64

Source: WSP

Notes: Red values indicate scenarios that will not achieve the 2026 goal. Green values indicate scenarios that will achieve the 2026 goal. Miles-Sensitive scenarios assume a maximum useful life of 800,000 miles; Age-Sensitive scenarios assume a minimum useful life of 13 years (refer to Section 4.4.2)

HYDROGEN FUELING STATION

On a fleet scale, the daily hydrogen consumption for Alternative Pathway 2 is approximately 925 to 2,238 kg (approximately 3,453 to 8,354 gallons).[12] There are several fueling solutions—from on-site production to hydrogen delivery—that can fulfill this need (as discussed in Section 3.1.2). However, the most appropriate locations, right-sizing of the equipment, required facility upgrades, and refueling methods will depend on the amount of hydrogen required by each fleet. Larger fleets may consider installing a hydrogen fueling station at the trucks' facility, while independent truckers may prefer to use public fueling stations. Even then, various hydrogen delivery methods and productions can be considered for both public and private fueling stations. Therefore, a site-specific analysis will be needed to estimate the actual infrastructure needs for a hydrogen fueling station.

As a comparison, the Orange County Transportation Authority receives hydrogen via liquid delivery and stores it in an 18,000-gallon storage tank (Figure 6-9). A tank filled to capacity would last approximately two to five days, based on the Port's total hydrogen need (Figure 6-9).

[12] Based on the analysis, approximately 18-44 FCETs will serve Port with a total daily mileage between 8,700 miles – 21,040 miles. The daily consumption assumes 9.4 mile/kgH_2 efficiency. 1 kg H_2 equals 3.733 gal H_2.

Figure 6-9. Orange County Transportation Authority 18,000-Gallon Liquid Hydrogen Storage Tank

Source: Trillium Energy

6.3.5 *ESTIMATED COSTS*

The estimated costs are based on initial capital expenditures for the acquisition of trucks and chargers, and they also include the residual value of the ICETs that are retired early. It should be noted that these costs are based on unit costs and estimates that do not factor in contingencies, the cost of construction, design, utility enhancements, warranties, customizations, etc. Also, the costs presented below do not include incentives offered by the state or electric utilities to offset the costs of acquiring trucks and infrastructure.

The scenario with no threshold for early retirement requires the fewest number of trucks and therefore has the lowest costs. In this scenario, the cost to achieve the 2026 goal is expected to be approximately $40 million (Table 6-10). The cost to achieve the 2026 goal in Alternative Pathway 2 varies based on the different sub-scenarios, with a maximum expected costs of $117 million. Figure 6-10 compares the detailed costs associated with each sub-scenario for Alternative Pathway 2.

Table 6-10. Alternative Pathway 2: Costs Summary

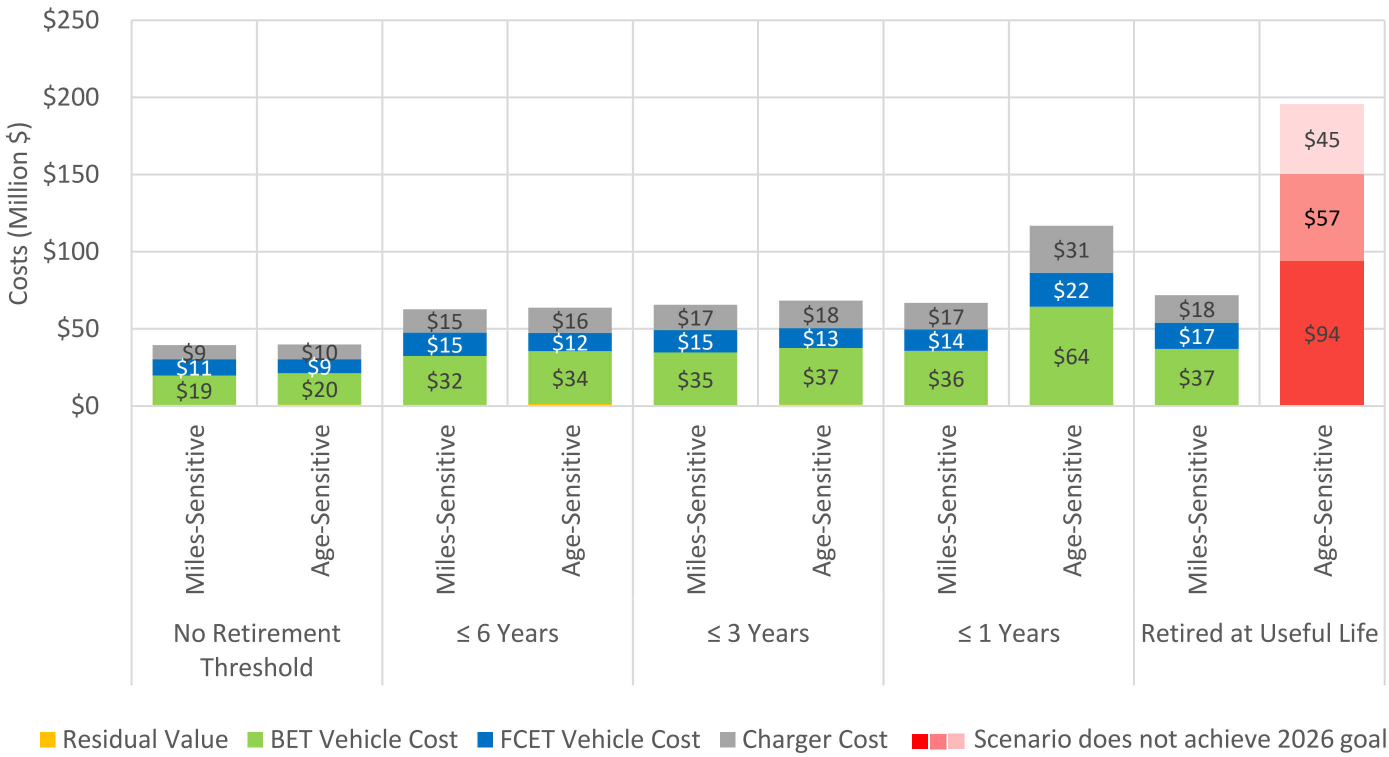
Retirement Threshold	Miles-Sensitive	Age-Sensitive
No retirement threshold	$40 million	$40 million
Retired within six years of end of useful life	$63 million	$64 million
Retired within three years of end of useful life	$66 million	$68 million
Retired within one year of end of useful life	$67 million	$117 million
Retired at end of useful life	$72 million	$196 million

Source: WSP

Notes: Red values indicate scenarios that will not achieve the 2026 goal. Green values indicate scenarios that will achieve the 2026 goal. All figures rounded to the nearest million.

Miles-Sensitive scenarios assume a maximum useful life of 800,000 miles; Age-Sensitive scenarios assume a minimum useful life of 13 years (refer to Section 4.4.2)

Figure 6-10. Alternative Pathway 2: Detailed Costs to Achieve 40% Zero emission Truck Trips by 2026



Source: WSP

Hydrogen fueling station costs are not included in estimates because costs vary based on various fueling strategies. However, as a comparison, the Orange County Transportation Authority receives liquid hydrogen deliveries for its 18,000-gallon hydrogen fueling station—enough to support up to 50 fuel cell electric buses. The infrastructure cost for the infrastructure was approximately $10 million.[13] Economies of scale are an essential factor in hydrogen delivery and production; thus, the capital cost for infrastructure and price per kilogram of hydrogen will change based on the fleet's need.

The costs for opportunity charging stations will vary widely based on the current electrical capacity of the sites, the needed electrical upgrades, the type of chargers (e.g., plug-in or pantograph chargers), charging configuration, and manufacturers. As a case study, based on a quote from a charger manufacturer, eight opportunity chargers will cost approximately $3.62 million for the charger units and installation support, excluding utility upgrades. The West Coast Clean Transit Corridor Initiative Study[14] estimated that utility upgrade costs were $410 thousand for a site with similar total utility needs. The utility upgrade costs can vary significantly based on a site's existing infrastructure. Based on the case study, a charging location with eight opportunity chargers is estimated to cost approximately $4 million.

6.4 ALTERNATIVE PATHWAY 3: NEAR-ZERO EMISSION TRUCKS (NZETS)

Another strategy to improve air quality is to transition vehicles that are exempt from or are provided flexibility to achieve the state's proposed ZE regulations to NZETs. The definition of an NZET has evolved over time. The California Code of Regulations (13, Section 1963(c)(16)) describes a near-zero emission vehicle as a plug-in hybrid vehicle that operates from electricity stored in a battery for a minimum number of miles and can be recharged from an external source. However, alternative fueled trucks (i.e., CNG trucks) that have low-NO_X engines eliminate DPM emissions and reduce NO_X emissions to such a low standard that they have been referred to as NZET, but they should instead be considered as "Low Emissions Trucks."

It is important to distinguish these two types of vehicles because California's proposed regulations may allow the state definition of an NZET to substitute for a ZET. In instances where a truck may not have to be replaced by a ZET, a Low Emissions Truck could be utilized and would result in lower emissions than its diesel counterpart (as further explained in Section 6.4.1). A qualitative analysis of situations in which an NZET or a Low Emissions Truck could be used is provided below. It is important to note that California's proposed ZET requirements are still in draft form and are subject to change prior to adoption. Therefore, the situations described below may need to be reexamined as the regulatory environment unfolds.

1 **Trucks that need to have a 2010 or newer model engine by 2023.**

Per the SB1 Bus and Truck regulation, trucks that have pre-2010 engine models will need to be replaced with newer models by 2023 (refer to Section 3.4). Because the proposed ACF Drayage regulation may not take effect until 2024, truck operators that replace their vehicles in 2023 will have the option to choose ICETs as replacements and operate

[13] The Orange County Transit Authority received $23 million in grants for hydrogen fueling stations and 10 fuel cell electric buses (FCEBs). Assuming that FCEBs cost $1 million each, the hydrogen fueling station was assumed to cost $10 million. Source: Orange County Transit Authority. 2022. Hydrogen Fuel Cell Electric Bus. https://www.octa.net/About-OCTA/Environmental-Sustainability/Zero-Emission-Bus-Progress/Fuel-Cell/

[14] West Coast Clean Transit Corridor Initiative. Note dated. https://westcoastcleantransit.com/

them until the end of their useful lives or 2035, whichever occurs earlier. Transitioning these trucks to NZETs or Low Emissions Trucks will potentially result in lower emissions than their ICET counterparts.

2 **Trucks that are exempt from the proposed ACF Drayage regulation.**

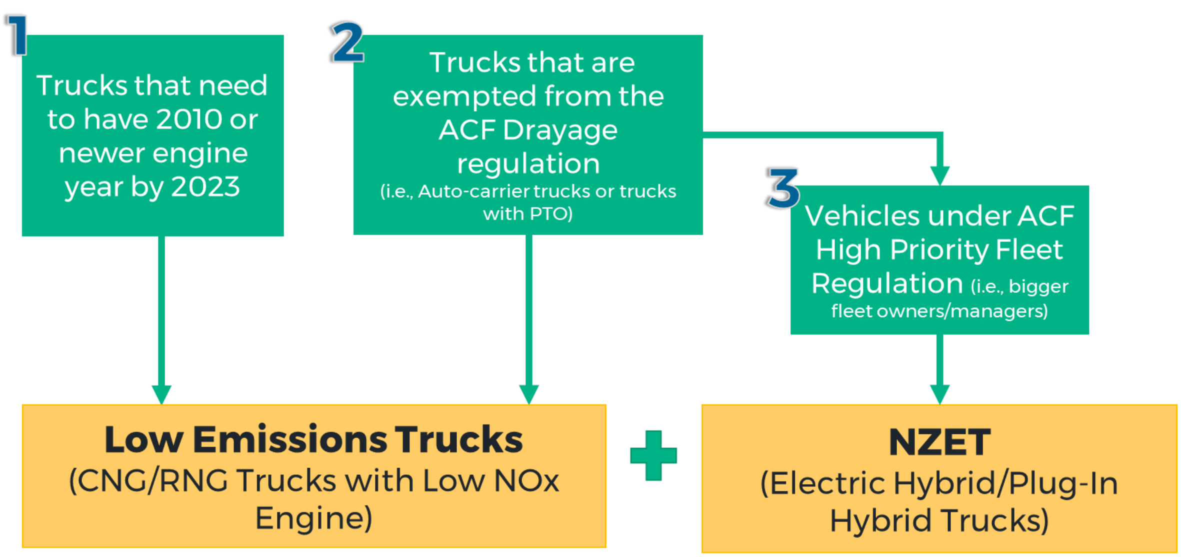
Some trucks that transport cargo at ports may be exempt from the proposed ACF Drayage regulation. These trucks include unibody auto carrier trucks and specialty trucks that utilize power from the engine for auxiliary needs on the trailer. These trucks may not be subject to the 2035 ZE deadline like other drayage trucks and may be able to operate beyond 2035, unless the specific fleet falls into the High Priority Fleet classification. Replacing these trucks with NZETs or Low Emission Trucks, if available, will also result in reduced emissions.

3 **Trucks that are exempt from the ACF Drayage regulation but fall into the ACF High Priority Fleet classification.**

The proposed ACF High Priority Fleet regulation deems both ZETs and NZETs as compliant with ZE requirements until 2035. Therefore, for vehicles that are exempt from the proposed ACF Drayage requirements but subject to the proposed High Priority Fleet regulation, NZETs are acceptable as replacement trucks for compliance with the ACF Drayage regulation. It is important to note that only NZETs are proposed to qualify as an alternative to a ZET for compliance. A Low Emissions Truck as defined above will not substitute for a ZET under the proposed High Priority Fleets requirement.

Figure 6-11 provides a schematic summary of potential vehicles that can follow the NZET Pathway.

Figure 6-11. Near-Zero Emission Truck Pathway



Source: WSP

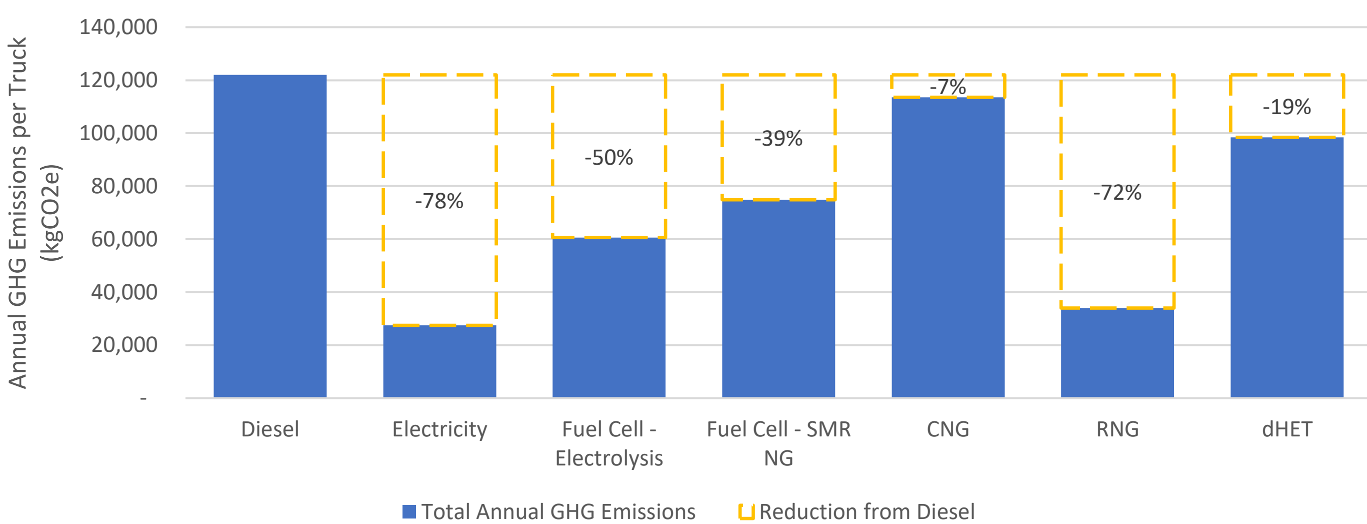
The TMD does not classify or differentiate trucks that are exempt from the regulations. Therefore, this Plan does not analyze the specific number of trucks or costs associated with an NZE pathway. Further study focusing on identification of the population of exempt vehicles could be conducted to assess the full impact of an NZE transition.

6.4.1 *FORECASTED EMISSION REDUCTION*

This section compares the emission reductions of NZETs and Low Emissions Trucks to those of conventional diesel trucks and ZETs. The three types of trucks analyzed are CNG, RNG, and diesel-hybrid trucks (dHETs).

Figure 6-12 compares annual GHG emissions for trucks by fuel type. In 2023, the fuel with the lowest annual GHG emissions will be electricity, followed by RNG produced from 100% landfill biogas. Because RNG is produced from captured methane, there is not a net increase in GHG emissions. The fuel production processes of RNG, given the assumptions, would emit fewer GHG emissions than electricity and hydrogen fuel production. However, regulations are pushing toward cleaner electricity and hydrogen production, so the GHG emissions from the production of electricity and hydrogen are expected to significantly decrease over the coming years. For the analysis displayed in Figure 6-12, GHG emissions associated with FCETs include both hydrogen produced via electrolysis (utilizing grid-based electricity as opposed to 100% renewable sources) and hydrogen produced via SMR from natural gas. Meanwhile, CNG and dHETs will only slightly reduce overall GHG emissions compared to diesel trucks. Hybrid truck emissions can decrease as the all-electric range improves, ultimately reducing the amount of diesel fuel consumption required to operate the truck.

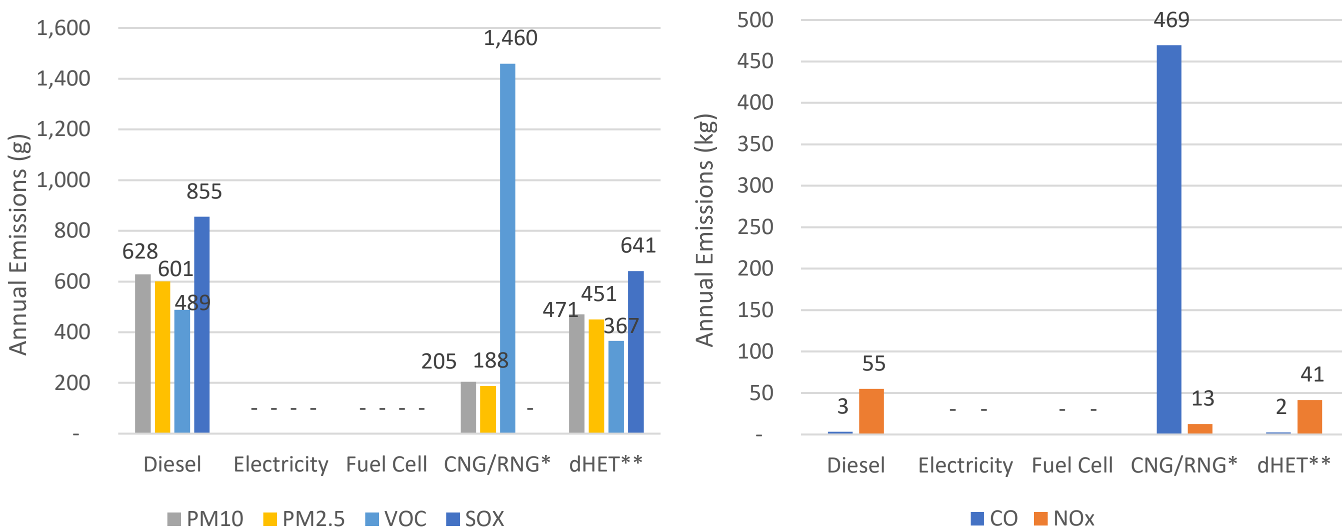
Figure 6-12. Annual Greenhouse Gas Emissions Comparison for Different Fuel Types in 2023 for Model Year 2023



Source: WSP, GREET Model 2021 (Upstream Emissions), CARB EMFAC (Tailpipe Emissions)
Notes: For diesel-electric hybrid trucks, it was assumed that 25% of the annual mileage used all-electric range

Figure 6-13 compares the annual local criteria air pollutant emissions for trucks with different fuels. In general, BETs and FCETs emit the least local criteria air pollutants because both trucks have zero tailpipe emissions. CNG emits 67% less PM10, 69% less PM2.5, and 77% less NO_X compared to diesel. A CNG/RNG truck coupled with a low NO_X engine can further decrease the NO_X emissions to 0.02 grams per brake-horsepower hour (nearly zero). However, CNG emits significantly more carbon monoxide (CO) compared to other fuels. Hybrid trucks produce more NO_X than CNG trucks but have lower CO emissions.

Figure 6-13. Local Criteria Air Pollutants Comparison for Different Fuel Types in 2023



Source: CARB EMFAC Model
* RNG has different upstream emissions than CNG but has the same tailpipe emissions
** Hybrid BET assumed 75–25% share of diesel vs all-electric annual mileage

6.4.2 *CONSIDERATIONS*

Several considerations are essential before pursuing the NZET Pathway:

1 **Emission reductions.** The use of NZETs or Low Emissions Trucks results in fewer emissions, which is the ultimate goal of the Port's MCAS. As discussed above, there may be situations where these types of trucks make sense for a truck operator given the availability of ZETs, regulatory requirements, and operating needs of the owner.

2 **Cost of interim refueling/recharging infrastructure installations.** Depending on the selected NZE technology, additional infrastructure may be needed to accommodate refueling or recharging. In the case of CNG trucks, facilities would need to be retrofitted for CNG refueling. If truck operators are expecting to electrify their fleet in the future, retrofitting the facility for CNG in the near term while planning to install chargers in the long term may end up being more costly than immediate electrification. Therefore, in-depth cost/benefit analysis would need to be conducted before deciding to convert the current fleet to NZE.

3 **Future regulation trends.** Currently, there is increasing pressure for drayage electrification at both federal and state levels. Current state regulations require not only an increasing rate of adoption of ZETs but also an increasing level of ZET production. Therefore, it is safe to assume that all trucks will gradually transition to ZE even if they are currently exempt from regulations. To anticipate this future trend, truck operators should consider planning for electrification even if it is not imminent.

4 **Availability of NZETs.** CNG is readily available for most truck types. However, electric and fuel cell hybrid trucks are not as prevalent, especially for the types of trucks that are exempt from the ACF Drayage regulation. Therefore, the conversion to NZETs may be a constrained option for many truck operators.

6.4.3 *ALTERNATIVE PATHWAYS SUMMARY*

Based on the Alternative Pathways analysis, the 2026 goal can be achieved by BETs if combined with the early retirement of vehicles and a robust opportunity charging network. Table 6-11 provides a summary of the Alternative Pathways and their associated results.

FCETs in Alternative Pathway 2 are projected to have longer ranges than BETs. They may also reduce the initial capital cost burden on truck operators if hydrogen fueling stations become readily available. However, the feasibility of this pathway is contingent on the availability of trucks and infrastructure, which is not the current situation. Moreover, hydrogen production is presently more carbon-intensive than electricity production; thus, adding FCETs to the fleet will increase overall lifecycle GHG emissions compared to a BET-only fleet (Alternative Pathway 1). There are several ongoing efforts to increase the production of green hydrogen and FCETs, which make the technology's future promising. However, considering the Port's short-term goal, it is difficult to rely on FCETs as a component of the initial strategy.

For these reasons, Alternative Pathway 1 (all BETs with opportunity charging) is the most suitable and Targeted Pathway to meet the Port's short-term 2026 goal. The scenarios in which trucks have no threshold age for early retirement or are retired within six years of the end of their useful life are the most feasible options because of the relatively low number of trucks and financial resources required to meet the goal. However, as FCETs come to market, further analysis will be needed to identify additional pathways to support to truck operators if they determine that FCETs better support their needs.

Table 6-11. Alternative Pathways Summary

Retirement Threshold	Alternative Pathway 1 BETs Only						Alternative Pathway 2 BET and FCET					
	2026 Goal Achieved?	No. of Trucks	No. of Early Retired Trucks	No. of Opportunity Chargers[a]	Capital Costs (Trucks + Chargers)	Emission Reduction[c]	2026 Goal Achieved?	No. of Trucks	No. of Early Retired Trucks	No. of Opportunity Chargers[b]	Capital Costs	Emission Reduction[c]
No retirement threshold	YES	86–89	25–47	24	$49–$51 million	70–71%	YES	72	17–30	14–24	$40 million	61–63%
Retired within six years of end of useful life	YES	146–153	63–89	29–31	$83–$87 million	70–71%	YES	115	20–54	26–29	$63–$64 million	62–64%
Retired within three years of end of useful life	YES	231–258	44–119	45–48	$123–$138 million	70–71%	YES	121–126	12–51	44–55	$66–$68 million	63–64%
Retired within one year of end of useful life	YES/NO (33%)[c]	313–394	43–123	71-83	$166–$209 million	-70%	YES	123–225	10–64	39–71	$57–$117 million	63–64%
Retired at end of useful life	NO (25%–37%)	271–428	0	89-54	$226–$139 million	-70%	YES/NO (33%)	137-384	0	54–89	$72–$196 million	51–62%

Source: WSP

Note: Red values indicate scenarios that will not achieve the 2026 goal. Green values indicate scenarios that will achieve the 2026 goal.

(a) Assumes one 500 kW DC charger with two dispensers (charges two trucks simultaneously at 250 kW)

(b) From diesel

(c) Goal completion depends on truck operators' sensitivity to truck's useful life.

7 IMPLEMENTATION STRATEGIES

The following section describes strategies that should be considered by the Port to implement the Targeted Pathway to reach the 2026 ZET trip target as well as the longer-term 2030 goal.

7.1 OVERVIEW

In approximately four years, the Port aspires to have 40% of Port-serving heavy-duty truck trips served by 86 to 153 BETs. By 2030, the Port plans to have *all* truck trips served by ZETs. Meeting these aspirational goals is contingent on several elements, including:

— **Cost competitiveness.** Currently, ZETs are approximately three times the costs of a typical diesel trucks, not including the supporting infrastructure. It is essential that there be more price parity between ICETs and ZETs to ensure that the transition does not put an undue burden on truck operators.

— **Technological advancement.** BETs, in particular, offer approximately half of the range that diesel trucks provide. This range shortfall will have to be overcome by advancements in BET technology (increased density, capacity, and/or efficiency) or additional capital investments (more vehicles and charging infrastructure) or operational changes to reduce existing range requirements.

— **Infrastructure suitability.** BETs (and FCETs) are not operable without required infrastructure. For BETs, this includes sufficient power from the grid and supporting infrastructure (switchgears, transformers, and chargers). FCETs also require sufficient power and fueling equipment (storage tanks, vaporizers, and compressors). It is essential that a charging/fueling network and strategy is in place in *advance* of truck delivery. This also will be required once regulations require use of ZEVs.

— **Market availability.** In the coming decades, the demand for ZEVs in all sectors will increase dramatically. This can put strains on supply chains and markets for infrastructure and vehicles, resulting in delays and potentially not meeting anticipated milestones and goals.

— **Increased funding and policy at all levels of government.** More ZET-friendly policy and funding to encourage the adoption of ZETs will allow for more coordination and creative strategies to increase the pace of ZET transitions.

While some of these elements are outside of the Port's control, there are several strategies that the Port can consider to support these elements. The strategies presented herein provide more emphasis on the near-term 2026 ZE target because of the known current operating profile of trucks that transport freight at the Port's marine cargo terminals, the state of ZE technology, and market and regulatory conditions. As a result, the strategies outlined below provide a more tactical approach to reach the 2026 goal. For 2030, a guiding policy framework is encouraged to support the transition to 100% ZETs. Over time, as the Port re-evaluates the progress to ZET trips, new tactical strategies will undoubtedly emerge and build off of the preceding strategies to eventually achieve systems-level change.

7.2 2026 TARGETED PATHWAY – SHORT-TERM STRATEGIES

1 **Provide technical assistance to truck operators.**

Navigating the policy of the state and the Port may be daunting for typical truck operators that frequent the Port. Technical assistance could be afforded to truck operators who transport freight to and from the Port's marine terminals. This assistance may help fleets comply with ZE regulations and better position themselves for funding opportunities. The Port could allocate resources to assist truck operators with, but not limited to, the following areas:

— Understanding California's proposed regulations surrounding ZE adoption

— Providing education and training on characteristics of ZETs (regenerative braking, degradation, etc.)

— Preparing ZET procurement and transition plans

— Navigating the ZET funding and incentive landscape

— Conducting total cost of ownership and other technical analyses

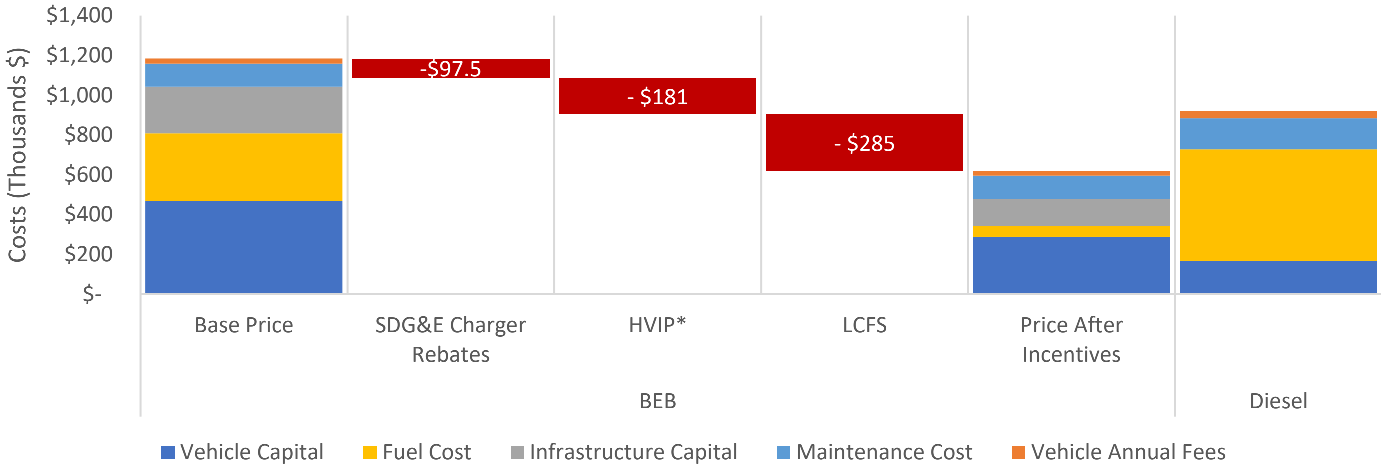
— Determining cursory infrastructure needs

2 **Develop and present a Short-Haul Zero Emission Truck Program for the Board's consideration by the end of 2022. In addition, pursue outside funding opportunities to offer subsidies, with priority to trucks identified in the Targeted Pathway.**

Consistent with MCAS Truck Objective 1B, the Port intends to jumpstart early adoption of ZETs and develop and present a Short-Haul Zero Emission Truck Program by the end of calendar year 2022, that targets displacing approximately 65,000 diesel truck miles. With an initial $1M in funding established through the Port's Economic Recovery Program, the Short-Haul Zero Emission Truck Program will be undertaken to demonstrate proof-of-concept for ZETs operating in consistent local and/or regional duty cycles to/from the Port's marine terminals. To maximize resources to deploy ZETs, the program will leverage existing state and local incentive programs including but not limited to the California HVIP, AB 617 CERP funding, and San Diego Gas & Electric's make-ready infrastructure programs. In order to ensure that the ZETs remain in operation to/from the Port's marine terminals, the program is focused on creating partnerships with willing Port tenants and trucking operators to commit to demonstrating ZETs as part of their daily operating model. The program will be presented to the Board for consideration by the end of 2022, and targets having the charging infrastructure in place in 2024, so that operations may commence later that calendar year.

As discussed, the higher initial capital cost of BETs, as compared to diesel trucks, is one of the main barriers to entry for truck operators. The Plan's total cost of ownership analysis (Appendix B) found that the cost of a BET (over a 13-year useful life) is forecasted to be $262 thousand higher than that of a diesel truck, assuming no funding from currently offered incentive programs or Port-provided subsidies (Figure 7-1). However, this $262 thousand can be further reduced—potentially to the point of savings—if adequate incentives and subsidies are applied. In the best-case scenario, in which truck operators can secure all available state and local funding, the TCO of a BET can be reduced to 67% of a diesel truck. The Port recognizes the cost of the transition can be a burden to truck operators. For this reason, the Port could provide additional subsidies to support the fleet. The Port will monitor and pursue additional outside funding opportunities from local, state, and federal resources to help further offset traditional incentive programs.

Figure 7-1. Total Cost of Ownership – Battery-Electric Truck and a Diesel Truck (13-Year Lifecycle)



Source: WSP
*HVIP value includes the $120 to $150 thousand voucher value and the savings from lower interest due to a reduced vehicle loan base price.

If truck operators can secure other funding (e.g., low carbon fuel standard, HVIP, and a charger rebate) and the Port can secure funding to provide an additional subsidy between $45 thousand (Option 1) and $120 thousand (Option 2) per truck, the combined incentives help to cover the higher costs experienced by truck operators during the first five years of BET ownership. In the worst-case scenario (with no state or local incentive funding), the Port could offer $262 thousand (Option 3) to cover the full TCO difference. Furthermore, Option 1 or Option 2 can cover between 17% and 46% of the TCO difference between a BET and a diesel truck in the event a truck operator cannot secure state and local incentive funding. Option 1 and Option 2 are more financially feasible to be implemented considering that Option 3 will cost approximately $23-40M through 2026. If the Port were to pursue Option 1 and Option 2 as a range of subsidy to encourage adoption of BETs, the total costs of the programs are approximately $4 to 7 million and $10 to $18 million through 2026, respectively (Table 7-1).

Table 7-1. Proposed Subsidies

Truck Operator Funding	Port-Provided Subsidies		
	Option 1: $4–7 million ($45 thousand/BET)	Option 2: $10–18 million ($120 thousand/BET)	Option 3: $23–40 million ($262 thousand/BET)
LCFS + HVIP + Charger Rebate	Fully covers the cost gap in the first five years of adoption	TCO savings	TCO savings
LCFS + HVIP	Covers approximately 30% of the cost gap in the first 5 years of adoption	Fully covers the cost gap in the first five years of adoption	TCO savings
No Incentives	Covers 17% of the TCO difference	Covers 46% of the TCO difference	Fully covers the TCO difference

Source: WSP
Notes: Green texts indicate options that will fully cover the cost gap between BET and diesel truck.
Costs do not include public opportunity charging stations and are rounded to the nearest million.

Port-provided incentives could focus on truck operators that are prioritized in the Targeted Pathway. These trucks each visit the Port's marine cargo terminals approximately between 192 and 327 times a year each and have a daily trip range of 250 to 275 miles (all median values). The approach to a Port subsidy could be a traditional rebate program that is contingent on meeting performance metrics and/or a public private partnership between the Port, a truck operator, the tenants, and other third parties to provide ZETs, supporting infrastructure, and maintenance. Higher incentives may be considered for truck operators that adopt more rapidly – especially if they are willing to retire their diesel trucks before the end of their useful lives.

Consistent with the Port's procurement and financial assistance programs, incentives may be awarded to truck operators to adopt ZETs which may consider criteria related to small business participation as well as diversity, equity, and inclusion. The following is a list of examples which may be included in decisions regarding incentives:

— The existence of a Small Business Enterprise (SBE) program including diverse and inclusive outreach and a goal to ensure SBE participation, which includes businesses owned by women, minorities, disabled veterans, veterans, and other historically underutilized businesses based on the number of employees or gross revenues, as determined by either state or federal criteria

— A commitment to Diversity, Equity, and Inclusion (DEI)

— The submittal of an Employment and Ownership Report

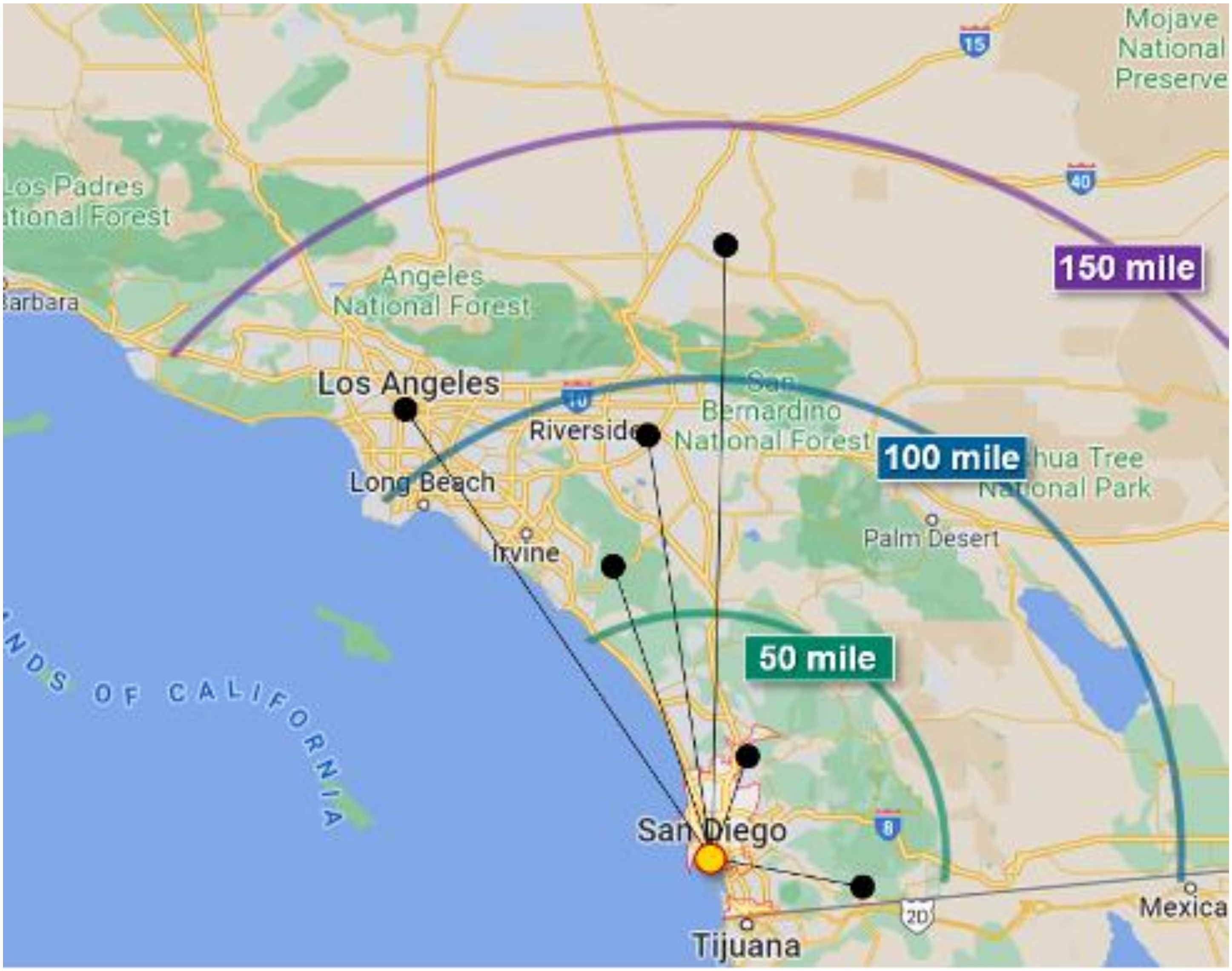
— The submittal of any reports on diversity, equity, and inclusion accomplishments in the workforce and/or procurement

— The inclusion of any career pathway programs or efforts to grow the industry with emphasis on diversity and inclusion

— The recognition or award for DEI in the workforce or procurement from an external source

As previously mentioned, a substantially large portion of Port-serving truck trips are provided by a relatively small number of trucks, known as the Port's "frequent flyers." Based on the analysis, the Targeted Pathways' trucks (between 86 and 153 trucks) visit the Port between 192 and 327 times a year each and have a daily trip range of 250 to 275 miles (all median values). The most cost-effective way to meet the Port's short-term goal is to transition the fewest number of trucks—i.e., trucks that most frequently serve the Port and/or have ranges that can be supported by existing BET technology. Figure 7-2 illustrates the conceptual extent that a truck can travel from the Port based on a 50-, 100-, and 150-mile extent, as well as common routes that represent the best targets for early adoption of BETs. Considering that the range in 2026 for a BET is expected to be approximately 215 miles, it is assumed that trucks can make a round trip (to and from) the blue line from the Port. If multiple or longer trips (purple line) are required, opportunity charging will be required.

Figure 7-2. Truck Trip Ranges (50-mile Increments)



Source: Port of San Diego

3 Assist in the the planning, design, and implementation of ZET-supporting infrastructure.

To support a fleet of BETs, it is essential that all trucks have supporting charging infrastructure. It is assumed that charging infrastructure will be available wherever vehicles are stored overnight, and to support the Targeted Pathway, there will also need to be several opportunity charging locations that provide charging during work shifts. These locations would likely be at trip nodes (the Port or warehouses) but could also be at truck/rest stops or anywhere else trucks can be temporarily stored and charged.

The Port could pursue and consider assisting in the deployment of infrastructure such as ZET charging and/or hydrogen fueling stations. Based on the Targeted Pathway, opportunity charging is needed to achieve the Port's near-term 2026 ZET target. It is estimated that approximately half of the Targeted Pathway's trucks will likely need opportunity charging to accomplish their operating demands. An estimated 30 chargers (assuming one charger supports two trucks) would be needed to support the transition, or approximately $16 million (minimum).

Based on the needs of the truck operators, opportunity charging sites could serve as locations where trucks could be domiciled if the truck operators do not have access to overnight charging. New business models for charging services are emerging, such as Charging As A Service (CaaS), in which a third party owns, operates, and maintains the infrastructure. Some CaaS providers also can provide vehicles on a subscription basis to truck operators.

For charging sites on Port property, it is essential that OEMs are engaged so that their offerings, pricing, and spatial requirements are understood. Charging sites should be in close proximity to existing feeders to minimize the construction, costs, and timeline associated with bringing power to the site. Ideally, chargers will have some sort of shelter to protect them from the elements and be accessible for maintenance. In a worst-case scenario, 24 to 31 DC fast chargers may be needed to fulfill the needs of the BETs (see Section 6.2.5 for a case study on the estimated costs).

As stated, Port staff have released an RFI to seek information regarding the potential for infrastructure development at eight locations within the vicinity of the Port's marine cargo terminals and throughout the region. These sites were selected based on conversations with the San Diego Association of Governments (SANDAG), the California State Transportation Agency, and others. Further, other incentives and strategies can be implemented in coordination with other stakeholders for sites. For example, reduced rates for charging at Port facilities may be explored with SDG&E. Port staff will present the results of the RFI and provide recommendations for deploying charging and/or hydrogen fueling stations to the Board prior to the end of 2022.

Critical for BET (and FCET) adoption are also additional power enhancements needed to support charging/fueling. The Port and its stakeholders may need to coordinate with SDG&E to ensure that the required power can be provided on schedule. Several trucks charging at a single time requires a high level of power—this may require additional line extensions from the substations/feeders that supply power to the site, additional transformers, switchgear, and metering. To provide this power, trenching may be needed. All of these requirements come at significant financial and schedule costs. Working with SDG&E early helps to ensure that power can be provided before trucks are delivered and that any incentive programs can be leveraged to reduce—or eliminate—costs outside the meter.

4 Support and promote various strategic policy goals and initiatives to increase ZET adoption.

To hasten the Port-serving fleet's adoption of ZETs, new and enhanced policy surrounding ZETs, at all levels of government, is encouraged. The Port has identified several areas for which it may advocate to reduce the burden of adoption on Port-serving truck operators, including:

— Leverage partnerships with regional agencies such as SDG&E, the San Diego Air Pollution Control District, SANDAG, and others to encourage public investment in the San Diego region to support freight electrification.

— Advocate for funding equity among California ports and encourage set-asides in state and federal funding programs to implement the Plan.

— Reduce the California sales tax burden on ZET purchases.

— Increase weight limits above 82,000 pounds for over-the-road Class 8 BETs, where feasible.

— Collaborate with the California Department of Transportation for priority access to dedicated lanes and border crossings for ZETs.

- Evaluate US Department of Transportation requirements regarding "Hours of Service" to consider time spent while charging a BET.
- Support the continuation of electric utility-based programs to build make-ready infrastructure for medium- and heavy-duty charging.
- Encourage local and utility streamlining of permits for electric vehicle charging and hydrogen fueling infrastructure installation.
- Advocate for continued deployment of infrastructure to support ZETs along highway and interstate corridors throughout the western US to support long-term freight transportation.

7.3 2030 TARGETED PATHWAY – LONG-TERM FRAMEWORK

While the strategies geared for 2026 are more specific, a longer-term framework has been established for achieving the 2030 goal of 100 percent ZET trips. This framework is meant to keep the Port on course to achieve the 2030 target through the development of a truck registry, biennial updates, and assessment of new projects in accordance with MCAS requirements. These strategies are outlined below.

1 **Develop a truck registry to track trips and monitor progress.**

According to MCAS Truck Objective 1D, the Port will develop and deploy a truck registry by June 30, 2023. The registry will contain a database of trucks that transport freight at the marine cargo terminals. Pertinent information regarding truck characteristics, operating profiles, and fuel type will be collected and stored. The purpose of the registry is to track trips to and from each of the terminals to measure progress on ZET goals. The data will allow Port staff continued insight into trucking operations as they evolve over time. Following implementation of the truck registry, Port staff will provide an initial summary report of trucking data and characteristics by the end of calendar year 2023.

2 **Conduct biennial updates to the Plan.**

MCAS Truck Objective 1E includes biennial opportunities to review the truck baseline, assess the state of ZE technology, determine market conditions, and evaluate funding availability. The biennial status report presents an opportunity to reevaluate and update the Plan's strategies after 2026. The first biennial update is scheduled to be completed by the end of calendar year 2023.

3 **Data collection for new leases and projects.**

Port staff will review new leases and projects at the marine cargo terminals that result in new truck trips and collect the number of truck trips and anticipated types of trucks. The data collected will inform the Port about where the Port is in relation to the goals and the baseline of 100,000 truck trips to the marine terminals (in accordance with the MCAS). The data will also inform the biennial updates to this Plan, as well as market availability, daily mileage limitations, and infrastructure and/or OEM deployment delays.

As with all other elements of the Plan, the Port will continue to monitor changes to all aspects of ZETs and make adjustments to assumptions and the short- and long-term strategies, as needed.

8 SUMMARY OF FINDINGS AND NEXT STEPS

8.1 SUMMARY OF FINDINGS

To determine the most feasible approach to achieving the Port's short-term goal of 40% ZET trips by 2026 and long-100% ZET trips by 2030, the Heavy-Duty Zero emission Truck Plan documents and establishes the "Targeted Pathway." The following provides a brief summary of the findings of each stage of analysis.

8.1.1 *PRELIMINARY PATHWAYS*

The Preliminary Pathways were established to identify the initial viability of meeting the 2026 and 2030 goals utilizing different ZET technologies and charging scenarios. The Preliminary Pathways consist of five pathways for 2026 and 2030, respectively:

- Preliminary Pathway 1: All BETs (without opportunity charging)
  - Preliminary Pathway 1A: All BETs (with opportunity charging)
- Preliminary Pathway 2: All FCETs
- Preliminary Pathway 3: BETs and FCETs (without opportunity charging)
  - Preliminary Pathway 3A: BETs and FCETs (with opportunity charging)

The Preliminary Pathways analysis found that FCETs, while promising, are not yet available on the market and therefore should not be a priority technology in meeting the Port's immediate goal (40% ZET trips by 2026). While BETs do not have the same range capabilities as FCETs, it appears that they may be a viable solution to meet the 2026 goal if opportunity charging and other optimization strategies, such as early retirement, are considered.

At this time, the 2030 goal (100%) does not appear to be achievable, as it is contingent on several factors outside of the Port's control, including more aggressive ZE policies and funding, advancement of ZET technologies, and availability of infrastructure for both BET charging and hydrogen fueling stations. It is also essential for battery advancements to continue or exceed their current trajectories to better suit the duty cycles of Port-serving trucks. The hydrogen industry (producers and vehicle OEMs) is expected to ramp up production, and whether this happens will also impact the Port meeting its goal. Considering these uncertainties, the Port will continue to evaluate the market and coordinate with regional and state partners over the coming years to advance towards the 2030 goal.

For these reasons, Preliminary Pathway 1A (BETs with Opportunity Charging) and Preliminary Pathway 3A (BETs and FCETs with opportunity charging) are the most suitable to meet the Port's short-term 2026 goal and thus are further analyzed as Alternative Pathways.

8.1.2 *ALTERNATIVE PATHWAYS*

The main purpose of the Alternative Pathways analysis is to identify the Targeted Pathway to meet the Port's near-term 2026 goal. The analysis expands on Preliminary Pathways 1A and 3A by providing further optimizations to attain the 2026 goal, such as minimizing the number of trucks by prioritizing "frequent flyers" (trucks that frequently visit the Port) and retiring or replacing trucks in advance of the end of their useful lives. A truck's age and mileage are both useful indicators when determining its useful life, and the Alternative Pathways include sensitivity analyses to examine the impacts of both. The Alternative Pathways analysis also includes a Near-ZE (NZE) Pathway that qualitatively assesses the use of NZE technologies for trucks that are exempt from the state's proposed ZE regulations, such as unibody auto carrier trucks. Lastly, the Alternative Pathways analysis provides rough order of magnitude costs and estimated emission reductions to provide a comprehensive picture of the impacts of the Pathways to the Port and its stakeholders. The three Alternative Pathways analyzed are listed below:

— Alternative Pathway 1: All BETs (with opportunity charging)

— Alternative Pathway 2: BETs and FCETs (with opportunity charging)

— Alternative Pathway 3: Near-ZE Trucks (NZETs)

Based on the Alternative Pathways analysis, the 2026 goal may be achieved by BETs ***if*** combined with the early retirement of vehicles and a robust opportunity charging network.

FCETs in Alternative Pathway 2 are projected to have longer ranges than BETs. They may also reduce the initial capital costs burden on truck operators if hydrogen fueling stations become readily available. However, the feasibility of this pathway is contingent on the availability of trucks and infrastructure, which is not the current situation. Moreover, hydrogen production is presently more carbon-intensive than electricity production; thus, adding FCETs to the fleet will increase overall lifecycle GHG emissions compared to a BET-only fleet (Alternative Pathway 1). There are several ongoing efforts to increase the production of green hydrogen and FCETs, which make the technology's future promising. However, considering the Port's short-term goal, it is difficult to rely on FCETs as a component of the initial strategy.

NZETs in Alternative Pathway 3 may provide an option for truck operators to reduce emissions compared to conventional diesel trucks. However, use of NZETs may be limited based on forthcoming regulations which may only allow their operation under specific and unique circumstances.

For these reasons, Alternative Pathway 1 (all BETs with opportunity charging) is the most suitable and identified Targeted Pathway to meet the Port's short-term 2026 goal. Focusing on replacing the most frequent diesel truck trips with ZET trips is the most reasonable option because of the relatively low number of trucks and financial resources required to meet the goal. As FCETs come to market, the increased range of these trucks may assist the Port to achieve its goals and should be considered as a substitute for BETs when appropriate. Special consideration for use of NZETs may also be considered in those instances where a ZET may not be available and emission reduction is needed.

8.1.3 *TARGETED PATHWAY*

The Port's Targeted Pathway (BETs with opportunity charging) prioritizes the replacement of diesel trucks that perform the most frequent truck trips. Based on the analysis of retirement schedules, BET range capabilities, and trip frequency, approximately 86 to 153 trucks are needed to achieve the 2026 goal. This pathway in the lowest overall cost ($49 to $87 million) to transition to ZE trucks given the lower number of vehicles and chargers required. However, not all of these trucks may have reached their useful life. These costs are inclusive of the residual costs of the number of trucks that may need to be retired before the end of their useful life. Table 8-1 summarizes the characteristics of the trucks, profiles, costs, and emissions associated with the Targeted Pathway.

Table 8-1. Targeted Pathway Summary

Category	Metric
Truck Profile	
Number of Trucks	86–153
Median Daily Mileage	250–275
Median of Annual Port Trips	192–327
Number of Early Retired Trucks	25–89
Number of Trucks Needing Opportunity Chargers	47–60
Costs and Emissions	
Costs (vehicle, charger, and residual of diesel trucks)	$49–87 million
GHG Emission Reduction in 2026 (metric tons of CO2e)	16,711–33,864 (-79% reduction)
NO_X Emission Reduction in 2026 (metric tons)	15.5–31.6
PM2.5 Emission Reduction in 2026 (kg)	185.2–375.4
PM10 Emission Reduction in 2026 (kg)	193.6–392.4
Total Cost of Port-Provided Subsidy	
Option 1: $45 thousand/BET	$4–7 million
Option 2: $120 thousand/BET	$10–18 million

Source: WSP

8.2 NEXT STEPS

The Heavy-Duty Zero Emission Truck Transition Plan provides a deeper understanding of the current truck operating profile at the Port and specific actions that can help the Port achieve its near-term zero emission goals given the state of technology as well as a framework for maintaining direction to accomplish the long-term 2030 goal. As the truck operating profile changes over time and ZE technologies advance, the Plan will also evolve. The Port and its stakeholders should remain flexible to evolving technologies, emerging business models, and new strategies to progress the MCAS' truck goals.

Beginning implementation of the Targeted Pathway to advance progress towards the MCAS' short-term 2026 goal would involve focusing on the following as immediate next steps. Additionally, pursuant to Section 1.2 Purpose and Approach, staff will return to the Board for further direction and approvals, as appropriate:

- Providing technical assistance to truck operators
- Developing and presenting a Short-Haul Zero Emission Truck Program for the Board's consideration by the end of 2022. In addition, pursuing outside funding opportunities to offer subsidies, with priority to trucks identified in the Targeted Pathway
- Assisting in the planning, design, and implementation of ZET-supporting infrastructure
- Supporting and promoting various strategic policy goals and initiatives to increase ZET adoption

APPENDIX A

SURVEY QUESTIONS, SUMMARY RESULTS, AND TRUCK MOVEMENT DATABASE

Fleet Manager Survey

General Information

1. What is your name?
2. What is your company's name?
3. What is your email address?
4. Describe your fleet operations that service the Port of San Diego? (Multiple Choice)
    a. Own or Lease all of our trucks that service the Port of San Diego
    b. Own trucks or lease trucks AND hire independent truckers to for Port of San Diego activities
    c. Hire independent truckers to service the Port of San Diego
5. How many independent truckers do you hire to service the Port of San Diego?
6. Roughly how much of your fleet's total operations are for Port-related trips? (Multiple Choice)
    a. All (100%)
    b. Most (80% or more)
    c. About half (40-60%)
    d. Less than half (20-40%)
    e. Not much (20% or less)
7. Where does your truck fleet typically park at the end of the workday? (Multiple Choice)
    a. Off-Street in workplace parking lot
    b. Off-Street in paid parking lot
    c. Off-Street in a free public parking lot
    d. On-Street near my home or business
8. How many hours are your trucks typically parked at the end of the workday?(Multiple Choice)
    a. 1-2 hours
    b. 2-3 hours
    c. 4-8 hours
9. During the course of a typical workday, what is the longest period your truck(s) are parked or waiting? (Multiple Choice)
    a. 1-2 hours
    b. 2-3 hours
    c. Greater than 3 hours
10. Where does your truck fleet typically refuel in the San Diego region?
11. Is there space for fueling/charging infrastructure at your facility?
12. Do you typically purchase/lease new or used trucks? (Multiple Choice)
    a. Purchase – NEW
    b. Purchase – Used
    c. Lease – NEW

13. Which alternative fuel type do you think may be most advantageous for your fleet? (Multiple Choice)
    a. Battery Electric
    b. Hydrogen Fuel Cell
    c. Compressed Natural Gas
14. In Questions 14a-14d below, rate the following statements 1-5, describing the hurdles to procuring zero-emission trucks:

1 = is not a hurdle
2 = is a minor hurdle
3 = is a hurdle
4 = is a significant hurdle
5 = is an extreme hurdle
NA = not sure

14a. There aren’t enough charging or fueling stations 14b. Too expensive
14c. Cannot perform duty cycle
14d. There aren't enough maintenance and repair facilities

Truck Inventory Questions

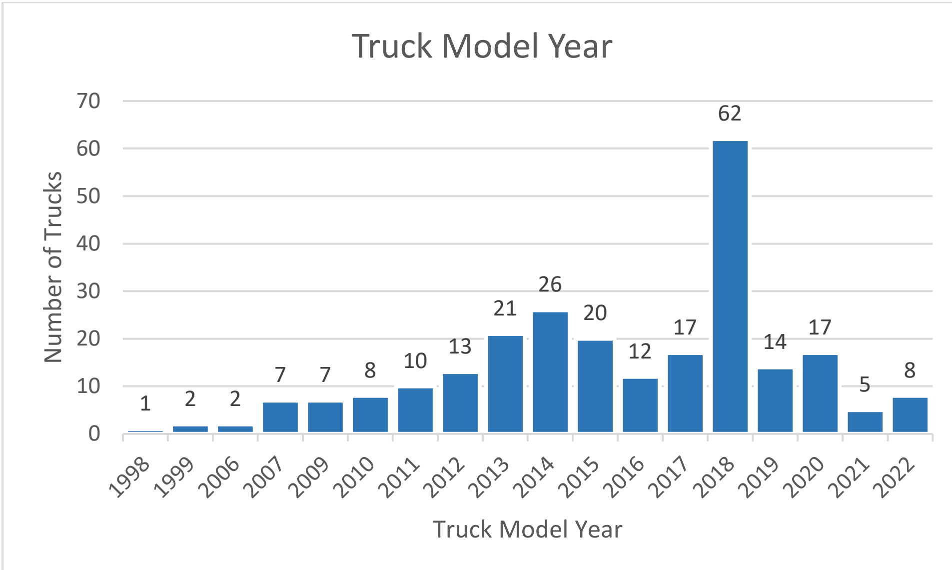
1. Year
2. Make
3. Model
4. Fuel Type
5. License Plate
6. License State
7. Current Odometer
8. Truck Type (Multiple Choice)
    a. Tractor Trailer
    b. Tractor Trailer with PTO
    c. Unibody Truck
    d. Unibody Auto Carrier
    e. Other
9. Typical Cargo Type Moved through Port of San Diego (Multiple Choice)
    a. Autos
    b. Dry Bulk – Bauxite
    c. Break Bulk
    d. Dry Bulk – Fertilizer
    e. Dry Bulk – Sugar
    f. Steel
    g. Military
    h. Misc. Project Cargo
    i. Refrigerated Produce
    j. Other
10. Typical Total Weight of Truck & Cargo (lbs)
11. Roughly how many miles does this truck drive on a typical day? (miles)
12. On average, how frequently does this truck visit the Port of San Diego?
13. Notes

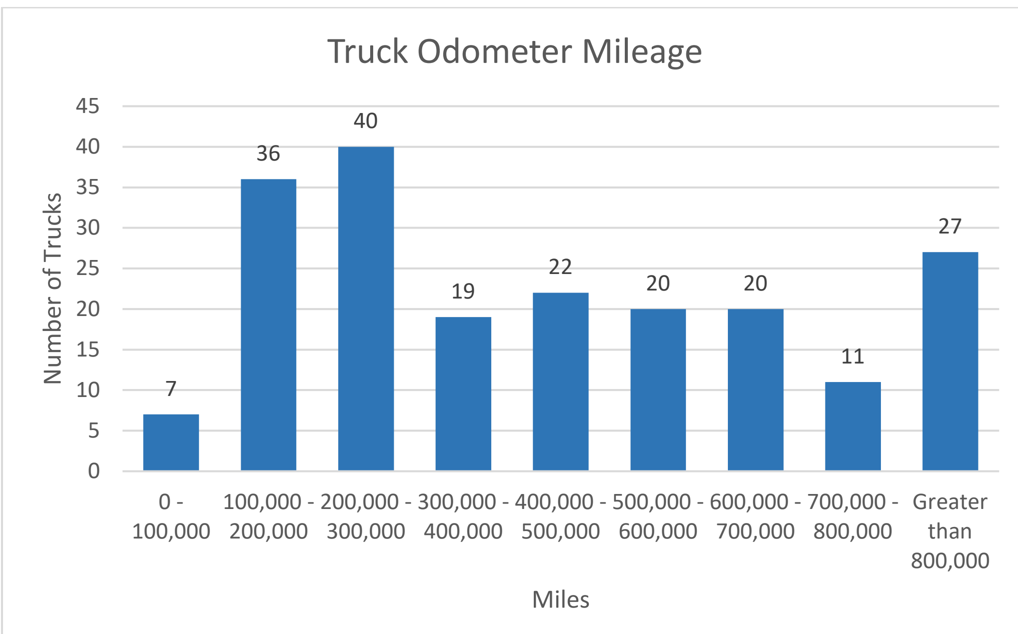
Truck Driver Survey

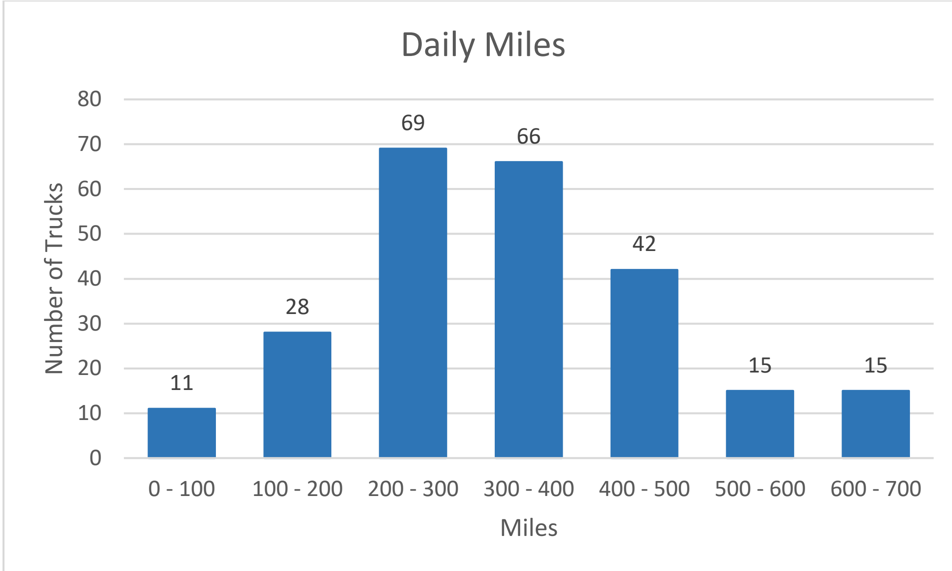
1. What is the license plate number of the truck you are driving?
2. What is the state your truck is licensed in?
3. What type of truck is this? (Multiple Choice)
    a. Tractor Trailer
    b. Tractor Trailer with PTO
    c. Unibody Truck
    d. Unibody Auto Carrier
    e. Other
4. What is your current odometer reading?
5. Are you picking up or dropping off cargo? (Multiple Choice)
    a. Picking up
    b. Dropping off
    c. Both picking up and dropping off
6. What is your cargo?
    a. Autos
    b. Bauxite
    c. Break Bulk
    d. Fertilizer
    e. Sugar
    f. Steel
    g. Military Equipment/Vehicles
    h. Heat exchangers
    i. Lithium Batteries
    j. Refrigerated Produce
    k. Other
7. What is the typical total weight of your truck and cargo? (Gross vehicle weight rating – GVWR)? (Multiple Choice)
    a. Less than 26,000 lbs
    b. 26,001 – 33,000 lbs
    c. 33,001 – 45,000 lbs
    d. 45,001 – 60,000 lbs
    e. 60,001 – 70,000 lbs
    f. Greater than 70,000 lbs

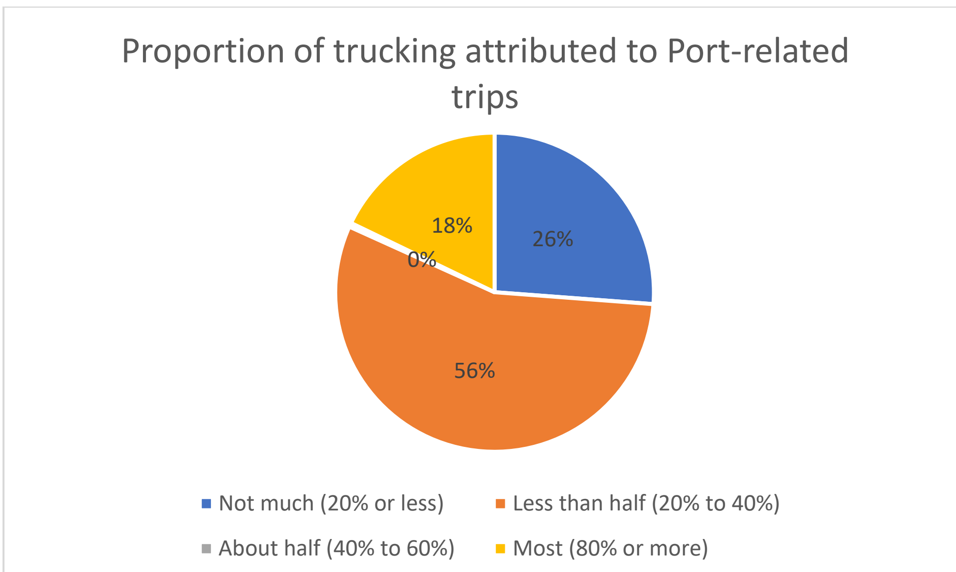
8. How far did this truck travel before arriving at the Port of San Diego today?
    a. 0 – 25 miles
    b. 26 – 50 miles
    c. 51 0 75 miles
    d. 76 – 100 miles
    e. 101 – 150 miles
    f. 151 – 200 miles
    g. 200 – 300 miles
    h. 300 – 400 miles
    i. 400 – 500 miles
    j. Other
9. How far will this truck travel after leaving the Port of San Diego today?
    a. 0 – 25 miles
    b. 26 – 50 miles
    c. 51 0 75 miles
    d. 76 – 100 miles
    e. 101 – 150 miles
    f. 151 – 200 miles
    g. 200 – 300 miles
    h. 300 – 400 miles
    i. 400 – 500 miles
    j. Other
10. Roughly, how many miles does this truck travel on a typical day?
    a. 0 – 100 miles
    b. 101 – 150 miles
    c. 151 - 200 miles
    d. 201 – 250 miles
    e. 250 – 300 miles
    f. 301 – 400 miles
    g. 401 – 500 miles
    h. 501 – 600 miles
    i. 600 – 700 miles
    j. 701 – 800 miles
    k. More than 800 miles
11. On average, how often do you transport this cargo to/from the Port of San Diego? (Enter number)
12. On average, how often do you transport this cargo to/from the Port of San Diego? (Select frequency corresponding to number in Question 11) (multiple choice)
    a. Time per day
    b. Times per week
    c. Times per month
    d. Times per quarter
    e. Times per year

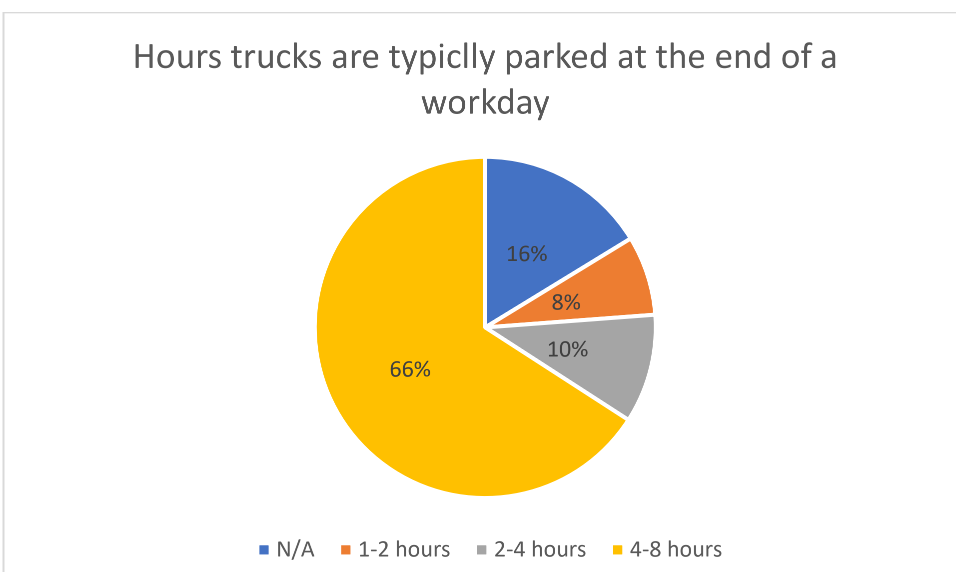
Comprehensive Marine Terminal Heavy-Duty Truck Operating Profile From the Fleet Manager and Truck Driver Survey Statistics

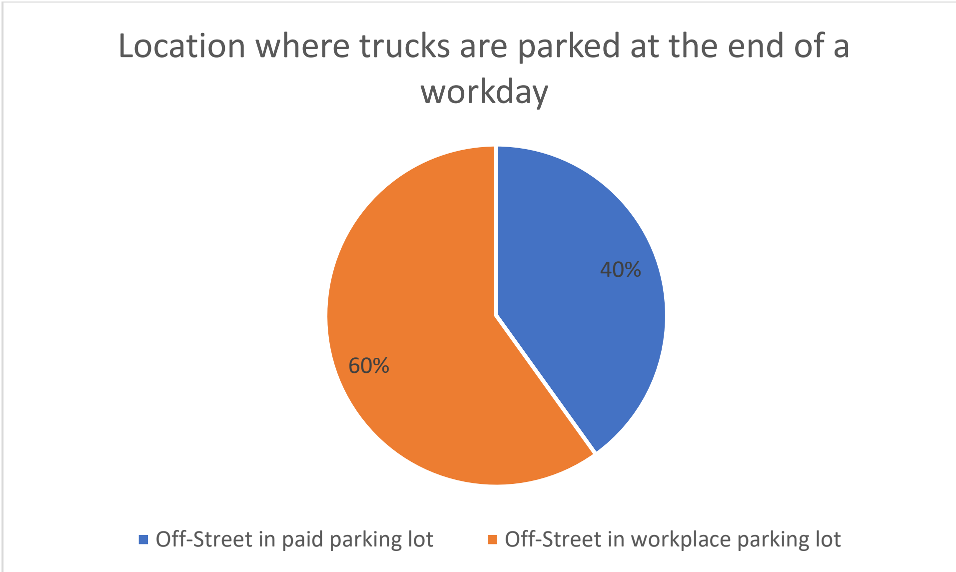


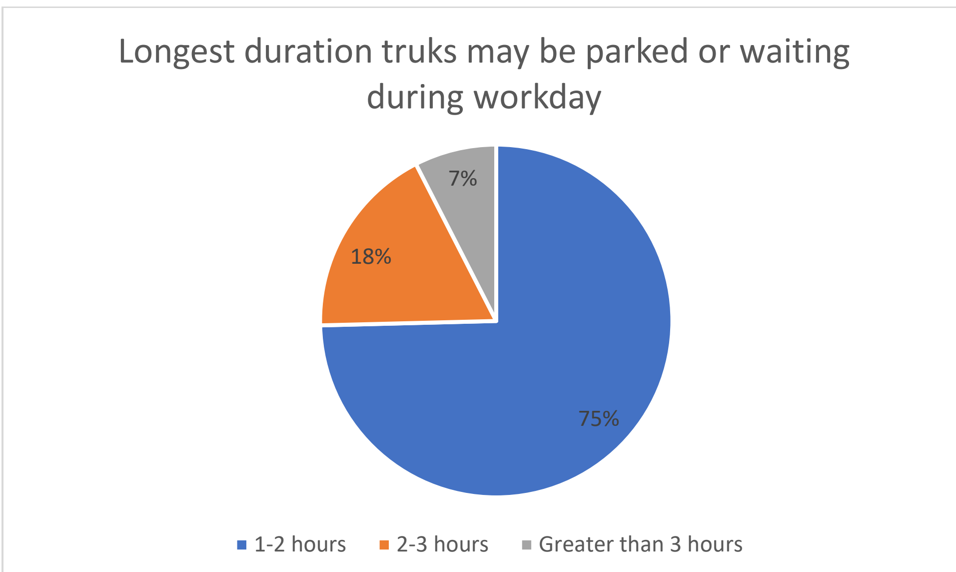


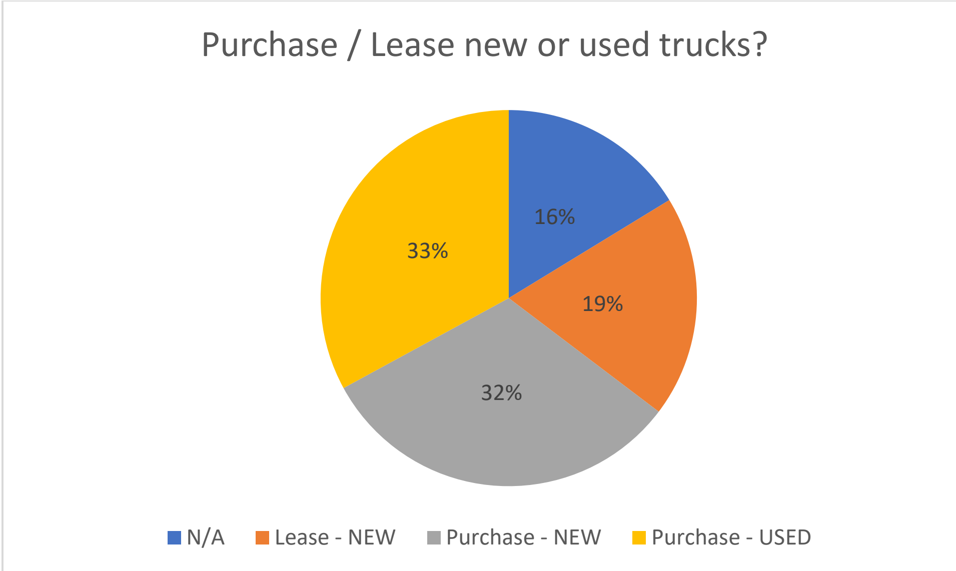

Daily Miles
80
70
60
50
40
30
20
10
0
Number of Trucks
11
28
69
66
42
15
15
0 - 100
100 - 200
200 - 300
300 - 400
400 - 500
500 - 600
600 - 700
Miles

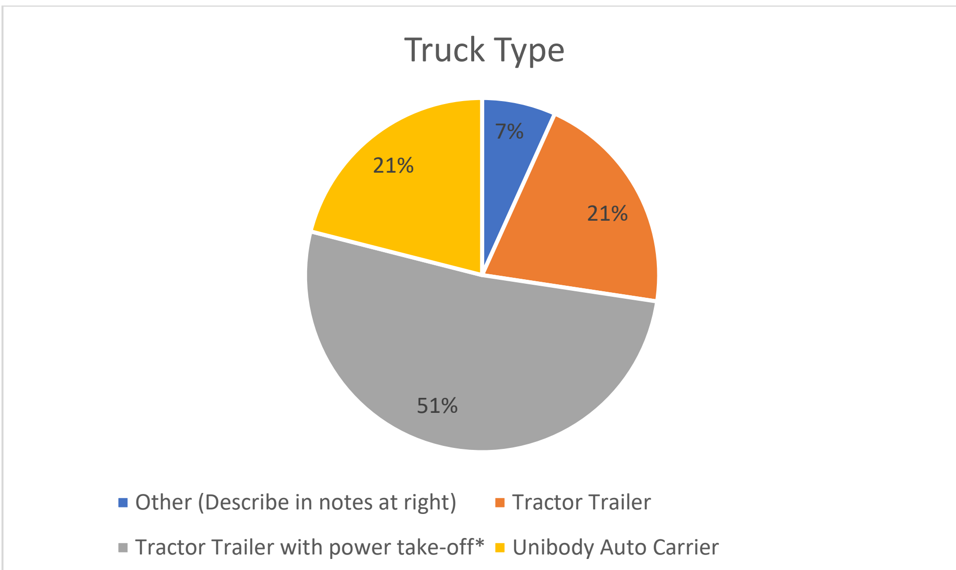

Proportion of trucking attributed to Port-related trips
18%
26%
0%
56%
Not much (20% or less)
Less than half (20% to 40%)
About half (40% to 60%)
Most (80% or more)


Hours trucks are typiclly parked at the end of a workday
16%
8%
10%
66%
N/A
1-2 hours
2-4 hours
4-8 hours


Location where trucks are parked at the end of a workday
40%
60%
Off-Street in paid parking lot
Off-Street in workplace parking lot


Longest duration truks may be parked or waiting during workday
7%
18%
75%
1-2 hours
2-3 hours
Greater than 3 hours

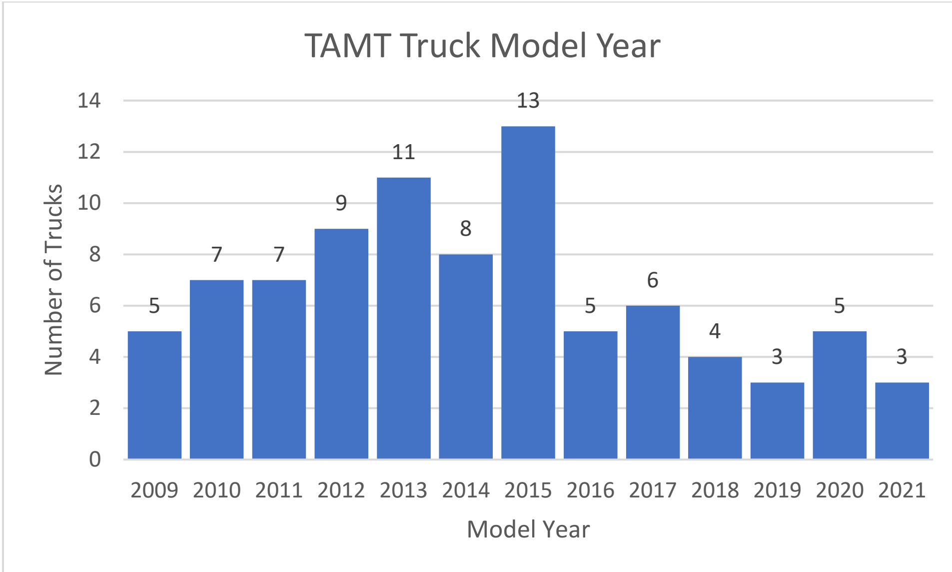


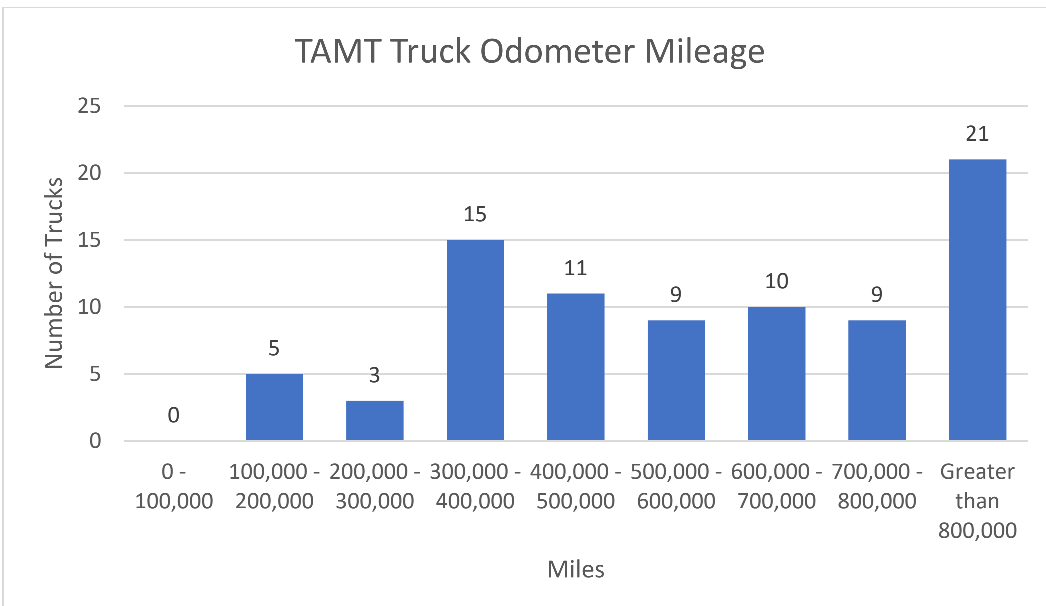


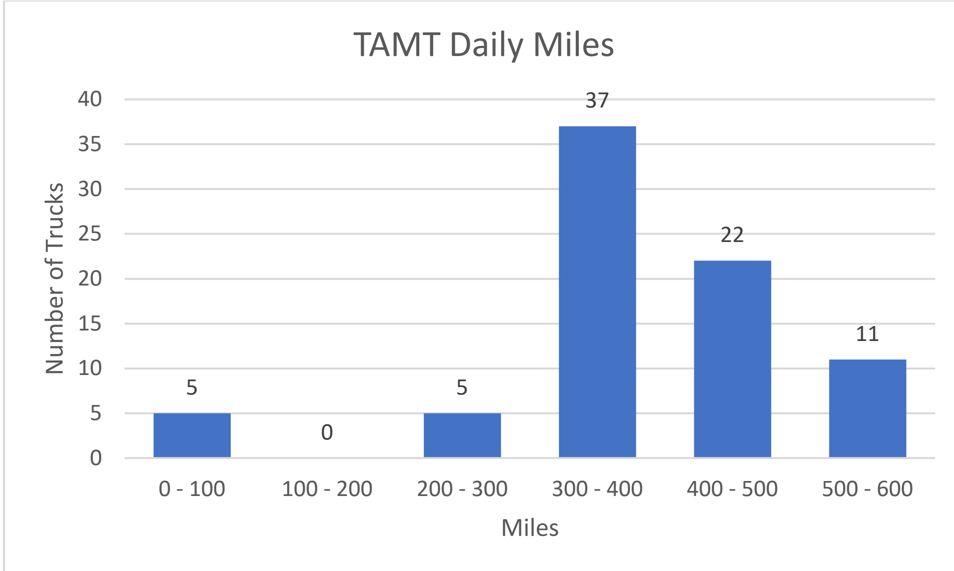
*Power Take-Off units provide auxiliary power to specialized equipment on a truck's trailer such as hydraulic pumps

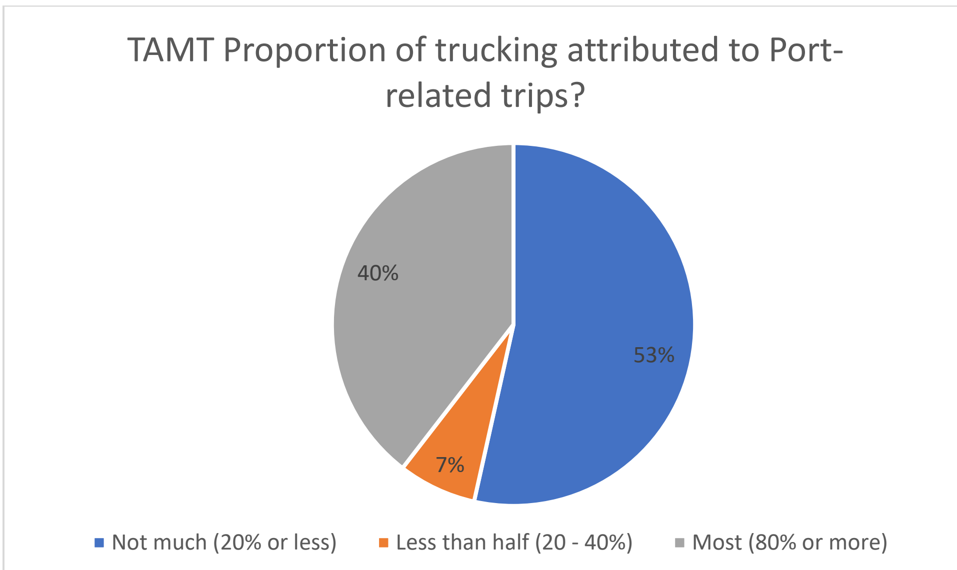
Tenth Avenue Marine Terminal Heavy-Duty Truck Operating Profile

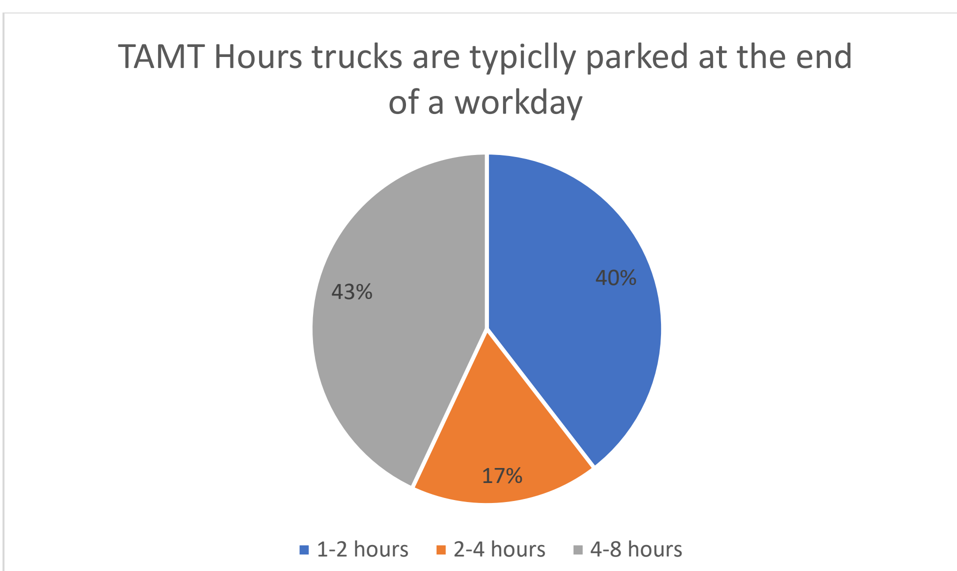
From the Fleet Manager and Truck Driver Survey Statistics

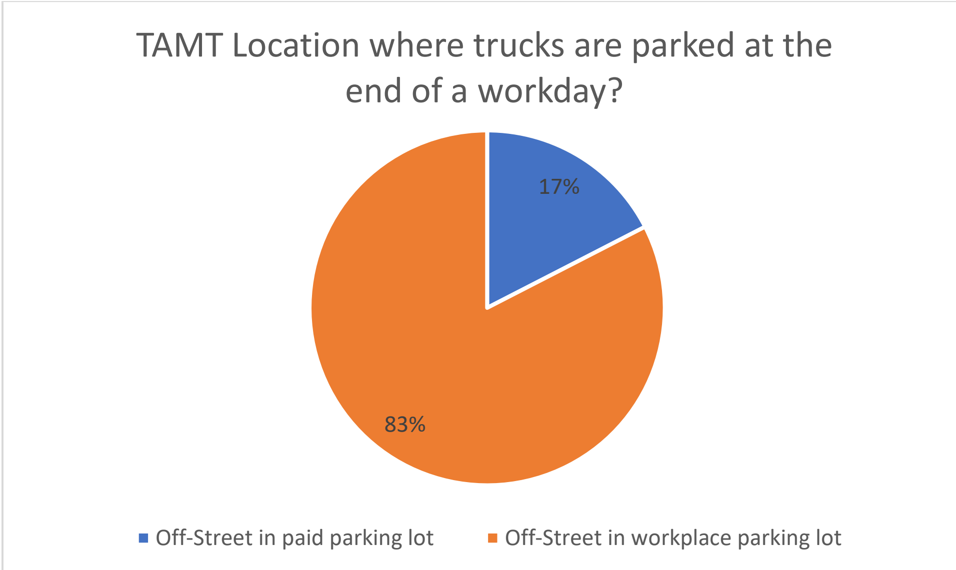


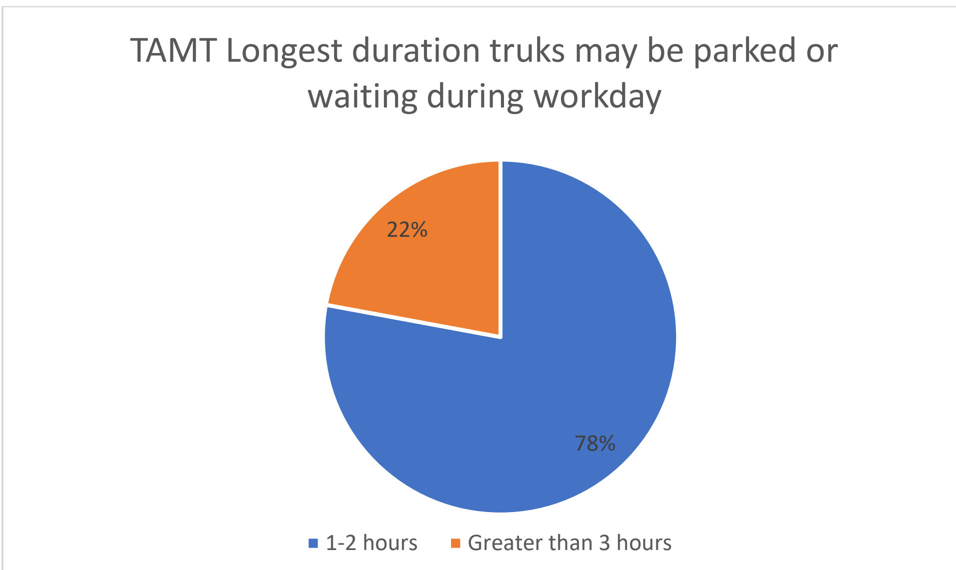


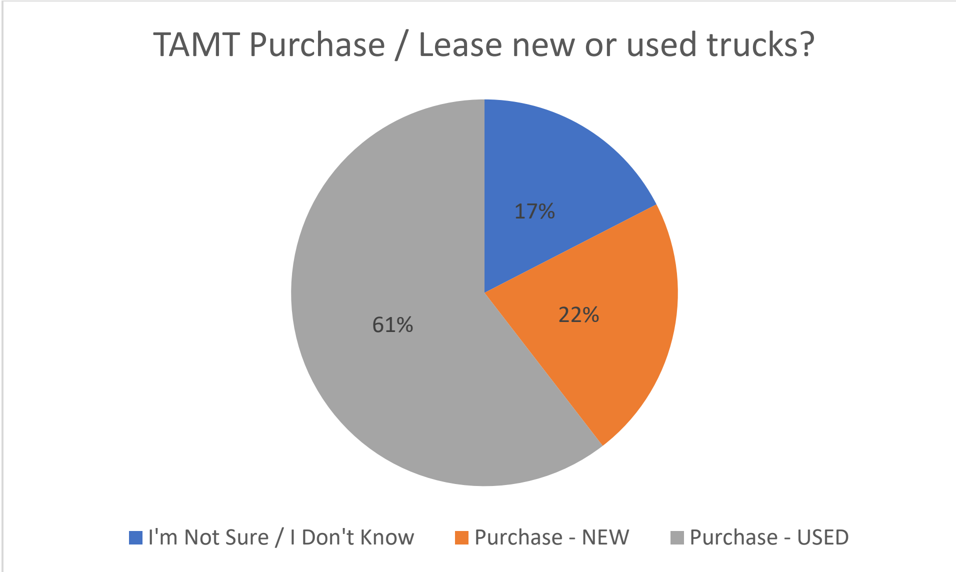

TAMT Daily Miles
Number of Trucks
40
35
30
25
20
15
10
5
0
5
0
5
37
22
11
0 - 100
100 - 200
200 - 300
300 - 400
400 - 500
500 - 600
Miles

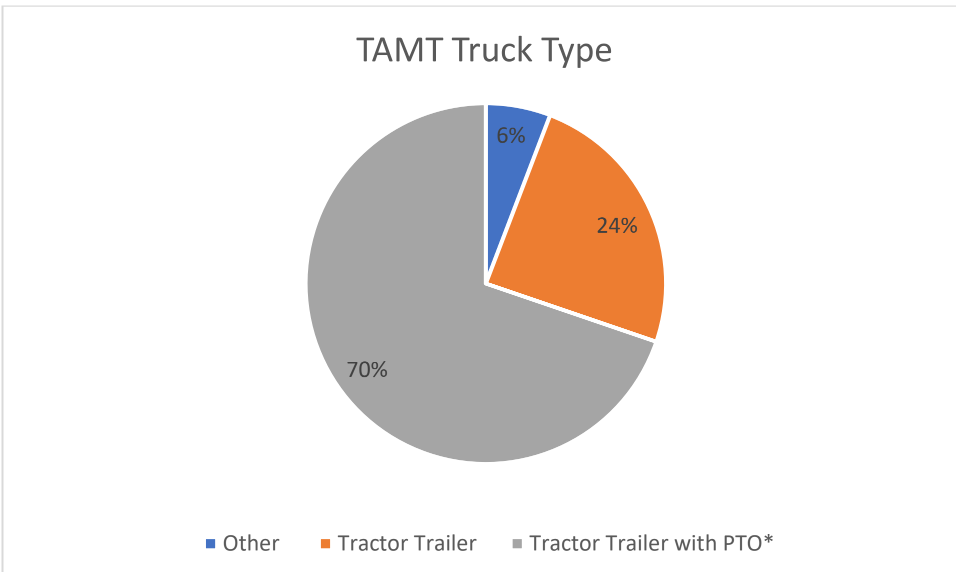

TAMT Proportion of trucking attributed to Port-related trips?
40%
53%
7%
Not much (20% or less)
Less than half (20 - 40%)
Most (80% or more)


TAMT Hours trucks are typiclly parked at the end of a workday
43%
40%
17%
1-2 hours
2-4 hours
4-8 hours


TAMT Location where trucks are parked at the end of a workday?
17%
83%
Off-Street in paid parking lot
Off-Street in workplace parking lot


TAMT Longest duration truks may be parked or waiting during workday
22%
78%
1-2 hours
Greater than 3 hours

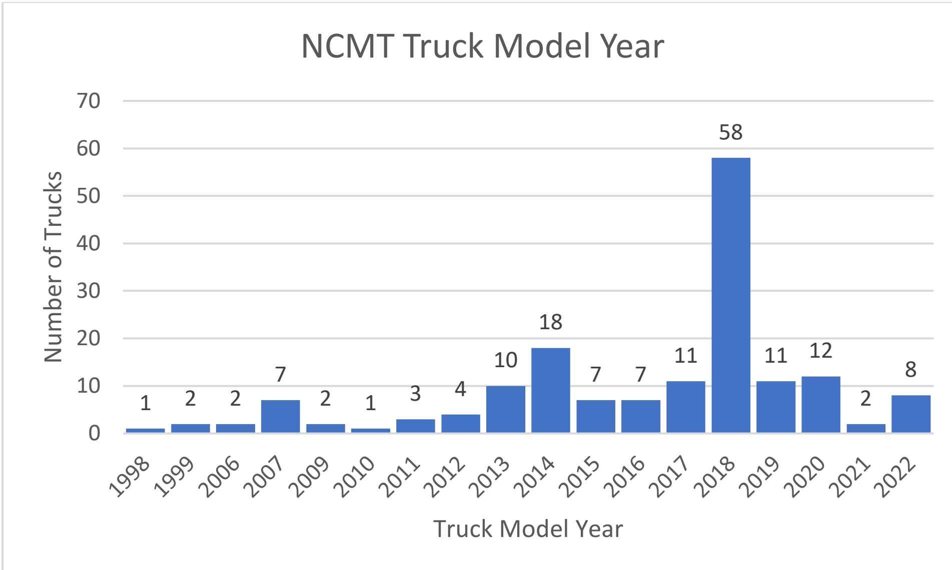


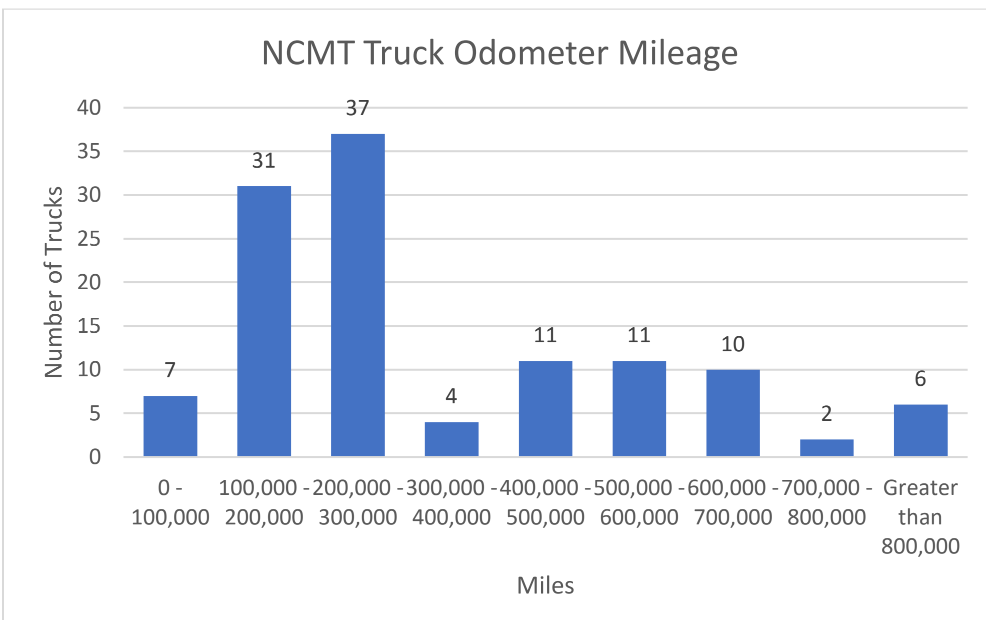


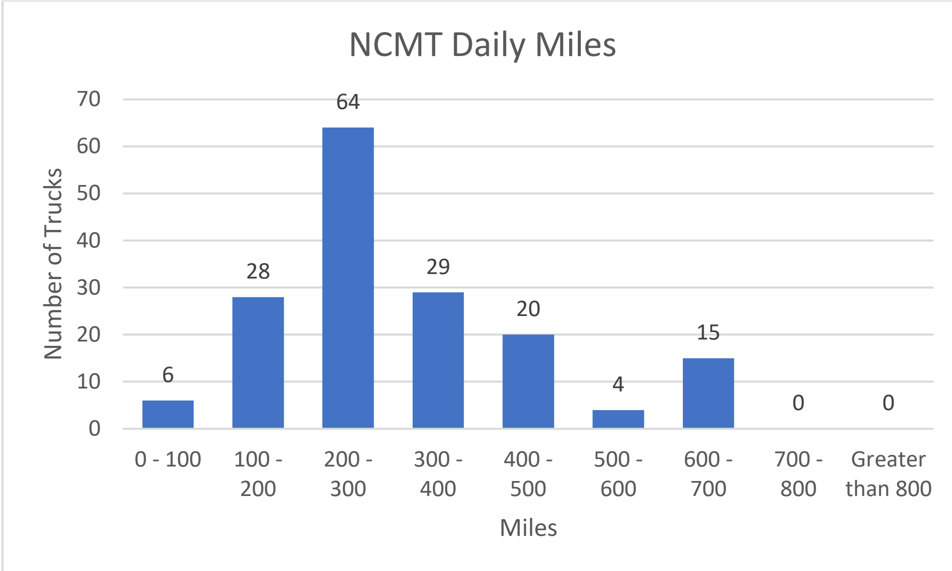
*Power Take-Off units provide auxiliary power to specialized equipment on a truck's trailer such as hydraulic pumps

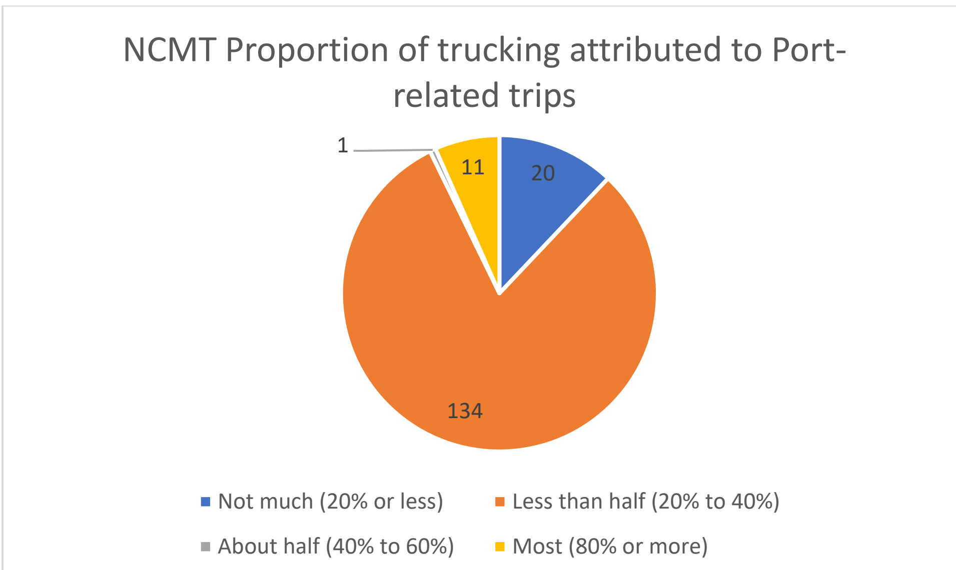
National City Marine Terminal Heavy-Duty Truck Operating Profile

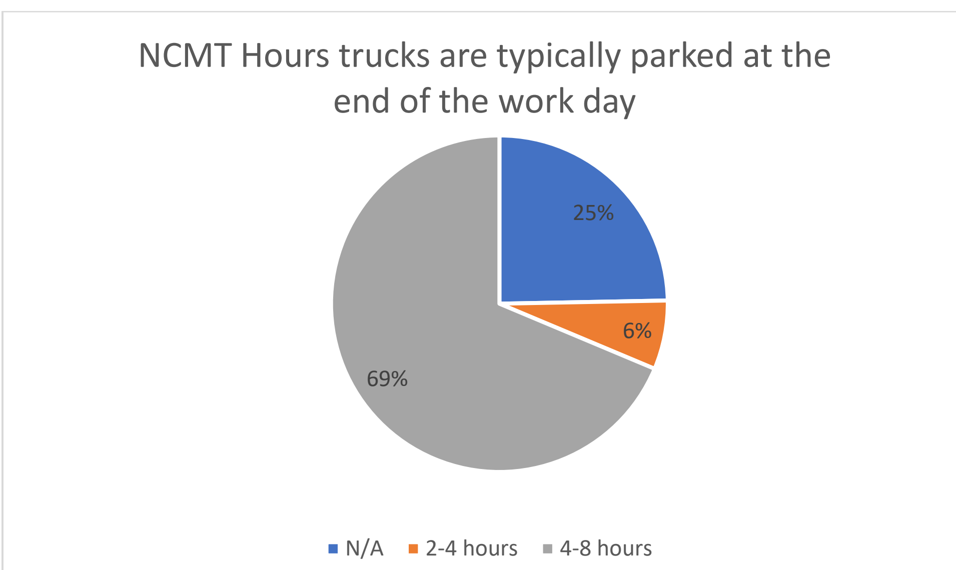
From the Fleet Manager and Truck Driver Survey Statistics

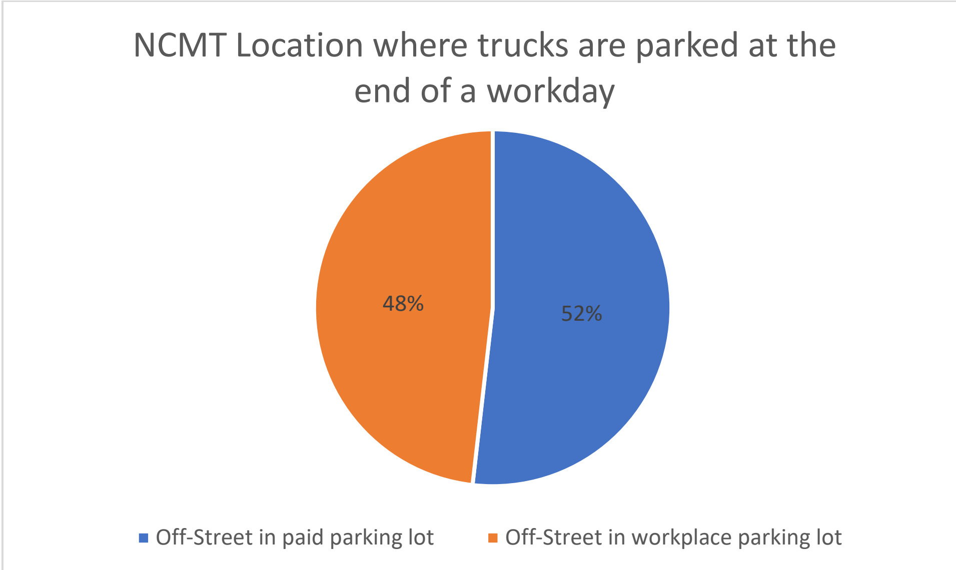


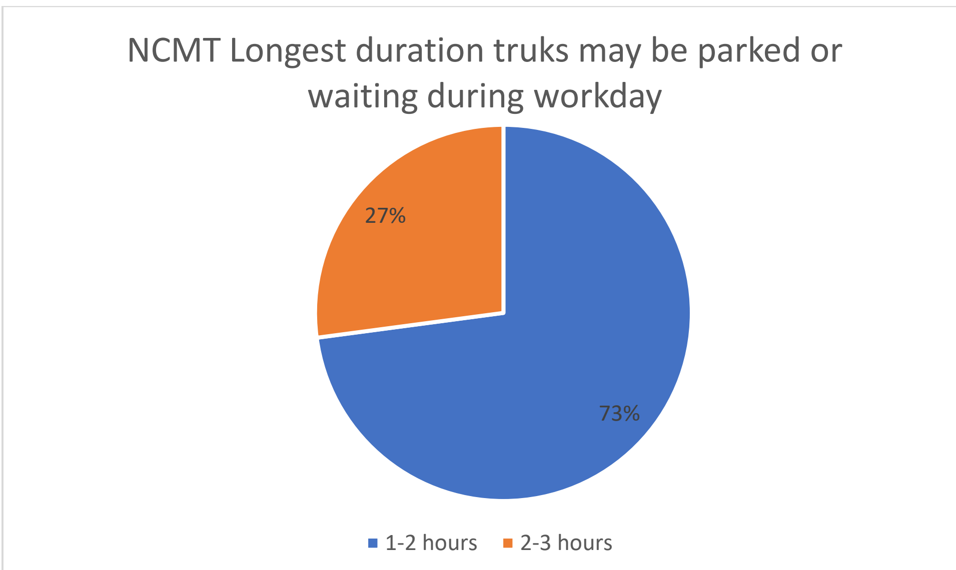


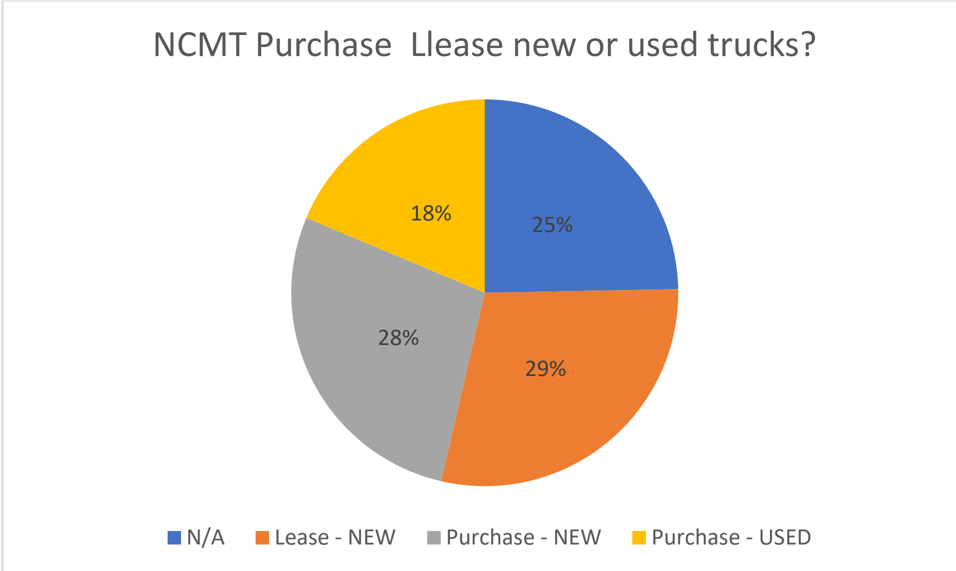

NCMT Daily Miles
Number of Trucks
70
60
50
40
30
20
10
0
6
28
64
29
20
4
15
0
0
0 - 100
100 - 200
200 - 300
300 - 400
400 - 500
500 - 600
600 - 700
700 - 800
Greater than 800
Miles

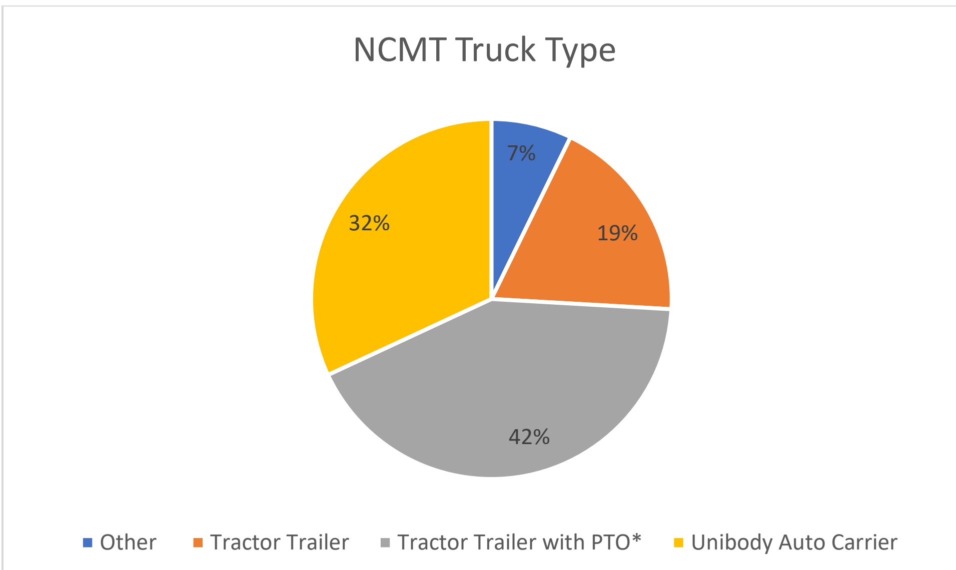

NCMT Proportion of trucking attributed to Port-related trips
1
11
20
134
Not much (20% or less)
Less than half (20% to 40%)
About half (40% to 60%)
Most (80% or more)


NCMT Hours trucks are typically parked at the end of the work day
25%
6%
69%
N/A
2-4 hours
4-8 hours


NCMT Location where trucks are parked at the end of a workday
48%
52%
Off-Street in paid parking lot
Off-Street in workplace parking lot


NCMT Longest duration truks may be parked or waiting during workday
27%
73%
1-2 hours
2-3 hours





*Power Take-Off units provide auxiliary power to specialized equipment on a truck's trailer such as hydraulic pumps

Truck #	Terminal	Sample	Year	Make	Model	Fuel Type	Odometer	Daily Mileage	Annual Trip Frequency
1	TAMT	N/A	2008	FREIGHTLINER	CASCADIA 125	Diesel	880835	100	1186
2	TAMT	N/A	2014	FREIGHTLINER	CASCADIA 125	Diesel	598511	200	918
3	TAMT	N/A	2009	INTERNATIONAL	8000	Diesel	845333	300	864
4	TAMT	N/A	2008	FREIGHTLINER	CASCADIA 125	Diesel	880835	500	844
5	TAMT	N/A	2012	FREIGHTLINER	CONVENTIONAL	Diesel	711103	100	839
6	TAMT	N/A	2012	PETERBILT	587	Diesel	711103	100	836
7	TAMT	N/A	2010	FREIGHTLINER	CASCADIA 125	Diesel	805211	100	811
8	TAMT	N/A	2009	PETERBILT	387	Diesel	845333	100	714
9	TAMT	N/A	2008	FREIGHTLINER	CASCADIA 125	Diesel	880835	300	679
10	TAMT	N/A	2008	FREIGHTLINER	CASCADIA 125	Diesel	880835	100	673
11	TAMT	N/A	2012	VOLVO	VN	Diesel	711103	100	672
12	TAMT	N/A	2011	FREIGHTLINER	CASCADIA 125	Diesel	760467	500	497
13	TAMT	N/A	2010	INTERNATIONAL	PROSTAR PREMIUM	Diesel	805211	500	496
14	TAMT	N/A	2013	VOLVO	VN	Diesel	657117	400	483
15	TAMT	N/A	2014	VOLVO	VN	Diesel	598511	400	478
16	TAMT	N/A	2013	VOLVO	VN	Diesel	657117	300	470
17	TAMT	N/A	2015	PETERBILT	579	Diesel	535283	500	463
18	TAMT	N/A	2016	FREIGHTLINER	CASCADIA 125	Diesel	467434	300	459
19	TAMT	N/A	2013	VOLVO	VN	Diesel	657117	300	453
20	TAMT	N/A	2015	INTERNATIONAL	PROSTAR	Diesel	535283	300	434
21	TAMT	N/A	2012	VOLVO	VN	Diesel	711103	600	426
22	TAMT	N/A	2010	FREIGHTLINER	CASCADIA 113	Diesel	805211	300	408
23	TAMT	N/A	2010	FREIGHTLINER	CASCADIA 125	Diesel	805211	500	405
24	TAMT	N/A	2013	VOLVO	VN	Diesel	657117	200	393
25	TAMT	N/A	2014	FREIGHTLINER	CASCADIA 125	Diesel	598511	300	390
26	TAMT	N/A	2016	INTERNATIONAL	PROSTAR	Diesel	467434	400	380
27	TAMT	N/A	2003	FREIGHTLINER	CONVENTIONAL	Diesel	989025	100	372
28	TAMT	N/A	2013	VOLVO	VN	Diesel	657117	500	355
29	TAMT	N/A	2011	INTERNATIONAL	PROSTAR PREMIUM	Diesel	760467	400	348
30	TAMT	N/A	2013	VOLVO	VN	Diesel	657117	300	344
31	TAMT	N/A	2015	FREIGHTLINER	CASCADIA 125	Diesel	535283	500	344
32	TAMT	N/A	2016	FREIGHTLINER	CASCADIA 113	Diesel	467434	500	337
33	TAMT	N/A	2018	FREIGHTLINER	CASCADIA 125	Diesel	317873	600	329
34	TAMT	N/A	2010	FREIGHTLINER	CASCADIA 125	Diesel	805211	100	328
35	TAMT	N/A	2016	INTERNATIONAL	PROSTAR	Diesel	467434	100	327
36	TAMT	N/A	2014	FREIGHTLINER	CASCADIA 125	Diesel	598511	200	327
37	TAMT	N/A	2015	VOLVO	VN	Diesel	535283	400	325
38	TAMT	N/A	2014	FREIGHTLINER	CASCADIA 125	Diesel	598511	300	316
39	TAMT	N/A	2013	VOLVO	VN	Diesel	657117	500	315
40	TAMT	N/A	2010	FREIGHTLINER	CASCADIA 125	Diesel	805211	300	310
41	TAMT	N/A	2015	FREIGHTLINER	CASCADIA 125	Diesel	535283	500	308
42	TAMT	N/A	2000	FREIGHTLINER	CONVENTIONAL	Diesel	998487	300	303
43	TAMT	N/A	2012	VOLVO	VN	Diesel	711103	300	302
44	TAMT	N/A	2013	VOLVO	VN	Diesel	657117	500	298
45	TAMT	N/A	2012	VOLVO	VN	Diesel	711103	300	287
46	TAMT	N/A	2011	FREIGHTLINER	CASCADIA 125	Diesel	760467	400	283
47	TAMT	N/A	2012	VOLVO	VN	Diesel	711103	300	281
48	TAMT	N/A	2013	VOLVO	VN	Diesel	657117	500	274
49	TAMT	N/A	2015	INTERNATIONAL	PROSTAR	Diesel	535283	300	271
50	TAMT	N/A	2012	VOLVO	VN	Diesel	711103	300	268
51	TAMT	N/A	2016	INTERNATIONAL	PROSTAR	Diesel	467434	300	267
52	TAMT	N/A	2012	VOLVO	VN	Diesel	711103	500	254
53	TAMT	N/A	2016	INTERNATIONAL	PROSTAR	Diesel	467434	300	252
54	TAMT	N/A	2014	PETERBILT	386	Diesel	598511	400	251
55	TAMT	N/A	2008	INTERNATIONAL	8000	Diesel	880835	600	236
56	TAMT	N/A	2008	VOLVO	VN	Diesel	880835	400	233
57	TAMT	N/A	2012	FREIGHTLINER	CASCADIA 125	Diesel	711103	600	232
58	TAMT	N/A	2015	VOLVO	VN	Diesel	535283	200	232
59	TAMT	N/A	2010	INTERNATIONAL	8000	Diesel	805211	200	232
60	TAMT	N/A	2010	FREIGHTLINER	CASCADIA 125	Diesel	805211	300	231
61	TAMT	N/A	2009	KENWORTH	CONSTRUCTION	Diesel	845333	200	227
62	TAMT	N/A	2009	INTERNATIONAL	8000	Diesel	845333	400	226
63	TAMT	N/A	2012	VOLVO	VN	Diesel	711103	200	218
64	TAMT	N/A	2013	VOLVO	VN	Diesel	657117	100	217
65	TAMT	N/A	2008	VOLVO	VN	Diesel	880835	200	213
66	TAMT	N/A	2009	INTERNATIONAL	8000	Diesel	845333	200	211
67	TAMT	N/A	2013	VOLVO	VN	Diesel	657117	400	211
68	TAMT	N/A	2015	VOLVO	VN	Diesel	535283	300	202
69	TAMT	N/A	2008	INTERNATIONAL	8000	Diesel	880835	200	197
70	TAMT	N/A	2015	FREIGHTLINER	CASCADIA 125	Diesel	535283	500	194
71	TAMT	N/A	2019	FREIGHTLINER	M2	Diesel	236162	600	193
72	TAMT	N/A	2013	FREIGHTLINER	CASCADIA 125	Diesel	657117	300	192
73	TAMT	N/A	2014	FREIGHTLINER	CASCADIA 113	Diesel	598511	600	191
74	TAMT	N/A	2014	PETERBILT	386	Diesel	598511	200	190
75	TAMT	N/A	2013	FREIGHTLINER	CASCADIA 113	Diesel	657117	200	187
76	TAMT	N/A	2020	FREIGHTLINER	CASCADIA 116	Diesel	149829	600	187
77	TAMT	N/A	2011	FREIGHTLINER	CASCADIA 125	Diesel	760467	200	181
78	TAMT	N/A	2013	FREIGHTLINER	CASCADIA 113	Diesel	657117	400	179
79	TAMT	N/A	2014	FREIGHTLINER	CASCADIA 125	Diesel	598511	400	178
80	TAMT	N/A	2012	VOLVO	VN	Diesel	711103	400	177
81	TAMT	N/A	2020	FREIGHTLINER	CASCADIA 116	Diesel	149829	100	176
82	TAMT	N/A	2015	MACK	600	Diesel	535283	400	175
83	TAMT	N/A	2014	FREIGHTLINER	CASCADIA 125	Diesel	598511	500	174
84	TAMT	N/A	2008	FREIGHTLINER	CASCADIA 125	Diesel	880835	200	173
85	TAMT	N/A	2008	FREIGHTLINER	CASCADIA 125	Diesel	880835	500	172
86	TAMT	N/A	2013	FREIGHTLINER	CASCADIA 125	Diesel	657117	200	169
87	TAMT	N/A	2015	VOLVO	VN	Diesel	535283	200	165
88	TAMT	N/A	2020	FREIGHTLINER	CASCADIA 116	Diesel	149829	200	160
89	TAMT	N/A	2021	FREIGHTLINER	CASCADIA 116	Diesel	58874	100	158
90	TAMT	N/A	2015	VOLVO	VN	Diesel	535283	200	156
91	TAMT	N/A	2011	FREIGHTLINER	CASCADIA 125	Diesel	760467	500	154
92	TAMT	N/A	2021	FREIGHTLINER	CASCADIA 116	Diesel	58874	200	146
93	TAMT	N/A	2015	FREIGHTLINER	CASCADIA 125	Diesel	535283	200	146
94	TAMT	N/A	2010	FREIGHTLINER	CASCADIA 125	Diesel	805211	700	145
95	TAMT	N/A	2014	PETERBILT	386	Diesel	598511	200	141
96	TAMT	N/A	2008	VOLVO	VN	Diesel	880835	200	141
97	TAMT	N/A	2014	VOLVO	VN	Diesel	598511	300	140
98	TAMT	N/A	2016	PETERBILT	579	Diesel	467434	500	134
99	TAMT	N/A	2016	VOLVO	VN	Diesel	467434	400	134
100	TAMT	N/A	2008	VOLVO	VN	Diesel	880835	200	132
101	TAMT	N/A	2012	FREIGHTLINER	CASCADIA 125	Diesel	711103	400	131
102	TAMT	N/A	2020	PETERBILT	389	Diesel	149829	500	131
103	TAMT	N/A	2012	VOLVO	VN	Diesel	711103	200	131
104	TAMT	N/A	2013	FREIGHTLINER	CASCADIA 125	Diesel	657117	600	125
105	TAMT	N/A	2010	KENWORTH	CONSTRUCTION	Diesel	805211	300	122
106	TAMT	N/A	2011	PETERBILT	389	Diesel	760467	500	118
107	TAMT	N/A	2012	FREIGHTLINER	CASCADIA 125	Diesel	711103	600	117
108	TAMT	N/A	2011	INTERNATIONAL	PROSTAR	Diesel	760467	200	116
109	TAMT	N/A	2019	FREIGHTLINER	CASCADIA 116	Diesel	236162	500	116
110	TAMT	N/A	2020	FREIGHTLINER	122SD	Diesel	149829	200	114
111	TAMT	N/A	2014	FREIGHTLINER	CASCADIA 125	Diesel	598511	400	110
112	TAMT	N/A	2013	VOLVO	VN	Diesel	657117	300	110
113	TAMT	N/A	2015	VOLVO	VN	Diesel	535283	200	109
114	TAMT	N/A	2017	FREIGHTLINER	CASCADIA 125	Diesel	394964	200	106
115	TAMT	N/A	2014	MACK	600	Diesel	598511	200	106
116	TAMT	N/A	2012	INTERNATIONAL	PROSTAR	Diesel	711103	200	106

Totals	
All Trucks	1574
TAMT Trucks	666
NCMT Trucks	908
All Trips	92641
TAMT Trips	44414
NCMT Trips	48227

117	TAMT	N/A	2018	FREIGHTLINER	CASCADIA 113	Diesel	317873	400	103
118	TAMT	N/A	2015	VOLVO	VN	Diesel	535283	400	102
119	TAMT	N/A	2020	PETERBILT	389	Diesel	149829	200	102
120	TAMT	N/A	2015	VOLVO	VN	Diesel	535283	200	102
121	TAMT	N/A	2015	VOLVO	VN	Diesel	535283	500	101
122	TAMT	N/A	2018	FREIGHTLINER	CASCADIA 113	Diesel	317873	200	100
123	TAMT	N/A	2014	KENWORTH	CONSTRUCTION	Diesel	598511	300	98
124	TAMT	N/A	2017	FREIGHTLINER	CASCADIA 125	Diesel	394964	100	97
125	TAMT	N/A	2015	KENWORTH	CONSTRUCTION	Diesel	535283	400	96
126	TAMT	N/A	2017	KENWORTH	CONSTRUCTION	Diesel	394964	400	95
127	TAMT	N/A	2010	FREIGHTLINER	CASCADIA 125	Diesel	805211	400	94
128	TAMT	N/A	2020	FREIGHTLINER	CASCADIA 116	Diesel	149829	200	93
129	TAMT	N/A	2017	PETERBILT	579	Diesel	394964	200	92
130	TAMT	N/A	2013	PETERBILT	386	Diesel	657117	300	91
131	TAMT	N/A	2012	VOLVO	VN	Diesel	711103	400	91
132	TAMT	N/A	2009	FREIGHTLINER	CASCADIA 125	Diesel	845333	400	90
133	TAMT	N/A	2012	FREIGHTLINER	CASCADIA 125	Diesel	711103	400	90
134	TAMT	N/A	2011	KENWORTH	CONSTRUCTION	Diesel	760467	100	89
135	TAMT	N/A	2014	FREIGHTLINER	CASCADIA 125	Diesel	598511	300	88
136	TAMT	N/A	2015	VOLVO	VN	Diesel	535283	100	88
137	TAMT	N/A	2012	VOLVO	VN	Diesel	711103	300	88
138	TAMT	N/A	2020	FREIGHTLINER	CASCADIA 116	Diesel	149829	700	88
139	TAMT	N/A	2017	KENWORTH	CONSTRUCTION	Diesel	394964	400	87
140	TAMT	N/A	2013	FREIGHTLINER	CASCADIA 125	Diesel	657117	100	86
141	TAMT	N/A	2012	FREIGHTLINER	CASCADIA 125	Diesel	711103	600	85
142	TAMT	N/A	2014	VOLVO	VN	Diesel	598511	200	84
143	TAMT	N/A	2014	VOLVO	VN	Diesel	598511	200	83
144	TAMT	N/A	2015	FREIGHTLINER	CASCADIA 113	Diesel	535283	100	82
145	TAMT	N/A	2015	FREIGHTLINER	CASCADIA 113	Diesel	535283	600	82
146	TAMT	N/A	2015	VOLVO	VN	Diesel	535283	100	80
147	TAMT	N/A	2019	BYD COACH AND BUS LLC	ELECTRIC TRUCK	Electric	236162	400	78
148	TAMT	N/A	2009	INTERNATIONAL	8000	Diesel	845333	300	78
149	TAMT	N/A	2012	FREIGHTLINER	CASCADIA 125	Diesel	711103	100	78
150	TAMT	N/A	2014	FREIGHTLINER	CASCADIA 125	Diesel	598511	200	78
151	TAMT	N/A	2013	PETERBILT	587	Diesel	657117	200	76
152	TAMT	N/A	2013	INTERNATIONAL	PROSTAR	Diesel	657117	500	75
153	TAMT	N/A	2017	MACK	600	Diesel	394964	200	74
154	TAMT	N/A	2016	MACK	600	Diesel	467434	100	73
155	TAMT	N/A	2009	FREIGHTLINER	CONVENTIONAL	Diesel	845333	200	73
156	TAMT	N/A	2013	KENWORTH	CONSTRUCTION	Diesel	657117	400	72
157	TAMT	N/A	2011	INTERNATIONAL	PROSTAR	Diesel	760467	200	70
158	TAMT	N/A	2014	VOLVO	VN	Diesel	598511	500	69
159	TAMT	N/A	2018	PETERBILT	389	Diesel	317873	400	69
160	TAMT	N/A	2014	KENWORTH	CONSTRUCTION	Diesel	598511	200	68
161	TAMT	N/A	2016	KENWORTH	CONSTRUCTION	Diesel	467434	200	68
162	TAMT	N/A	2014	FREIGHTLINER	CASCADIA 113	Diesel	598511	700	66
163	TAMT	N/A	2015	VOLVO	VN	Diesel	535283	400	66
164	TAMT	N/A	2014	VOLVO	VN	Diesel	598511	400	66
165	TAMT	N/A	2013	FREIGHTLINER	CASCADIA 125	Diesel	657117	300	63
166	TAMT	N/A	2015	FREIGHTLINER	CASCADIA 125	Diesel	535283	200	61
167	TAMT	N/A	2010	FREIGHTLINER	CASCADIA 125	Diesel	805211	400	60
168	TAMT	N/A	2016	MACK	600	Diesel	467434	300	60
169	TAMT	N/A	2016	VOLVO	VN	Diesel	467434	700	60
170	TAMT	N/A	2019	PETERBILT	389	Diesel	236162	600	59
171	TAMT	N/A	2015	INTERNATIONAL	PROSTAR	Diesel	535283	200	59
172	TAMT	N/A	2011	PETERBILT	386	Diesel	760467	300	58
173	TAMT	N/A	2014	INTERNATIONAL	PROSTAR	Diesel	598511	300	58
174	TAMT	N/A	2014	FREIGHTLINER	CASCADIA 125	Diesel	598511	400	57
175	TAMT	N/A	2012	PETERBILT	386	Diesel	711103	700	57
176	TAMT	N/A	2019	FREIGHTLINER	CASCADIA 116	Diesel	236162	200	56
177	TAMT	N/A	2016	MACK	600	Diesel	467434	200	55
178	TAMT	N/A	2015	PETERBILT	389	Diesel	535283	400	55
179	TAMT	N/A	2019	BYD COACH AND BUS LLC	ELECTRIC TRUCK	Electric	236162	200	55
180	TAMT	N/A	2016	KENWORTH	CONSTRUCTION	Diesel	467434	200	54
181	TAMT	N/A	2015	FREIGHTLINER	CASCADIA 125	Diesel	535283	500	53
182	TAMT	N/A	2013	FREIGHTLINER	CASCADIA 125	Diesel	657117	200	53
183	TAMT	N/A	2000	FREIGHTLINER	CONVENTIONAL	Diesel	998487	200	52
184	TAMT	N/A	2018	FREIGHTLINER	CASCADIA 126	Diesel	317873	400	51
185	TAMT	N/A	2016	FREIGHTLINER	CASCADIA 125	Diesel	467434	200	50
186	TAMT	N/A	2010	FREIGHTLINER	CONVENTIONAL	Diesel	805211	400	50
187	TAMT	N/A	2012	INTERNATIONAL	PROSTAR	Diesel	711103	400	49
188	TAMT	N/A	2012	FREIGHTLINER	CONVENTIONAL	Diesel	711103	200	49
189	TAMT	N/A	2016	VOLVO	VN	Diesel	467434	500	49
190	TAMT	N/A	2008	PETERBILT	386	Diesel	880835	300	48
191	TAMT	N/A	2020	PETERBILT	389	Diesel	149829	200	45
192	TAMT	N/A	2018	PETERBILT	389	Diesel	317873	300	44
193	TAMT	N/A	2019	PETERBILT	389	Diesel	236162	500	44
194	TAMT	N/A	2021	PETERBILT	367	Diesel	58874	200	44
195	TAMT	N/A	2019	PETERBILT	389	Diesel	236162	400	43
196	TAMT	N/A	2015	VOLVO	VN	Diesel	535283	200	42
197	TAMT	N/A	2017	PETERBILT	389	Diesel	394964	300	41
198	TAMT	N/A	2017	FREIGHTLINER	CASCADIA 125	Diesel	394964	600	41
199	TAMT	N/A	2009	FREIGHTLINER	CASCADIA 125	Diesel	845333	300	40
200	TAMT	N/A	2012	FREIGHTLINER	CASCADIA 113	Diesel	711103	200	39
201	TAMT	N/A	2014	FREIGHTLINER	CASCADIA 125	Diesel	598511	600	37
202	TAMT	N/A	2012	PETERBILT	367	Diesel	711103	400	37
203	TAMT	N/A	2012	FREIGHTLINER	CASCADIA 125	Diesel	711103	300	37
204	TAMT	N/A	2012	FREIGHTLINER	CASCADIA 125	Diesel	711103	600	36
205	TAMT	N/A	2014	FREIGHTLINER	CASCADIA 125	Diesel	598511	400	36
206	TAMT	N/A	2012	FREIGHTLINER	CASCADIA 125	Diesel	711103	100	36
207	TAMT	N/A	2013	FREIGHTLINER	CASCADIA 125	Diesel	657117	300	36
208	TAMT	N/A	2016	FREIGHTLINER	CASCADIA 125	Diesel	467434	100	36
209	TAMT	N/A	2014	INTERNATIONAL	PROSTAR	Diesel	598511	200	35
210	TAMT	N/A	2012	FREIGHTLINER	CASCADIA 125	Diesel	711103	200	35
211	TAMT	N/A	2011	PETERBILT	386	Diesel	760467	300	34
212	TAMT	N/A	2014	PETERBILT	389	Diesel	598511	400	34
213	TAMT	N/A	2012	FREIGHTLINER	CASCADIA 125	Diesel	711103	500	34
214	TAMT	N/A	2014	KENWORTH	CONSTRUCTION	Diesel	598511	200	34
215	TAMT	N/A	2013	VOLVO	VN	Diesel	657117	200	34
216	TAMT	N/A	2008	PETERBILT	386	Diesel	880835	200	33
217	TAMT	N/A	2011	PETERBILT	386	Diesel	760467	600	33
218	TAMT	N/A	2010	INTERNATIONAL	PROSTAR PREMIUM	Diesel	805211	200	33
219	TAMT	N/A	2016	KENWORTH	CONSTRUCTION	Diesel	467434	500	33
220	TAMT	N/A	2016	FREIGHTLINER	CASCADIA 125	Diesel	467434	600	32
221	TAMT	N/A	2019	PETERBILT	389	Diesel	236162	200	32
222	TAMT	N/A	2016	KENWORTH	CONSTRUCTION	Diesel	467434	500	31
223	TAMT	N/A	2014	PETERBILT	386	Diesel	598511	100	31
224	TAMT	N/A	2013	PETERBILT	386	Diesel	657117	500	30
225	TAMT	N/A	2019	FREIGHTLINER	CASCADIA 116	Diesel	236162	200	30
226	TAMT	N/A	2009	FREIGHTLINER	CASCADIA 125	Diesel	845333	100	29
227	TAMT	N/A	2014	KENWORTH	CONSTRUCTION	Diesel	598511	500	29
228	TAMT	N/A	2018	FREIGHTLINER	CASCADIA 113	Diesel	317873	200	29
229	TAMT	N/A	2013	KENWORTH	CONSTRUCTION	Diesel	657117	200	28
230	TAMT	N/A	2016	FREIGHTLINER	122SD	Diesel	467434	700	28
231	TAMT	N/A	2009	PETERBILT	388	Diesel	845333	300	27
232	TAMT	N/A	2016	MACK	600	Diesel	467434	500	27
233	TAMT	N/A	2013	VOLVO	VN	Diesel	657117	500	27

234	TAMT	N/A	2021	KENWORTH	CONSTRUCTION	Diesel	58874	300	27
235	TAMT	N/A	2019	PETERBILT	389	Diesel	236162	400	27
236	TAMT	N/A	2016	FREIGHTLINER	CASCADIA 125	Diesel	467434	300	26
237	TAMT	N/A	2014	KENWORTH	CONSTRUCTION	Diesel	598511	700	26
238	TAMT	N/A	2013	FREIGHTLINER	CASCADIA 125	Diesel	657117	400	26
239	TAMT	N/A	2008	INTERNATIONAL	7000	Diesel	880835	200	25
240	TAMT	N/A	2008	FREIGHTLINER	CONVENTIONAL	Diesel	880835	200	24
241	TAMT	N/A	2020	PETERBILT	389	Diesel	149829	400	24
242	TAMT	N/A	2013	WESTERN STAR/AUTO CAR	CONVENTIONAL	Diesel	657117	100	24
243	TAMT	N/A	2016	KENWORTH	CONSTRUCTION	Diesel	467434	200	23
244	TAMT	N/A	2009	INTERNATIONAL	4000	Diesel	845333	100	23
245	TAMT	N/A	2016	KENWORTH	CONSTRUCTION	Diesel	467434	200	23
246	TAMT	N/A	2014	KENWORTH	CONSTRUCTION	Diesel	598511	300	23
247	TAMT	N/A	2010	PETERBILT	387	Diesel	805211	200	23
248	TAMT	N/A	2013	PETERBILT	367	Diesel	657117	100	23
249	TAMT	N/A	2018	PETERBILT	389	Diesel	317873	600	22
250	TAMT	N/A	2021	PETERBILT	367	Diesel	58874	200	22
251	TAMT	N/A	2011	INTERNATIONAL	PROSTAR	Diesel	760467	500	22
252	TAMT	N/A	2011	INTERNATIONAL	PROSTAR PREMIUM	Diesel	760467	500	22
253	TAMT	N/A	2016	FREIGHTLINER	CASCADIA 125	Diesel	467434	400	22
254	TAMT	N/A	2011	INTERNATIONAL	PROSTAR PREMIUM	Diesel	760467	200	21
255	TAMT	N/A	2013	PETERBILT	367	Diesel	657117	300	21
256	TAMT	N/A	2012	FREIGHTLINER	CASCADIA 125	Diesel	711103	600	21
257	TAMT	N/A	2017	FREIGHTLINER	CASCADIA 125	Diesel	394964	200	20
258	TAMT	N/A	2010	KENWORTH	CONSTRUCTION	Diesel	805211	200	20
259	TAMT	N/A	2018	PETERBILT	389	Diesel	317873	400	20
260	TAMT	N/A	2012	VOLVO	VN	Diesel	711103	700	20
261	TAMT	N/A	2017	PETERBILT	367	Diesel	394964	500	20
262	TAMT	N/A	2022	KENWORTH	CONSTRUCTION	Diesel	0	200	19
263	TAMT	N/A	2013	FREIGHTLINER	CASCADIA 125	Diesel	657117	400	19
264	TAMT	N/A	2022	KENWORTH	CONSTRUCTION	Diesel	0	200	19
265	TAMT	N/A	2020	INTERNATIONAL	LT625	Diesel	149829	500	19
266	TAMT	N/A	2013	WESTERN STAR/AUTO CAR	CONVENTIONAL	Diesel	657117	300	19
267	TAMT	N/A	2014	FREIGHTLINER	CASCADIA 125	Diesel	598511	200	19
268	TAMT	N/A	2017	FREIGHTLINER	CASCADIA 125	Diesel	394964	700	19
269	TAMT	N/A	2020	FREIGHTLINER	CASCADIA 126	Diesel	149829	700	19
270	TAMT	N/A	2015	KENWORTH	CONSTRUCTION	Diesel	535283	300	19
271	TAMT	N/A	2013	KENWORTH	CONSTRUCTION	Diesel	657117	400	19
272	TAMT	N/A	2018	KENWORTH	CONSTRUCTION	Diesel	317873	400	19
273	TAMT	N/A	2012	KENWORTH	CONSTRUCTION	Diesel	711103	300	18
274	TAMT	N/A	2011	PETERBILT	386	Diesel	760467	100	18
275	TAMT	N/A	2009	FREIGHTLINER	CASCADIA 125	Diesel	845333	500	18
276	TAMT	N/A	2019	VOLVO	VN	Diesel	236162	700	18
277	TAMT	N/A	2015	VOLVO	VN	Diesel	535283	200	18
278	TAMT	N/A	2013	PETERBILT	367	Diesel	657117	400	18
279	TAMT	N/A	2019	PETERBILT	389	Diesel	236162	200	17
280	TAMT	N/A	2010	KENWORTH	CONSTRUCTION	Diesel	805211	200	17
281	TAMT	N/A	2020	KENWORTH	CONSTRUCTION	Diesel	149829	400	17
282	TAMT	N/A	2021	KENWORTH	CONSTRUCTION	Diesel	58874	400	17
283	TAMT	N/A	2015	CATERPILLAR	CT660	Diesel	535283	500	17
284	TAMT	N/A	2014	VOLVO	VN	Diesel	598511	600	17
285	TAMT	N/A	2016	PETERBILT	579	Diesel	467434	500	17
286	TAMT	N/A	2012	VOLVO	VN	Diesel	711103	200	17
287	TAMT	N/A	2010	FREIGHTLINER	CASCADIA 125	Diesel	805211	200	17
288	TAMT	N/A	2015	FREIGHTLINER	CASCADIA 125	Diesel	535283	200	17
289	TAMT	N/A	2013	KENWORTH	CONSTRUCTION	Diesel	657117	400	16
290	TAMT	N/A	2016	KENWORTH	CONSTRUCTION	Diesel	467434	200	16
291	TAMT	N/A	2014	KENWORTH	CONSTRUCTION	Diesel	598511	100	16
292	TAMT	N/A	2011	FREIGHTLINER	CONVENTIONAL	Diesel	760467	700	16
293	TAMT	N/A	2012	PETERBILT	587	Diesel	711103	400	16
294	TAMT	N/A	2014	PETERBILT	386	Diesel	598511	100	15
295	TAMT	N/A	2020	PETERBILT	389	Diesel	149829	200	15
296	TAMT	N/A	2018	FREIGHTLINER	CASCADIA 113	npressed Natural	317873	400	15
297	TAMT	N/A	2021	FREIGHTLINER	CASCADIA 126	Diesel	58874	200	15
298	TAMT	N/A	2018	FREIGHTLINER	CASCADIA 126	Diesel	317873	400	15
299	TAMT	N/A	2016	KENWORTH	CONSTRUCTION	Diesel	467434	200	15
300	TAMT	N/A	2022	KENWORTH	CONSTRUCTION	Diesel	0	400	14
301	TAMT	N/A	2017	KENWORTH	CONSTRUCTION	Diesel	394964	200	14
302	TAMT	N/A	2015	PETERBILT	389	Diesel	535283	400	14
303	TAMT	N/A	2012	FREIGHTLINER	CASCADIA 125	Diesel	711103	400	14
304	TAMT	N/A	2020	VOLVO	VN	Diesel	149829	100	14
305	TAMT	N/A	2015	FREIGHTLINER	CASCADIA 125	Diesel	535283	200	14
306	TAMT	N/A	2015	KENWORTH	CONSTRUCTION	Diesel	535283	200	14
307	TAMT	N/A	2020	PETERBILT	389	Diesel	149829	300	14
308	TAMT	N/A	2019	FREIGHTLINER	CASCADIA 126	Diesel	236162	300	14
309	TAMT	N/A	2018	FREIGHTLINER	CASCADIA 113	Diesel	317873	200	14
310	TAMT	N/A	2008	KENWORTH	CONSTRUCTION	Diesel	880835	600	13
311	TAMT	N/A	2009	INTERNATIONAL	8000	Diesel	845333	500	13
312	TAMT	N/A	2020	INTERNATIONAL	LT625	Diesel	149829	700	13
313	TAMT	N/A	2022	PETERBILT	389	Diesel	0	200	13
314	TAMT	N/A	2016	FREIGHTLINER	CASCADIA 113	Diesel	467434	200	13
315	TAMT	N/A	2020	INTERNATIONAL	LT625	Diesel	149829	200	13
316	TAMT	N/A	2021	KENWORTH	CONSTRUCTION	Diesel	58874	200	13
317	TAMT	N/A	2016	FREIGHTLINER	CASCADIA 125	Diesel	467434	500	13
318	TAMT	N/A	2013	PETERBILT	388	Diesel	657117	200	12
319	TAMT	N/A	2017	FREIGHTLINER	CASCADIA 125	Diesel	394964	400	12
320	TAMT	N/A	2012	PETERBILT	389	Diesel	711103	600	12
321	TAMT	N/A	2016	FREIGHTLINER	CASCADIA 113	Diesel	467434	300	12
322	TAMT	N/A	2008	KENWORTH	CONSTRUCTION	Diesel	880835	200	12
323	TAMT	N/A	2012	FREIGHTLINER	CASCADIA 125	Diesel	711103	700	11
324	TAMT	N/A	2012	PETERBILT	587	Diesel	711103	200	11
325	TAMT	N/A	2014	FREIGHTLINER	CASCADIA 125	Diesel	598511	200	11
326	TAMT	N/A	1993	KENWORTH	CONSTRUCTION	Diesel	858827	200	11
327	TAMT	N/A	2019	FREIGHTLINER	CASCADIA 116	Diesel	236162	700	11
328	TAMT	N/A	2012	INTERNATIONAL	PROSTAR	Diesel	711103	500	11
329	TAMT	N/A	2019	FREIGHTLINER	CASCADIA 116	Diesel	236162	500	11
330	TAMT	N/A	2021	KENWORTH	CONSTRUCTION	Diesel	58874	200	11
331	TAMT	N/A	2009	FREIGHTLINER	CONVENTIONAL	Diesel	845333	600	10
332	TAMT	N/A	2016	KENWORTH	CONSTRUCTION	Diesel	467434	500	10
333	TAMT	N/A	2015	FREIGHTLINER	CASCADIA 125	Diesel	535283	100	10
334	TAMT	N/A	2007	FREIGHTLINER	CONVENTIONAL	Diesel	911715	200	10
335	TAMT	N/A	2014	FREIGHTLINER	CASCADIA 125	Diesel	598511	400	10
336	TAMT	N/A	2016	FREIGHTLINER	CASCADIA 125	Diesel	467434	700	10
337	TAMT	N/A	2015	KENWORTH	CONSTRUCTION	Diesel	535283	700	10
338	TAMT	N/A	2021	FREIGHTLINER	CASCADIA 116	Diesel	58874	400	10
339	TAMT	N/A	2014	VOLVO	VN	Diesel	598511	100	10
340	TAMT	N/A	2009	FREIGHTLINER	CASCADIA 125	Diesel	845333	500	10
341	TAMT	N/A	2016	PETERBILT	389	Diesel	467434	300	9
342	TAMT	N/A	2009	PETERBILT	386	Diesel	845333	300	9
343	TAMT	N/A	2009	FREIGHTLINER	CONVENTIONAL	Diesel	845333	400	9
344	TAMT	N/A	2013	KENWORTH	CONSTRUCTION	Diesel	657117	500	9
345	TAMT	N/A	2022	PETERBILT	389	Diesel	0	100	9
346	TAMT	N/A	2012	FREIGHTLINER	CASCADIA 125	Diesel	711103	200	9
347	TAMT	N/A	2015	KENWORTH	CONSTRUCTION	Diesel	535283	200	9
348	TAMT	N/A	2012	KENWORTH	CONSTRUCTION	Diesel	711103	200	9
349	TAMT	N/A	2008	INTERNATIONAL	PROSTAR PREMIUM	Diesel	880835	400	9
350	TAMT	N/A	2010	PETERBILT	389	Diesel	805211	200	9

351	TAMT	N/A	2020	FREIGHTLINER	CASCADIA 126	Diesel	149829	200	9
352	TAMT	N/A	2014	FREIGHTLINER	CASCADIA 125	Diesel	598511	700	9
353	TAMT	N/A	2009	KENWORTH	CONSTRUCTION	Diesel	845333	300	9
354	TAMT	N/A	2017	FREIGHTLINER	CASCADIA 125	Diesel	394964	200	8
355	TAMT	N/A	2013	KENWORTH	CONSTRUCTION	Diesel	657117	200	8
356	TAMT	N/A	2017	VOLVO	VN	Diesel	394964	100	8
357	TAMT	N/A	2011	INTERNATIONAL	PROSTAR PREMIUM	Diesel	760467	200	8
358	TAMT	N/A	2019	KENWORTH	CONSTRUCTION	Diesel	236162	200	8
359	TAMT	N/A	2012	VOLVO	VN	Diesel	711103	600	8
360	TAMT	N/A	2012	KENWORTH	CONSTRUCTION	Diesel	711103	500	8
361	TAMT	N/A	2017	FREIGHTLINER	CASCADIA 125	Diesel	394964	600	8
362	TAMT	N/A	2016	FREIGHTLINER	CASCADIA 125	Diesel	467434	500	8
363	TAMT	N/A	2017	FREIGHTLINER	CASCADIA 125	Diesel	394964	500	8
364	TAMT	N/A	2019	FREIGHTLINER	CASCADIA 116	Diesel	236162	500	8
365	TAMT	N/A	2008	FREIGHTLINER	CASCADIA 125	Diesel	880835	300	8
366	TAMT	N/A	2013	PETERBILT	386	Diesel	657117	400	8
367	TAMT	N/A	2015	KENWORTH	CONSTRUCTION	Diesel	535283	200	8
368	TAMT	N/A	2015	KENWORTH	CONSTRUCTION	Diesel	535283	200	8
369	TAMT	N/A	2016	PETERBILT	579	Diesel	467434	300	8
370	TAMT	N/A	2018	FREIGHTLINER	CASCADIA 116	Diesel	317873	700	7
371	TAMT	N/A	2009	INTERNATIONAL	PROSTAR PREMIUM	Diesel	845333	200	7
372	TAMT	N/A	2015	FREIGHTLINER	CASCADIA 113	Diesel	535283	400	7
373	TAMT	N/A	2008	PETERBILT	389	Diesel	880835	200	7
374	TAMT	N/A	2017	KENWORTH	CONSTRUCTION	Diesel	394964	400	7
375	TAMT	N/A	2013	MACK	600	Diesel	657117	200	7
376	TAMT	N/A	2016	KENWORTH	CONSTRUCTION	Diesel	467434	200	7
377	TAMT	N/A	2015	FREIGHTLINER	CASCADIA 125	Diesel	535283	200	7
378	TAMT	N/A	2014	PETERBILT	579	Diesel	598511	100	7
379	TAMT	N/A	2012	PETERBILT	384	Diesel	711103	400	7
380	TAMT	N/A	2011	PETERBILT	386	Diesel	760467	100	7
381	TAMT	N/A	2011	INTERNATIONAL	PROSTAR PREMIUM	Diesel	760467	200	7
382	TAMT	N/A	2015	PETERBILT	579	Diesel	535283	100	7
383	TAMT	N/A	2014	FREIGHTLINER	CASCADIA 125	Diesel	598511	200	7
384	TAMT	N/A	2016	PETERBILT	389	Diesel	467434	300	7
385	TAMT	N/A	2012	FREIGHTLINER	CASCADIA 125	Diesel	711103	500	6
386	TAMT	N/A	2008	FREIGHTLINER	CASCADIA 125	Diesel	880835	100	6
387	TAMT	N/A	2008	FREIGHTLINER	CONVENTIONAL	Diesel	880835	400	6
388	TAMT	N/A	2013	FREIGHTLINER	CASCADIA 125	Diesel	657117	600	6
389	TAMT	N/A	2008	PETERBILT	386	Diesel	880835	200	6
390	TAMT	N/A	2015	INTERNATIONAL	PROSTAR	Diesel	535283	200	6
391	TAMT	N/A	2021	PETERBILT	389	Diesel	58874	400	6
392	TAMT	N/A	2020	PETERBILT	389	Diesel	149829	300	6
393	TAMT	N/A	2020	FREIGHTLINER	CASCADIA 126	Diesel	149829	200	6
394	TAMT	N/A	2011	PETERBILT	386	Diesel	760467	200	6
395	TAMT	N/A	2013	FREIGHTLINER	M2	Diesel	657117	300	6
396	TAMT	N/A	2015	KENWORTH	CONSTRUCTION	Diesel	535283	200	6
397	TAMT	N/A	2014	PETERBILT	388	Diesel	598511	400	6
398	TAMT	N/A	2019	FREIGHTLINER	CASCADIA 126	Diesel	236162	300	6
399	TAMT	N/A	2014	VOLVO	VN	Diesel	598511	700	6
400	TAMT	N/A	2013	FREIGHTLINER	CASCADIA 113	Diesel	657117	200	6
401	TAMT	N/A	2022	WESTERN STAR/AUTO CAR	NEW 4900 CHASSIS	Diesel	0	200	6
402	TAMT	N/A	2011	KENWORTH	CONSTRUCTION	Diesel	760467	700	6
403	TAMT	N/A	2014	KENWORTH	CONSTRUCTION	Diesel	598511	200	6
404	TAMT	N/A	2020	INTERNATIONAL	LT625	Diesel	149829	200	6
405	TAMT	N/A	2019	FREIGHTLINER	CASCADIA 126	Diesel	236162	200	6
406	TAMT	N/A	2015	FREIGHTLINER	CASCADIA 113	Diesel	535283	200	6
407	TAMT	N/A	2009	KENWORTH	CONSTRUCTION	Diesel	845333	200	5
408	TAMT	N/A	2014	INTERNATIONAL	PROSTAR	Diesel	598511	300	5
409	TAMT	N/A	2006	INTERNATIONAL	9400	Diesel	937974	400	5
410	TAMT	N/A	2016	WESTERN STAR/AUTO CAR	5700 XE	Diesel	467434	200	5
411	TAMT	N/A	2003	PETERBILT	378	Diesel	989025	300	5
412	TAMT	N/A	2018	FREIGHTLINER	CASCADIA 116	Diesel	317873	300	5
413	TAMT	N/A	2013	KENWORTH	CONSTRUCTION	Diesel	657117	200	5
414	TAMT	N/A	2004	STERLING TRUCK	LT	Diesel	976629	100	5
415	TAMT	N/A	2019	KENWORTH	CONSTRUCTION	Diesel	236162	200	5
416	TAMT	N/A	2013	KENWORTH	CONSTRUCTION	Diesel	657117	200	5
417	TAMT	N/A	2014	PETERBILT	384	Diesel	598511	400	5
418	TAMT	N/A	2010	VOLVO	VN	Diesel	805211	700	5
419	TAMT	N/A	2015	INTERNATIONAL	PROSTAR	Diesel	535283	200	5
420	TAMT	N/A	2012	VOLVO	VN	Diesel	711103	200	5
421	TAMT	N/A	2019	PETERBILT	389	Diesel	236162	300	5
422	TAMT	N/A	2018	FREIGHTLINER	CASCADIA 125	Diesel	317873	200	4
423	TAMT	N/A	2016	FREIGHTLINER	CASCADIA 113	Diesel	467434	500	4
424	TAMT	N/A	2021	FREIGHTLINER	CASCADIA 126	Diesel	58874	400	4
425	TAMT	N/A	2008	PETERBILT	389	Diesel	880835	200	4
426	TAMT	N/A	2015	FREIGHTLINER	CASCADIA 125	Diesel	535283	700	4
427	TAMT	N/A	2021	FREIGHTLINER	CASCADIA 126	Diesel	58874	200	4
428	TAMT	N/A	2015	INTERNATIONAL	PROSTAR	Diesel	535283	300	4
429	TAMT	N/A	2015	FREIGHTLINER	CASCADIA 113	Diesel	535283	300	4
430	TAMT	N/A	2019	PETERBILT	579	Diesel	236162	200	4
431	TAMT	N/A	2012	FREIGHTLINER	CASCADIA 125	Diesel	711103	200	4
432	TAMT	N/A	2015	FREIGHTLINER	CASCADIA 113	Diesel	535283	400	4
433	TAMT	N/A	2008	PETERBILT	389	Diesel	880835	300	4
434	TAMT	N/A	2011	FREIGHTLINER	CONVENTIONAL	Diesel	760467	500	4
435	TAMT	N/A	2015	KENWORTH	CONSTRUCTION	Diesel	535283	500	4
436	TAMT	N/A	2014	INTERNATIONAL	PROSTAR	Diesel	598511	400	4
437	TAMT	N/A	2014	VOLVO	VN	Diesel	598511	400	4
438	TAMT	N/A	2018	KENWORTH	CONSTRUCTION	Diesel	317873	500	4
439	TAMT	N/A	2013	WESTERN STAR/AUTO CAR	CONVENTIONAL	Diesel	657117	300	4
440	TAMT	N/A	2015	PETERBILT	389	Diesel	535283	200	4
441	TAMT	N/A	2015	FREIGHTLINER	CASCADIA 125	Diesel	535283	200	4
442	TAMT	N/A	2014	FREIGHTLINER	CASCADIA 125	Diesel	598511	300	4
443	TAMT	N/A	2001	PETERBILT	379	Diesel	999954	300	4
444	TAMT	N/A	2012	PETERBILT	384	Diesel	711103	400	4
445	TAMT	N/A	2021	KENWORTH	CONSTRUCTION	Diesel	58874	500	4
446	TAMT	N/A	2021	KENWORTH	CONSTRUCTION	Diesel	58874	600	4
447	TAMT	N/A	2015	FREIGHTLINER	CASCADIA 125	Diesel	535283	200	4
448	TAMT	N/A	2010	PETERBILT	386	Diesel	805211	200	4
449	TAMT	N/A	2016	FREIGHTLINER	CASCADIA 125	Diesel	467434	200	4
450	TAMT	N/A	2018	KENWORTH	CONSTRUCTION	Diesel	317873	500	4
451	TAMT	N/A	2018	FREIGHTLINER	CASCADIA 126	Diesel	317873	300	4
452	TAMT	N/A	2014	FREIGHTLINER	CASCADIA 113	Diesel	598511	200	3
453	TAMT	N/A	2019	KENWORTH	CONSTRUCTION	Diesel	236162	400	3
454	TAMT	N/A	2016	FREIGHTLINER	CASCADIA 125	Diesel	467434	500	3
455	TAMT	N/A	2016	VOLVO	VN	Diesel	467434	400	3
456	TAMT	N/A	2009	FREIGHTLINER	CONVENTIONAL	Diesel	845333	500	3
457	TAMT	N/A	2018	FREIGHTLINER	114SD	Diesel	317873	500	3
458	TAMT	N/A	2020	FREIGHTLINER	CASCADIA 126	Diesel	149829	300	3
459	TAMT	N/A	2013	FREIGHTLINER	CASCADIA 125	Diesel	657117	500	3
460	TAMT	N/A	2013	FREIGHTLINER	CASCADIA 113	Diesel	657117	700	3
461	TAMT	N/A	2016	PETERBILT	389	Diesel	467434	500	3
462	TAMT	N/A	2020	PETERBILT	389	Diesel	149829	600	3
463	TAMT	N/A	2009	KENWORTH	CONSTRUCTION	Diesel	845333	300	3
464	TAMT	N/A	2019	FREIGHTLINER	CASCADIA 126	Diesel	236162	300	3
465	TAMT	N/A	2014	KENWORTH	CONSTRUCTION	Diesel	598511	200	3
466	TAMT	N/A	2017	FREIGHTLINER	CASCADIA 125	Diesel	394964	200	3
467	TAMT	N/A	2020	KENWORTH	CONSTRUCTION	Diesel	149829	200	3

468	TAMT	N/A	2017	FREIGHTLINER	CASCADIA 125	Diesel	394964	600	3
469	TAMT	N/A	2014	FREIGHTLINER	CASCADIA 125	Diesel	598511	400	3
470	TAMT	N/A	2019	PETERBILT	389	Diesel	236162	200	3
471	TAMT	N/A	2017	KENWORTH	CONSTRUCTION	Diesel	394964	100	3
472	TAMT	N/A	2012	PETERBILT	587	Diesel	711103	200	3
473	TAMT	N/A	2016	FREIGHTLINER	CASCADIA 113	Diesel	467434	400	3
474	TAMT	N/A	2016	VOLVO	VN	Diesel	467434	500	3
475	TAMT	N/A	2013	INTERNATIONAL	8000	Diesel	657117	200	3
476	TAMT	N/A	2014	KENWORTH	CONSTRUCTION	Diesel	598511	200	3
477	TAMT	N/A	2015	KENWORTH	CONSTRUCTION	Diesel	535283	200	3
478	TAMT	N/A	2012	KENWORTH	CONSTRUCTION	Diesel	711103	200	3
479	TAMT	N/A	2013	FREIGHTLINER	CASCADIA 125	Diesel	657117	100	3
480	TAMT	N/A	2017	FREIGHTLINER	CASCADIA 125	Diesel	394964	400	3
481	TAMT	N/A	2008	PETERBILT	389	Diesel	880835	600	3
482	TAMT	N/A	2020	FREIGHTLINER	CASCADIA 126	Diesel	149829	200	3
483	TAMT	N/A	2016	VOLVO	VN	Diesel	467434	100	3
484	TAMT	N/A	2017	FREIGHTLINER	CASCADIA 125	Diesel	394964	200	3
485	TAMT	N/A	2017	PETERBILT	579	Diesel	394964	300	3
486	TAMT	N/A	2008	INTERNATIONAL	PROSTAR PREMIUM	Diesel	880835	500	3
487	TAMT	N/A	2021	KENWORTH	CONSTRUCTION	Diesel	58874	700	3
488	TAMT	N/A	2016	FREIGHTLINER	CASCADIA 125	Diesel	467434	200	3
489	TAMT	N/A	2008	KENWORTH	CONSTRUCTION	Diesel	880835	700	3
490	TAMT	N/A	2014	KENWORTH	CONSTRUCTION	Diesel	598511	200	3
491	TAMT	N/A	2016	KENWORTH	CONSTRUCTION	Diesel	467434	100	3
492	TAMT	N/A	2016	KENWORTH	CONSTRUCTION	Diesel	467434	300	3
493	TAMT	N/A	2012	KENWORTH	CONSTRUCTION	Diesel	711103	600	3
494	TAMT	N/A	2019	FREIGHTLINER	CASCADIA 126	Diesel	236162	300	3
495	TAMT	N/A	2017	KENWORTH	CONSTRUCTION	Diesel	394964	400	3
496	TAMT	N/A	2011	FREIGHTLINER	CASCADIA 125	Diesel	760467	200	3
497	TAMT	N/A	2012	FREIGHTLINER	CASCADIA 125	Diesel	711103	400	3
498	TAMT	N/A	2013	KENWORTH	CONSTRUCTION	Diesel	657117	600	2
499	TAMT	N/A	2021	PETERBILT	579	Diesel	58874	300	2
500	TAMT	N/A	2011	INTERNATIONAL	PROSTAR	Diesel	760467	500	2
501	TAMT	N/A	2015	PETERBILT	384	Diesel	535283	300	2
502	TAMT	N/A	2020	PETERBILT	567	Diesel	149829	400	2
503	TAMT	N/A	2018	KENWORTH	CONSTRUCTION	Diesel	317873	400	2
504	TAMT	N/A	2015	INTERNATIONAL	PROSTAR	Diesel	535283	300	2
505	TAMT	N/A	2021	KENWORTH	CONSTRUCTION	Diesel	58874	700	2
506	TAMT	N/A	1994	FREIGHTLINER	CONVENTIONAL	Diesel	892642	200	2
507	TAMT	N/A	2008	VOLVO	VN	Diesel	880835	400	2
508	TAMT	N/A	2016	FREIGHTLINER	CASCADIA 125	Diesel	467434	600	2
509	TAMT	N/A	2014	VOLVO	VN	Diesel	598511	700	2
510	TAMT	N/A	2019	KENWORTH	CONSTRUCTION	Diesel	236162	200	2
511	TAMT	N/A	2014	FREIGHTLINER	CASCADIA 125	Diesel	598511	200	2
512	TAMT	N/A	2014	INTERNATIONAL	PROSTAR	Diesel	598511	200	2
513	TAMT	N/A	2020	FREIGHTLINER	CASCADIA 126	Diesel	149829	200	2
514	TAMT	N/A	2013	FREIGHTLINER	CASCADIA 113	Diesel	657117	200	2
515	TAMT	N/A	2013	FREIGHTLINER	CASCADIA 125	Diesel	657117	200	2
516	TAMT	N/A	2017	FREIGHTLINER	CASCADIA 125	Diesel	394964	500	2
517	TAMT	N/A	2018	INTERNATIONAL	LT625	Diesel	317873	200	2
518	TAMT	N/A	2016	INTERNATIONAL	PROSTAR	Diesel	467434	200	2
519	TAMT	N/A	2012	PETERBILT	386	Diesel	711103	200	2
520	TAMT	N/A	2019	FREIGHTLINER	CASCADIA 126	Diesel	236162	200	2
521	TAMT	N/A	2014	FREIGHTLINER	CASCADIA 125	Diesel	598511	600	2
522	TAMT	N/A	2018	INTERNATIONAL	LT625	Diesel	317873	600	2
523	TAMT	N/A	2020	FREIGHTLINER	CASCADIA 126	Diesel	149829	200	2
524	TAMT	N/A	2016	KENWORTH	CONSTRUCTION	Diesel	467434	200	2
525	TAMT	N/A	2010	KENWORTH	CONSTRUCTION	Diesel	805211	700	2
526	TAMT	N/A	2014	VOLVO	VN	Diesel	598511	700	2
527	TAMT	N/A	2013	FREIGHTLINER	CASCADIA 125	Diesel	657117	100	2
528	TAMT	N/A	2019	FREIGHTLINER	CASCADIA 126	Diesel	236162	300	2
529	TAMT	N/A	2009	FREIGHTLINER	CONVENTIONAL	Diesel	845333	500	2
530	TAMT	N/A	2012	FREIGHTLINER	CASCADIA 125	Diesel	711103	500	2
531	TAMT	N/A	2014	FREIGHTLINER	CASCADIA 113	Diesel	598511	100	2
532	TAMT	N/A	2010	FREIGHTLINER	CASCADIA 125	Diesel	805211	700	2
533	TAMT	N/A	2013	FREIGHTLINER	CASCADIA 125	Diesel	657117	500	2
534	TAMT	N/A	2015	FREIGHTLINER	CASCADIA 113	Diesel	535283	200	2
535	TAMT	N/A	2015	FREIGHTLINER	CASCADIA 125	Diesel	535283	100	2
536	TAMT	N/A	2018	KENWORTH	CONSTRUCTION	Diesel	317873	200	2
537	TAMT	N/A	2008	KENWORTH	CONSTRUCTION	Diesel	880835	300	2
538	TAMT	N/A	2021	KENWORTH	CONSTRUCTION	Diesel	58874	100	2
539	TAMT	N/A	2012	FREIGHTLINER	CASCADIA 125	Diesel	711103	600	2
540	TAMT	N/A	2014	FREIGHTLINER	CASCADIA 125	Diesel	598511	500	2
541	TAMT	N/A	2019	FREIGHTLINER	CASCADIA 126	Diesel	236162	700	2
542	TAMT	N/A	2012	FREIGHTLINER	CASCADIA 125	Diesel	711103	500	2
543	TAMT	N/A	2019	VOLVO	VN	Diesel	236162	200	2
544	TAMT	N/A	2015	PETERBILT	579	Diesel	535283	400	2
545	TAMT	N/A	2012	VOLVO	VN	Diesel	711103	200	2
546	TAMT	N/A	2016	FREIGHTLINER	122SD	Diesel	467434	100	2
547	TAMT	N/A	2019	KENWORTH	CONSTRUCTION	Diesel	236162	700	2
548	TAMT	N/A	2015	FREIGHTLINER	CASCADIA 125	Diesel	535283	600	2
549	TAMT	N/A	2022	FREIGHTLINER	CASCADIA 126	Diesel	0	100	2
550	TAMT	N/A	2012	KENWORTH	CONSTRUCTION	Diesel	711103	200	2
551	TAMT	N/A	2013	FREIGHTLINER	CASCADIA 125	Diesel	657117	200	2
552	TAMT	N/A	2014	PETERBILT	389	Diesel	598511	200	2
553	TAMT	N/A	2014	FREIGHTLINER	CASCADIA 125	Diesel	598511	500	2
554	TAMT	N/A	2013	PETERBILT	587	Diesel	657117	400	2
555	TAMT	N/A	2009	FREIGHTLINER	CASCADIA 125	Diesel	845333	700	2
556	TAMT	N/A	2018	FREIGHTLINER	CASCADIA 126	Diesel	317873	300	2
557	TAMT	N/A	2019	PETERBILT	367	Diesel	236162	700	2
558	TAMT	N/A	2016	FREIGHTLINER	M2	Diesel	467434	200	2
559	TAMT	N/A	2017	PETERBILT	389	Diesel	394964	500	2
560	TAMT	N/A	2015	FREIGHTLINER	CASCADIA 125	Diesel	535283	600	2
561	TAMT	N/A	2017	VOLVO	VN	Diesel	394964	200	2
562	TAMT	N/A	2016	PETERBILT	579	Diesel	467434	200	2
563	TAMT	N/A	2022	KENWORTH	CONSTRUCTION	Diesel	0	200	2
564	TAMT	N/A	2014	INTERNATIONAL	PROSTAR	Diesel	598511	200	2
565	TAMT	N/A	2015	PETERBILT	579	Diesel	535283	200	2
566	TAMT	N/A	2016	KENWORTH	CONSTRUCTION	Diesel	467434	600	2
567	TAMT	N/A	2016	INTERNATIONAL	PROSTAR	Diesel	467434	500	2
568	TAMT	N/A	2016	FREIGHTLINER	CASCADIA 125	Diesel	467434	200	2
569	TAMT	N/A	2009	INTERNATIONAL	PROSTAR PREMIUM	Diesel	845333	200	2
570	TAMT	N/A	2016	INTERNATIONAL	PROSTAR	Diesel	467434	300	2
571	TAMT	N/A	2017	VOLVO	VN	Diesel	394964	600	2
572	TAMT	N/A	2014	KENWORTH	CONSTRUCTION	Diesel	598511	400	2
573	TAMT	N/A	2015	INTERNATIONAL	PROSTAR	Diesel	535283	700	2
574	TAMT	N/A	2015	VOLVO	VN	Diesel	535283	300	2
575	TAMT	N/A	2009	PETERBILT	387	Diesel	845333	200	2
576	TAMT	N/A	2014	KENWORTH	CONSTRUCTION	Diesel	598511	200	2
577	TAMT	N/A	2010	KENWORTH	CONSTRUCTION	Diesel	805211	200	2
578	TAMT	N/A	2017	KENWORTH	CONSTRUCTION	Diesel	394964	300	2
579	TAMT	N/A	2015	KENWORTH	CONSTRUCTION	Diesel	535283	400	2
580	TAMT	N/A	2015	FREIGHTLINER	CASCADIA 125	Diesel	535283	300	2
581	TAMT	N/A	2018	FREIGHTLINER	CASCADIA 125	Diesel	317873	400	2
582	TAMT	N/A	2013	WESTERN STAR/AUTO CAR	CONVENTIONAL	Diesel	657117	600	2
583	TAMT	N/A	2021	FREIGHTLINER	CASCADIA 126	Diesel	58874	400	2
584	TAMT	N/A	2017	PETERBILT	367	Diesel	394964	400	2

585	TAMT	N/A	2016	PETERBILT	579	Diesel	467434	200	2
586	TAMT	N/A	2015	KENWORTH	CONSTRUCTION	Diesel	535283	600	2
587	TAMT	N/A	2018	FREIGHTLINER	CASCADIA 126	Diesel	317873	300	2
588	TAMT	N/A	2021	KENWORTH	CONSTRUCTION	Diesel	58874	600	2
589	TAMT	N/A	2019	PETERBILT	567	Diesel	236162	200	2
590	TAMT	N/A	2016	FREIGHTLINER	CASCADIA 125	Diesel	467434	400	2
591	TAMT	N/A	2013	FREIGHTLINER	CASCADIA 125	Diesel	657117	700	2
592	TAMT	N/A	2016	FREIGHTLINER	CASCADIA 125	Diesel	467434	100	2
593	TAMT	N/A	2021	VOLVO	VN	Diesel	58874	200	2
594	TAMT	N/A	2021	KENWORTH	CONSTRUCTION	Diesel	58874	200	2
595	TAMT	N/A	2022	PETERBILT	389	Diesel	0	500	1
596	TAMT	N/A	2020	PETERBILT	389	Diesel	149829	300	1
597	TAMT	N/A	2015	FREIGHTLINER	CASCADIA 125	Diesel	535283	200	1
598	TAMT	N/A	2022	FREIGHTLINER	CASCADIA 126	Diesel	0	200	1
599	TAMT	N/A	2010	FREIGHTLINER	CASCADIA 125	Diesel	805211	500	1
600	TAMT	N/A	2015	KENWORTH	CONSTRUCTION	Diesel	535283	200	1
601	TAMT	N/A	2013	FREIGHTLINER	CASCADIA 125	Diesel	657117	500	1
602	TAMT	N/A	2008	MACK	600	Diesel	880835	400	1
603	TAMT	N/A	2011	FREIGHTLINER	CASCADIA 125	Diesel	760467	300	1
604	TAMT	N/A	2010	PETERBILT	389	Diesel	805211	200	1
605	TAMT	N/A	2020	VOLVO	VN	Diesel	149829	200	1
606	TAMT	N/A	2014	VOLVO	VN	Diesel	598511	400	1
607	TAMT	N/A	2012	FREIGHTLINER	CASCADIA 125	Diesel	711103	100	1
608	TAMT	N/A	2018	KENWORTH	CONSTRUCTION	Diesel	317873	400	1
609	TAMT	N/A	2013	KENWORTH	CONSTRUCTION	Diesel	657117	100	1
610	TAMT	N/A	2017	PETERBILT	567	Diesel	394964	400	1
611	TAMT	N/A	2009	FREIGHTLINER	CASCADIA 125	Diesel	845333	200	1
612	TAMT	N/A	2018	INTERNATIONAL	LT625	Diesel	317873	300	1
613	TAMT	N/A	2020	INTERNATIONAL	LT625	Diesel	149829	500	1
614	TAMT	N/A	2016	PETERBILT	579	Diesel	467434	400	1
615	TAMT	N/A	2021	FREIGHTLINER	CASCADIA 126	Diesel	58874	300	1
616	TAMT	N/A	2015	INTERNATIONAL	PROSTAR	Diesel	535283	200	1
617	TAMT	N/A	2011	INTERNATIONAL	PROSTAR PREMIUM	Diesel	760467	300	1
618	TAMT	N/A	2001	FREIGHTLINER	MEDIUM CONVENTIONAL	Diesel	999954	600	1
619	TAMT	N/A	2016	PETERBILT	367	Diesel	467434	300	1
620	TAMT	N/A	2019	KENWORTH	CONSTRUCTION	Diesel	236162	300	1
621	TAMT	N/A	2011	FREIGHTLINER	CASCADIA 125	Diesel	760467	300	1
622	TAMT	N/A	2014	INTERNATIONAL	PROSTAR	Diesel	598511	200	1
623	TAMT	N/A	2008	FREIGHTLINER	CONVENTIONAL	Diesel	880835	300	1
624	TAMT	N/A	2011	FREIGHTLINER	M2	Diesel	760467	200	1
625	TAMT	N/A	2006	AUTOCAR LLC	XPEDITOR	Diesel	937974	200	1
626	TAMT	N/A	2020	VOLVO	VN	Diesel	149829	200	1
627	TAMT	N/A	2010	PETERBILT	386	Diesel	805211	700	1
628	TAMT	N/A	2018	PETERBILT	579	Diesel	317873	200	1
629	TAMT	N/A	2018	KENWORTH	CONSTRUCTION	Diesel	317873	500	1
630	TAMT	N/A	2011	FREIGHTLINER	CASCADIA 125	Diesel	760467	300	1
631	TAMT	N/A	2014	KENWORTH	CONSTRUCTION	Diesel	598511	300	1
632	TAMT	N/A	2012	PETERBILT	384	Diesel	711103	500	1
633	TAMT	N/A	2012	FREIGHTLINER	CASCADIA 125	Diesel	711103	300	1
634	TAMT	N/A	2019	FREIGHTLINER	CASCADIA 126	Diesel	236162	200	1
635	TAMT	N/A	2018	PETERBILT	579	Diesel	317873	600	1
636	TAMT	N/A	2020	FREIGHTLINER	CASCADIA 126	Diesel	149829	400	1
637	TAMT	N/A	2022	MACK	ANTHEM	Diesel	0	500	1
638	TAMT	N/A	2012	PETERBILT	587	Diesel	711103	400	1
639	TAMT	N/A	2009	VOLVO	VN	Diesel	845333	300	1
640	TAMT	N/A	2014	FREIGHTLINER	CASCADIA 125	Diesel	598511	500	1
641	TAMT	N/A	2012	INTERNATIONAL	PROSTAR	Diesel	711103	100	1
642	TAMT	N/A	2020	FREIGHTLINER	CASCADIA 116	Diesel	149829	500	1
643	TAMT	N/A	2014	KENWORTH	CONSTRUCTION	Diesel	598511	500	1
644	TAMT	N/A	2009	INTERNATIONAL	PROSTAR PREMIUM	Diesel	845333	200	1
645	TAMT	N/A	2022	KENWORTH	CONSTRUCTION	Diesel	0	300	1
646	TAMT	N/A	2019	KENWORTH	CONSTRUCTION	Diesel	236162	200	1
647	TAMT	N/A	2021	FREIGHTLINER	CASCADIA 126	Diesel	58874	700	1
648	TAMT	N/A	2019	FREIGHTLINER	CASCADIA 126	Diesel	236162	500	1
649	TAMT	N/A	2013	FREIGHTLINER	CASCADIA 125	Diesel	657117	500	1
650	TAMT	N/A	2016	FREIGHTLINER	CASCADIA 125	Diesel	467434	700	1
651	TAMT	N/A	2013	VOLVO	VN	Diesel	657117	600	1
652	TAMT	N/A	2014	KENWORTH	CONSTRUCTION	Diesel	598511	300	1
653	TAMT	N/A	2013	KENWORTH	CONSTRUCTION	Diesel	657117	700	1
654	TAMT	N/A	2013	KENWORTH	CONSTRUCTION	Diesel	657117	100	1
655	TAMT	N/A	2020	KENWORTH	CONSTRUCTION	Diesel	149829	200	1
656	TAMT	N/A	2022	VOLVO	VN	Diesel	0	400	1
657	TAMT	N/A	2012	FREIGHTLINER	CASCADIA 125	Diesel	711103	300	1
658	TAMT	N/A	2016	FREIGHTLINER	CASCADIA 125	Diesel	467434	200	1
659	TAMT	N/A	2014	INTERNATIONAL	PROSTAR	Diesel	598511	400	1
660	TAMT	N/A	2019	PETERBILT	389	Diesel	236162	700	1
661	TAMT	N/A	2021	PETERBILT	389	Diesel	58874	500	1
662	TAMT	N/A	2010	KENWORTH	CONSTRUCTION	Diesel	805211	300	1
663	TAMT	N/A	2011	FREIGHTLINER	CASCADIA 125	Diesel	760467	700	1
664	TAMT	N/A	2019	KENWORTH	CONSTRUCTION	Diesel	236162	700	1
665	TAMT	N/A	2012	KENWORTH	CONSTRUCTION	Diesel	711103	500	1
666	TAMT	N/A	2019	VOLVO	VN	Diesel	236162	500	1
667	NCMT	Tecate	2014	Peterbuilt	389	Diesel	509134	300	214
668	NCMT	Tecate	2014	Peterbuilt	389	Diesel	512669	250	214
669	NCMT	Tecate	2014	Peterbuilt	389	Diesel	367283	250	214
670	NCMT	Tecate	2014	Peterbuilt	389	Diesel	681562	250	214
671	NCMT	Tecate	2009	Peterbuilt	388	Diesel	673812	250	214
672	NCMT	Tecate	2009	Peterbuilt	388	Diesel	732456	250	214
673	NCMT	Tecate	2013	Volvo	Volvo	Diesel	476633	100	86
674	NCMT	Tecate	2013	Volvo	Volvo	Diesel	504852	300	214
675	NCMT	Tecate	2018	BYD	Electric Truck	Battery Electric	928	100	128
676	NCMT	Tecate	2018	BYD	Electric Truck	Battery Electric	1003	100	128
677	NCMT	Tecate	2017	BYD	Electric Truck	Battery Electric	406	50	43
678	NCMT	Tecate	2013	Freightliner	N/A	Diesel	500000	200	2
679	NCMT	Tecate	2011	International	N/A	Diesel	500000	200	2
680	NCMT	Tecate	2018	Peterbilt	N/A	Diesel	350000	200	2
681	NCMT	Tecate	2015	Peterbilt	N/A	Diesel	300000	200	2
682	NCMT	Tecate	2014	Peterbilt	N/A	Diesel	500000	200	2
683	NCMT	Tecate	1999	Freightliner	N/A	Diesel	1000000	200	2
684	NCMT	Tecate	2015	Peterbilt	N/A	Diesel	300000	200	2
685	NCMT	Tecate	2014	Peterbilt	N/A	Diesel	500000	200	2
686	NCMT	Tecate	1998	Volvo	N/A	Diesel	1000000	200	2
687	NCMT	Tecate	2016	Peterbilt	N/A	Diesel	300000	200	2
688	NCMT	Tecate	2019	Peterbilt	N/A	Diesel	200000	200	2
689	NCMT	Tecate	2007	Peterbilt	N/A	Diesel	650000	200	2
690	NCMT	Tecate	2015	Peterbilt	N/A	Diesel	300000	200	2
691	NCMT	Tecate	2018	Peterbilt	N/A	Diesel	250000	200	2
692	NCMT	Tecate	2019	Peterbilt	N/A	Diesel	200000	200	2
693	NCMT	Tecate	2018	Peterbilt	N/A	Diesel	250000	200	2
694	NCMT	Tecate	2020	Peterbilt	N/A	Diesel	200000	200	2
695	NCMT	Tecate	2015	Peterbilt	N/A	Diesel	300000	200	2
696	NCMT	Tecate	2018	Peterbilt	N/A	Diesel	250000	200	2
697	NCMT	Tecate	2011	International	N/A	Diesel	600000	200	2
698	NCMT	Tecate	2017	RAM	3500	Diesel	220000	300	641
699	NCMT	Tecate	2018	RAM	5500	Diesel	130000	300	214
700	NCMT	Tecate	2022	FORD	650	Diesel	26	200	214
701	NCMT	Tecate	2020	Dodge RAM	0	Diesel	165665	200	171

702	NCMT	Tecate	2018	RAM	5500	Diesel	141000	250	214
703	NCMT	Tecate	2014	VOLVO	vnm42T200	Diesel	453256	350	148
704	NCMT	Tecate	2019	RAM	5500	Diesel	84022	200	171
705	NCMT	Tecate	2017	PETERBILT	389	Diesel	497470	350	86
706	NCMT	Tecate	2020	peterbuilt	389	Diesel	123278	250	2138
707	NCMT	Tecate	2016	chevy	silverado	Diesel	351241	150	30
708	NCMT	Tecate	2011	chevy	silverado	Diesel	218356	150	30
709	NCMT	Tecate	2022	RAM	3500	Diesel	7350	500	59
710	NCMT	Tecate	2022	ram	3500	Diesel	3000	500	59
711	NCMT	Tecate	2018	Freightliner	cascadia	Diesel	608000	500	59
712	NCMT	Tecate	2019	DODGE	RAM	DIESEL	208904	350	86
713	NCMT	Tecate	2017	DODGE	RAM 5500	Diesel	178900	400	86
714	NCMT	Tecate	2017	PETERBILT	389	Diesel	632545	350	214
715	NCMT	Tecate	2018	PETERBILT	389	Diesel	572788	350	214
716	NCMT	Tecate	2018	PETERBILT	389	Diesel	548796	350	214
717	NCMT	Tecate	2019	PETERBILT	389	Diesel	564535	350	214
718	NCMT	Tecate	2016	PETERBILT	389	Diesel	679990	350	214
719	NCMT	Tecate	2013	VOLVO	VAH	Diesel	824401	250	40
720	NCMT	Tecate	2012	VOLVO	D-11	Diesel	573631	300	30
721	NCMT	Tecate	2015	FREIGHTLINER	CASCADIA	Diesel	466443	100	214
722	NCMT	Tecate	2019	FORD	F450	Diesel	187898	650	128
723	NCMT	Tecate	2014	Freightliner	cascadia	Diesel	609381	450	20
724	NCMT	Tecate	2012	VOLVO	VNL	Diesel	520000	450	128
725	NCMT	Tecate	2020	FORD	F350	Diesel	112651	600	59
726	NCMT	Tecate	2014	KENWORTH	T680	Diesel	783286	600	59
727	NCMT	Tecate	2018	Peterbilt	579	Diesel	447255	700	86
728	NCMT	Tecate	2019	Peterbilt	579	Diesel	413022	700	86
729	NCMT	Tecate	2013	International	Prostar Plus	Diesel	875527	700	86
730	NCMT	Tecate	2012	Peterbilt	389	Diesel	559053	700	86
731	NCMT	Tecate	2017	Peterbilt	579	Diesel	4332789	700	86
732	NCMT	Tecate	2017	Peterbilt	579	Diesel	393494	700	86
733	NCMT	Tecate	2017	Kenworth	T680	Diesel	469500	700	86
734	NCMT	Tecate	2014	Kenworth	T660	Diesel	1151303	700	86
735	NCMT	Tecate	2017	Kenworth	W900	Diesel	649255	700	86
736	NCMT	Tecate	2015	Kenworth	T660	Diesel	600156	700	86
737	NCMT	Tecate	2013	International	Prostar	Diesel	567551	700	86
738	NCMT	Tecate	2013	Western Star	4900	Diesel	698829	700	86
739	NCMT	Tecate	2019	Peterbilt	0	Diesel	236161.54	325	171
740	NCMT	Tecate	2007	Sterling	0	Diesel	911714.86	225	86
741	NCMT	Tecate	2007	Peterbilt	0	Diesel	911714.86	300	171
742	NCMT	Tecate	2007	Peterbilt	0	Diesel	911714.86	100	171
743	NCMT	Tecate	2020	Peterbilt	0	Diesel	149828.54	275	86
744	NCMT	Tecate	2014	Peterbilt	0	Diesel	598510.64	175	171
745	NCMT	Tecate	2014	Peterbilt	0	Diesel	598510.64	240	171
746	NCMT	Tecate	2017	Peterbilt	0	Diesel	394964.36	435	43
747	NCMT	Tecate	2014	Peterbilt	0	Diesel	598510.64	570	43
748	NCMT	Tecate	2012	Peterbilt	0	Diesel	711102.86	155	171
749	NCMT	Tecate	2022	Peterbilt	0	Diesel	0	320	171
750	NCMT	Tecate	2007	Sterling	0	Diesel	911714.86	120	257
751	NCMT	Tecate	2017	Peterbilt	0	Diesel	394964.36	400	43
752	NCMT	Tecate	2006	Peterbilt	0	Diesel	937974.08	400	20
753	NCMT	Tecate	1999	Peterbilt	0	Diesel	992398.94	450	10
754	NCMT	Tecate	2007	Peterbilt	0	Diesel	911714.86	400	10
755	NCMT	Tecate	2016	Peterbilt	0	Diesel	467434.18	500	20
756	NCMT	Tecate	2016	Volvo	0	Diesel	467434.18	500	20
757	NCMT	Tecate	2013	Peterbilt	0	Diesel	657117.28	500	10
758	NCMT	Tecate	2014	Peterbilt	0	Diesel	598510.64	500	20
759	NCMT	Tecate	2014	Peterbilt	0	Diesel	598510.64	375	20
760	NCMT	Tecate	2014	Peterbilt	0	Diesel	598510.64	350	30
761	NCMT	Tecate	2014	Peterbilt	0	Diesel	598510.64	450	20
762	NCMT	Tecate	2022	Peterbilt	0	Diesel	0	400	20
763	NCMT	Tecate	2020	Peterbilt	0	Diesel	149828.54	400	20
764	NCMT	Tecate	2019	Peterbilt	0	Diesel	236161.54	500	20
765	NCMT	Tecate	2019	Volvo	0	Diesel	236161.54	450	20
766	NCMT	Tecate	2020	Peterbilt	0	Diesel	149828.54	500	20
767	NCMT	Tecate	2019	Peterbilt	0	Diesel	236161.54	600	10
768	NCMT	Tecate	2020	Peterbilt	0	Diesel	149828.54	400	30
769	NCMT	Tecate	2015	Peterbilt	0	Diesel	535282.94	400	10
770	NCMT	Tecate	2020	Peterbilt	0	Diesel	149828.54	450	30
771	NCMT	Tecate	2014	Peterbilt	0	Diesel	598510.64	400	20
772	NCMT	Tecate	2021	Peterbilt	0	Diesel	58874.48	450	20
773	NCMT	Tecate	2021	Peterbilt	0	Diesel	58874.48	650	20
774	NCMT	Tecate	2022	Peterbilt	0	Diesel	0	650	30
775	NCMT	Tecate	2020	Peterbilt	0	Diesel	149828.54	375	40
776	NCMT	Tecate	2010	Peterbilt	0	Diesel	805210.84	450	20
777	NCMT	Tecate	2016	Peterbilt	0	Diesel	467434.18	400	20
778	NCMT	Tecate	2006	Peterbilt	0	Diesel	937974.08	400	10
779	NCMT	Tecate	2013	Freightliner	0	Diesel	657117.28	400	20
780	NCMT	Tecate	2020	Peterbilt	0	Diesel	149828.54	400	20
781	NCMT	Tecate	2007	Peterbilt	0	Diesel	911714.86	425	10
782	NCMT	Tecate	2016	Peterbilt	0	Diesel	467434.18	500	10
783	NCMT	Tecate	2013	Peterbilt	0	Diesel	657117.28	400	20
784	NCMT	Tecate	2018	Freightliner	114SD	Diesel	240424	250	128
785	NCMT	Tecate	2018	Freightliner	114SD	Diesel	247410	250	128
786	NCMT	Tecate	2018	Freightliner	114SD	Diesel	239330	250	128
787	NCMT	Tecate	2018	Freightliner	114SD	Diesel	236459	250	128
788	NCMT	Tecate	2018	Freightliner	114SD	Diesel	234215	250	128
789	NCMT	Tecate	2018	Freightliner	114SD	Diesel	218326	250	128
790	NCMT	Tecate	2018	Freightliner	114SD	Diesel	153362	250	128
791	NCMT	Tecate	2018	Freightliner	114SD	Diesel	204137	250	128
792	NCMT	Tecate	2018	Freightliner	114SD	Diesel	208527	250	128
793	NCMT	Tecate	2018	Freightliner	114SD	Diesel	201633	250	128
794	NCMT	Tecate	2018	Freightliner	114SD	Diesel	227325	250	128
795	NCMT	Tecate	2018	Freightliner	114SD	Diesel	173734	250	128
796	NCMT	Tecate	2018	Freightliner	114SD	Diesel	197926	250	128
797	NCMT	Tecate	2018	Freightliner	114SD	Diesel	158429	250	128
798	NCMT	Tecate	2018	Freightliner	114SD	Diesel	152609	250	128
799	NCMT	Tecate	2018	Freightliner	114SD	Diesel	205919	250	128
800	NCMT	Tecate	2018	Freightliner	114SD	Diesel	197450	250	128
801	NCMT	Tecate	2018	Freightliner	114SD	Diesel	173492	250	128
802	NCMT	Tecate	2018	Freightliner	114SD	Diesel	141020	250	128
803	NCMT	Tecate	2018	Freightliner	114SD	Diesel	165259	250	128
804	NCMT	Tecate	2018	Freightliner	114SD	Diesel	265341	250	128
805	NCMT	Tecate	2018	Freightliner	114SD	Diesel	242779	250	128
806	NCMT	Tecate	2018	Freightliner	114SD	Diesel	234895	250	128
807	NCMT	Tecate	2018	Freightliner	114SD	Diesel	233837	250	128
808	NCMT	Tecate	2018	Freightliner	114SD	Diesel	228643	250	128
809	NCMT	Tecate	2018	Freightliner	114SD	Diesel	226369	250	128
810	NCMT	Tecate	2018	Freightliner	114SD	Diesel	222450	250	128
811	NCMT	Tecate	2018	Freightliner	114SD	Diesel	221115	250	128
812	NCMT	Tecate	2018	Freightliner	114SD	Diesel	220244	250	128
813	NCMT	Tecate	2018	Freightliner	114SD	Diesel	220221	250	128
814	NCMT	Tecate	2018	Freightliner	114SD	Diesel	219715	250	128
815	NCMT	Tecate	2018	Freightliner	114SD	Diesel	214950	250	128
816	NCMT	Tecate	2018	Freightliner	114SD	Diesel	212489	250	128
817	NCMT	Tecate	2018	Freightliner	114SD	Diesel	204363	250	128
818	NCMT	Tecate	2018	Freightliner	114SD	Diesel	201119	250	128

819	NCMT	Tecate	2018	Freightliner	114SD	Diesel	199672	250	128
820	NCMT	Tecate	2018	Freightliner	114SD	Diesel	198742	250	128
821	NCMT	Tecate	2018	Freightliner	114SD	Diesel	190940	250	128
822	NCMT	Tecate	2018	Freightliner	114SD	Diesel	190920	250	128
823	NCMT	Tecate	2018	Freightliner	114SD	Diesel	190290	250	128
824	NCMT	Tecate	2018	Freightliner	114SD	Diesel	189564	250	128
825	NCMT	Tecate	2018	Freightliner	114SD	Diesel	188659	250	128
826	NCMT	Tecate	2018	Freightliner	114SD	Diesel	183470	250	128
827	NCMT	Tecate	2018	Freightliner	114SD	Diesel	181962	250	128
828	NCMT	Tecate	2018	Freightliner	114SD	Diesel	177760	250	128
829	NCMT	Tecate	2018	Freightliner	114SD	Diesel	172853	250	128
830	NCMT	Tecate	2022	Peterbuilt	0	Diesel	0	400	128
831	NCMT	Tecate	2022	Peterbuilt	0	Diesel	0	400	128
832	NCMT	Tecate	2020	peterbuilt	389	Diesel	123278	250	2138
833	NCMT	SD Local Sample 1	2014	Peterbuilt	389	Diesel	509134	300	56
834	NCMT	SD Local Sample 1	2014	Peterbuilt	389	Diesel	512669	250	56
835	NCMT	SD Local Sample 1	2014	Peterbuilt	389	Diesel	367283	250	56
836	NCMT	SD Local Sample 1	2014	Peterbuilt	389	Diesel	681562	250	56
837	NCMT	SD Local Sample 1	2009	Peterbuilt	388	Diesel	673812	250	56
838	NCMT	SD Local Sample 1	2009	Peterbuilt	388	Diesel	732456	250	56
839	NCMT	SD Local Sample 1	2013	Volvo	Volvo	Diesel	476633	100	22
840	NCMT	SD Local Sample 1	2013	Volvo	Volvo	Diesel	504852	300	56
841	NCMT	SD Local Sample 1	2018	BYD	Electric Truck	Battery Electric	928	100	33
842	NCMT	SD Local Sample 1	2018	BYD	Electric Truck	Battery Electric	1003	100	33
843	NCMT	SD Local Sample 1	2017	BYD	Electric Truck	Battery Electric	406	50	11
844	NCMT	SD Local Sample 1	2017	RAM	3500	Diesel	220000	300	167
845	NCMT	SD Local Sample 1	2018	RAM	5500	Diesel	130000	300	56
846	NCMT	SD Local Sample 1	2022	FORD	650	Diesel	26	200	56
847	NCMT	SD Local Sample 1	2020	Dodge RAM	0	Diesel	165665	200	45
848	NCMT	SD Local Sample 1	2018	RAM	5500	Diesel	141000	250	56
849	NCMT	SD Local Sample 1	2014	VOLVO	vnm42T200	Diesel	453256	350	39
850	NCMT	SD Local Sample 1	2019	RAM	5500	Diesel	84022	200	45
851	NCMT	SD Local Sample 1	2017	PETERBILT	389	Diesel	497470	350	22
852	NCMT	SD Local Sample 1	2020	peterbuilt	389	Diesel	123278	250	557
853	NCMT	SD Local Sample 1	2016	chevy	silverado	Diesel	351241	150	8
854	NCMT	SD Local Sample 1	2011	chevy	silverado	Diesel	218356	150	8
855	NCMT	SD Local Sample 1	2022	RAM	3500	Diesel	7350	500	15
856	NCMT	SD Local Sample 1	2022	ram	3500	Diesel	3000	500	15
857	NCMT	SD Local Sample 1	2018	Freightliner	cascadia	Diesel	608000	500	15
858	NCMT	SD Local Sample 1	2019	DODGE	RAM	DIESEL	208904	350	22
859	NCMT	SD Local Sample 1	2017	DODGE	RAM 5500	Diesel	178900	400	22
860	NCMT	SD Local Sample 1	2017	PETERBILT	389	Diesel	632545	350	56
861	NCMT	SD Local Sample 1	2018	PETERBILT	389	Diesel	572788	350	56
862	NCMT	SD Local Sample 1	2018	PETERBILT	389	Diesel	548796	350	56
863	NCMT	SD Local Sample 1	2019	PETERBILT	389	Diesel	564535	350	56
864	NCMT	SD Local Sample 1	2016	PETERBILT	389	Diesel	679990	350	56
865	NCMT	SD Local Sample 1	2013	VOLVO	VAH	Diesel	824401	250	10
866	NCMT	SD Local Sample 1	2012	VOLVO	D-11	Diesel	573631	300	8
867	NCMT	SD Local Sample 1	2015	FREIGHTLINER	CASCADIA	Diesel	466443	100	56
868	NCMT	SD Local Sample 1	2019	FORD	F450	Diesel	187898	650	33
869	NCMT	SD Local Sample 1	2014	Freightliner	cascadia	Diesel	609381	450	5
870	NCMT	SD Local Sample 1	2012	VOLVO	VNL	Diesel	520000	450	33
871	NCMT	SD Local Sample 1	2020	FORD	F350	Diesel	112651	600	15
872	NCMT	SD Local Sample 1	2014	KENWORTH	T680	Diesel	783286	600	15
873	NCMT	SD Local Sample 1	2018	Peterbilt	579	Diesel	447255	700	22
874	NCMT	SD Local Sample 1	2019	Peterbilt	579	Diesel	413022	700	22
875	NCMT	SD Local Sample 1	2013	International	Prostar Plus	Diesel	875527	700	22
876	NCMT	SD Local Sample 1	2012	Peterbilt	389	Diesel	559053	700	22
877	NCMT	SD Local Sample 1	2017	Peterbilt	579	Diesel	4332789	700	22
878	NCMT	SD Local Sample 1	2017	Peterbilt	579	Diesel	393494	700	22
879	NCMT	SD Local Sample 1	2017	Kenworth	T680	Diesel	469500	700	22
880	NCMT	SD Local Sample 1	2014	Kenworth	T660	Diesel	1151303	700	22
881	NCMT	SD Local Sample 1	2017	Kenworth	W900	Diesel	649255	700	22
882	NCMT	SD Local Sample 1	2015	Kenworth	T660	Diesel	600156	700	22
883	NCMT	SD Local Sample 1	2013	International	Prostar	Diesel	567551	700	22
884	NCMT	SD Local Sample 1	2013	Western Star	4900	Diesel	698829	700	22
885	NCMT	SD Local Sample 1	2019	Peterbilt	0	Diesel	236161.54	325	45
886	NCMT	SD Local Sample 1	2007	Sterling	0	Diesel	911714.86	225	22
887	NCMT	SD Local Sample 1	2007	Peterbilt	0	Diesel	911714.86	300	45
888	NCMT	SD Local Sample 1	2007	Peterbilt	0	Diesel	911714.86	100	45
889	NCMT	SD Local Sample 1	2020	Peterbilt	0	Diesel	149828.54	275	22
890	NCMT	SD Local Sample 1	2014	Peterbilt	0	Diesel	598510.64	175	45
891	NCMT	SD Local Sample 1	2014	Peterbilt	0	Diesel	598510.64	240	45
892	NCMT	SD Local Sample 1	2017	Peterbilt	0	Diesel	394964.36	435	11
893	NCMT	SD Local Sample 1	2014	Peterbilt	0	Diesel	598510.64	570	11
894	NCMT	SD Local Sample 1	2012	Peterbilt	0	Diesel	711102.86	155	45
895	NCMT	SD Local Sample 1	2022	Peterbilt	0	Diesel	0	320	45
896	NCMT	SD Local Sample 1	2007	Sterling	0	Diesel	911714.86	120	67
897	NCMT	SD Local Sample 1	2017	Peterbilt	0	Diesel	394964.36	400	11
898	NCMT	SD Local Sample 1	2006	Peterbilt	0	Diesel	937974.08	400	5
899	NCMT	SD Local Sample 1	1999	Peterbilt	0	Diesel	992398.94	450	3
900	NCMT	SD Local Sample 1	2007	Peterbilt	0	Diesel	911714.86	400	3
901	NCMT	SD Local Sample 1	2016	Peterbilt	0	Diesel	467434.18	500	5
902	NCMT	SD Local Sample 1	2016	Volvo	0	Diesel	467434.18	500	5
903	NCMT	SD Local Sample 1	2013	Peterbilt	0	Diesel	657117.28	500	3
904	NCMT	SD Local Sample 1	2014	Peterbilt	0	Diesel	598510.64	500	5
905	NCMT	SD Local Sample 1	2014	Peterbilt	0	Diesel	598510.64	375	5
906	NCMT	SD Local Sample 1	2014	Peterbilt	0	Diesel	598510.64	350	8
907	NCMT	SD Local Sample 1	2014	Peterbilt	0	Diesel	598510.64	450	5
908	NCMT	SD Local Sample 1	2022	Peterbilt	0	Diesel	0	400	5
909	NCMT	SD Local Sample 1	2020	Peterbilt	0	Diesel	149828.54	400	5
910	NCMT	SD Local Sample 1	2019	Peterbilt	0	Diesel	236161.54	500	5
911	NCMT	SD Local Sample 1	2019	Volvo	0	Diesel	236161.54	450	5
912	NCMT	SD Local Sample 1	2020	Peterbilt	0	Diesel	149828.54	500	5
913	NCMT	SD Local Sample 1	2019	Peterbilt	0	Diesel	236161.54	600	3
914	NCMT	SD Local Sample 1	2020	Peterbilt	0	Diesel	149828.54	400	8
915	NCMT	SD Local Sample 1	2015	Peterbilt	0	Diesel	535282.94	400	3
916	NCMT	SD Local Sample 1	2020	Peterbilt	0	Diesel	149828.54	450	8
917	NCMT	SD Local Sample 1	2014	Peterbilt	0	Diesel	598510.64	400	5
918	NCMT	SD Local Sample 1	2021	Peterbilt	0	Diesel	58874.48	450	5
919	NCMT	SD Local Sample 1	2021	Peterbilt	0	Diesel	58874.48	650	5
920	NCMT	SD Local Sample 1	2022	Peterbilt	0	Diesel	0	650	8
921	NCMT	SD Local Sample 1	2020	Peterbilt	0	Diesel	149828.54	375	10
922	NCMT	SD Local Sample 1	2010	Peterbilt	0	Diesel	805210.84	450	5
923	NCMT	SD Local Sample 1	2016	Peterbilt	0	Diesel	467434.18	400	5
924	NCMT	SD Local Sample 1	2006	Peterbilt	0	Diesel	937974.08	400	3
925	NCMT	SD Local Sample 1	2013	Freightliner	0	Diesel	657117.28	400	5
926	NCMT	SD Local Sample 1	2020	Peterbilt	0	Diesel	149828.54	400	5
927	NCMT	SD Local Sample 1	2007	Peterbilt	0	Diesel	911714.86	425	3
928	NCMT	SD Local Sample 1	2016	Peterbilt	0	Diesel	467434.18	500	3
929	NCMT	SD Local Sample 1	2013	Peterbilt	0	Diesel	657117.28	400	5
930	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	240424	250	33
931	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	247410	250	33
932	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	239330	250	33
933	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	236459	250	33
934	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	234215	250	33
935	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	218326	250	33

936	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	153362	250	33
937	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	204137	250	33
938	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	208527	250	33
939	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	201633	250	33
940	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	227325	250	33
941	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	173734	250	33
942	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	197926	250	33
943	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	158429	250	33
944	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	152609	250	33
945	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	205919	250	33
946	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	197450	250	33
947	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	173492	250	33
948	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	141020	250	33
949	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	165259	250	33
950	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	265341	250	33
951	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	242779	250	33
952	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	234895	250	33
953	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	233837	250	33
954	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	228643	250	33
955	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	226369	250	33
956	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	222450	250	33
957	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	221115	250	33
958	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	220244	250	33
959	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	220221	250	33
960	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	219715	250	33
961	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	214950	250	33
962	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	212489	250	33
963	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	204363	250	33
964	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	201119	250	33
965	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	199672	250	33
966	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	198742	250	33
967	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	190940	250	33
968	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	190920	250	33
969	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	190290	250	33
970	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	189564	250	33
971	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	188659	250	33
972	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	183470	250	33
973	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	181962	250	33
974	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	177760	250	33
975	NCMT	SD Local Sample 1	2018	Freightliner	114SD	Diesel	172853	250	33
976	NCMT	SD Local Sample 1	2022	Peterbuilt	0	Diesel	0	400	33
977	NCMT	SD Local Sample 1	2022	Peterbuilt	0	Diesel	0	400	33
978	NCMT	SD Local Sample 1	2020	peterbuilt	389	Diesel	123278	250	557
979	NCMT	SD Local Sample 2	2014	Peterbuilt	389	Diesel	509134	300	12
980	NCMT	SD Local Sample 2	2014	Peterbuilt	389	Diesel	512669	250	12
981	NCMT	SD Local Sample 2	2014	Peterbuilt	389	Diesel	367283	250	12
982	NCMT	SD Local Sample 2	2014	Peterbuilt	389	Diesel	681562	250	12
983	NCMT	SD Local Sample 2	2009	Peterbuilt	388	Diesel	673812	250	12
984	NCMT	SD Local Sample 2	2009	Peterbuilt	388	Diesel	732456	250	12
985	NCMT	SD Local Sample 2	2013	Volvo	Volvo	Diesel	476633	100	5
986	NCMT	SD Local Sample 2	2013	Volvo	Volvo	Diesel	504852	300	12
987	NCMT	SD Local Sample 2	2018	BYD	Electric Truck	Battery Electric	928	100	7
988	NCMT	SD Local Sample 2	2018	BYD	Electric Truck	Battery Electric	1003	100	7
989	NCMT	SD Local Sample 2	2017	BYD	Electric Truck	Battery Electric	406	50	3
990	NCMT	SD Local Sample 2	2017	RAM	3500	Diesel	220000	300	37
991	NCMT	SD Local Sample 2	2018	RAM	5500	Diesel	130000	300	12
992	NCMT	SD Local Sample 2	2022	FORD	650	Diesel	26	200	12
993	NCMT	SD Local Sample 2	2020	Dodge RAM	0	Diesel	165665	200	10
994	NCMT	SD Local Sample 2	2018	RAM	5500	Diesel	141000	250	12
995	NCMT	SD Local Sample 2	2014	VOLVO	vnm42T200	Diesel	453256	350	9
996	NCMT	SD Local Sample 2	2019	RAM	5500	Diesel	84022	200	10
997	NCMT	SD Local Sample 2	2017	PETERBILT	389	Diesel	497470	350	5
998	NCMT	SD Local Sample 2	2020	peterbuilt	389	Diesel	123278	250	123
999	NCMT	SD Local Sample 2	2016	chevy	silverado	Diesel	351241	150	2
1000	NCMT	SD Local Sample 2	2011	chevy	silverado	Diesel	218356	150	2
1001	NCMT	SD Local Sample 2	2022	RAM	3500	Diesel	7350	500	3
1002	NCMT	SD Local Sample 2	2022	ram	3500	Diesel	3000	500	3
1003	NCMT	SD Local Sample 2	2018	Freightliner	cascadia	Diesel	608000	500	3
1004	NCMT	SD Local Sample 2	2019	DODGE	RAM	DIESEL	208904	350	5
1005	NCMT	SD Local Sample 2	2017	DODGE	RAM 5500	Diesel	178900	400	5
1006	NCMT	SD Local Sample 2	2017	PETERBILT	389	Diesel	632545	350	12
1007	NCMT	SD Local Sample 2	2018	PETERBILT	389	Diesel	572788	350	12
1008	NCMT	SD Local Sample 2	2018	PETERBILT	389	Diesel	548796	350	12
1009	NCMT	SD Local Sample 2	2019	PETERBILT	389	Diesel	564535	350	12
1010	NCMT	SD Local Sample 2	2016	PETERBILT	389	Diesel	679990	350	12
1011	NCMT	SD Local Sample 2	2013	VOLVO	VAH	Diesel	824401	250	2
1012	NCMT	SD Local Sample 2	2012	VOLVO	D-11	Diesel	573631	300	2
1013	NCMT	SD Local Sample 2	2015	FREIGHTLINER	CASCADIA	Diesel	466443	100	12
1014	NCMT	SD Local Sample 2	2019	FORD	F450	Diesel	187898	650	7
1015	NCMT	SD Local Sample 2	2014	Freightliner	cascadia	Diesel	609381	450	1
1016	NCMT	SD Local Sample 2	2012	VOLVO	VNL	Diesel	520000	450	7
1017	NCMT	SD Local Sample 2	2020	FORD	F350	Diesel	112651	600	3
1018	NCMT	SD Local Sample 2	2014	KENWORTH	T680	Diesel	783286	600	3
1019	NCMT	SD Local Sample 2	2018	Peterbilt	579	Diesel	447255	700	5
1020	NCMT	SD Local Sample 2	2019	Peterbilt	579	Diesel	413022	700	5
1021	NCMT	SD Local Sample 2	2013	International	Prostar Plus	Diesel	875527	700	5
1022	NCMT	SD Local Sample 2	2012	Peterbilt	389	Diesel	559053	700	5
1023	NCMT	SD Local Sample 2	2017	Peterbilt	579	Diesel	4332789	700	5
1024	NCMT	SD Local Sample 2	2017	Peterbilt	579	Diesel	393494	700	5
1025	NCMT	SD Local Sample 2	2017	Kenworth	T680	Diesel	469500	700	5
1026	NCMT	SD Local Sample 2	2014	Kenworth	T660	Diesel	1151303	700	5
1027	NCMT	SD Local Sample 2	2017	Kenworth	W900	Diesel	649255	700	5
1028	NCMT	SD Local Sample 2	2015	Kenworth	T660	Diesel	600156	700	5
1029	NCMT	SD Local Sample 2	2013	International	Prostar	Diesel	567551	700	5
1030	NCMT	SD Local Sample 2	2013	Western Star	4900	Diesel	698829	700	5
1031	NCMT	SD Local Sample 2	2019	Peterbilt	0	Diesel	236161.54	325	10
1032	NCMT	SD Local Sample 2	2007	Sterling	0	Diesel	911714.86	225	5
1033	NCMT	SD Local Sample 2	2007	Peterbilt	0	Diesel	911714.86	300	10
1034	NCMT	SD Local Sample 2	2007	Peterbilt	0	Diesel	911714.86	100	10
1035	NCMT	SD Local Sample 2	2020	Peterbilt	0	Diesel	149828.54	275	5
1036	NCMT	SD Local Sample 2	2014	Peterbilt	0	Diesel	598510.64	175	10
1037	NCMT	SD Local Sample 2	2014	Peterbilt	0	Diesel	598510.64	240	10
1038	NCMT	SD Local Sample 2	2017	Peterbilt	0	Diesel	394964.36	435	3
1039	NCMT	SD Local Sample 2	2014	Peterbilt	0	Diesel	598510.64	570	3
1040	NCMT	SD Local Sample 2	2012	Peterbilt	0	Diesel	711102.86	155	10
1041	NCMT	SD Local Sample 2	2022	Peterbilt	0	Diesel	0	320	10
1042	NCMT	SD Local Sample 2	2007	Sterling	0	Diesel	911714.86	120	15
1043	NCMT	SD Local Sample 2	2017	Peterbilt	0	Diesel	394964.36	400	3
1044	NCMT	SD Local Sample 2	2006	Peterbilt	0	Diesel	937974.08	400	1
1045	NCMT	SD Local Sample 2	1999	Peterbilt	0	Diesel	992398.94	450	1
1046	NCMT	SD Local Sample 2	2007	Peterbilt	0	Diesel	911714.86	400	1
1047	NCMT	SD Local Sample 2	2016	Peterbilt	0	Diesel	467434.18	500	1
1048	NCMT	SD Local Sample 2	2016	Volvo	0	Diesel	467434.18	500	1
1049	NCMT	SD Local Sample 2	2013	Peterbilt	0	Diesel	657117.28	500	1
1050	NCMT	SD Local Sample 2	2014	Peterbilt	0	Diesel	598510.64	500	1
1051	NCMT	SD Local Sample 2	2014	Peterbilt	0	Diesel	598510.64	375	1
1052	NCMT	SD Local Sample 2	2014	Peterbilt	0	Diesel	598510.64	350	2

1053	NCMT	SD Local Sample 2	2014	Peterbilt	0	Diesel	598510.64	450	1
1054	NCMT	SD Local Sample 2	2022	Peterbilt	0	Diesel	0	400	1
1055	NCMT	SD Local Sample 2	2020	Peterbilt	0	Diesel	149828.54	400	1
1056	NCMT	SD Local Sample 2	2019	Peterbilt	0	Diesel	236161.54	500	1
1057	NCMT	SD Local Sample 2	2019	Volvo	0	Diesel	236161.54	450	1
1058	NCMT	SD Local Sample 2	2020	Peterbilt	0	Diesel	149828.54	500	1
1059	NCMT	SD Local Sample 2	2019	Peterbilt	0	Diesel	236161.54	600	1
1060	NCMT	SD Local Sample 2	2020	Peterbilt	0	Diesel	149828.54	400	2
1061	NCMT	SD Local Sample 2	2015	Peterbilt	0	Diesel	535282.94	400	1
1062	NCMT	SD Local Sample 2	2020	Peterbilt	0	Diesel	149828.54	450	2
1063	NCMT	SD Local Sample 2	2014	Peterbilt	0	Diesel	598510.64	400	1
1064	NCMT	SD Local Sample 2	2021	Peterbilt	0	Diesel	58874.48	450	1
1065	NCMT	SD Local Sample 2	2021	Peterbilt	0	Diesel	58874.48	650	1
1066	NCMT	SD Local Sample 2	2022	Peterbilt	0	Diesel	0	650	2
1067	NCMT	SD Local Sample 2	2020	Peterbilt	0	Diesel	149828.54	375	2
1068	NCMT	SD Local Sample 2	2010	Peterbilt	0	Diesel	805210.84	450	1
1069	NCMT	SD Local Sample 2	2016	Peterbilt	0	Diesel	467434.18	400	1
1070	NCMT	SD Local Sample 2	2006	Peterbilt	0	Diesel	937974.08	400	1
1071	NCMT	SD Local Sample 2	2013	Freightliner	0	Diesel	657117.28	400	1
1072	NCMT	SD Local Sample 2	2020	Peterbilt	0	Diesel	149828.54	400	1
1073	NCMT	SD Local Sample 2	2007	Peterbilt	0	Diesel	911714.86	425	1
1074	NCMT	SD Local Sample 2	2016	Peterbilt	0	Diesel	467434.18	500	1
1075	NCMT	SD Local Sample 2	2013	Peterbilt	0	Diesel	657117.28	400	1
1076	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	240424	250	7
1077	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	247410	250	7
1078	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	239330	250	7
1079	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	236459	250	7
1080	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	234215	250	7
1081	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	218326	250	7
1082	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	153362	250	7
1083	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	204137	250	7
1084	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	208527	250	7
1085	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	201633	250	7
1086	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	227325	250	7
1087	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	173734	250	7
1088	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	197926	250	7
1089	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	158429	250	7
1090	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	152609	250	7
1091	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	205919	250	7
1092	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	197450	250	7
1093	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	173492	250	7
1094	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	141020	250	7
1095	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	165259	250	7
1096	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	265341	250	7
1097	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	242779	250	7
1098	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	234895	250	7
1099	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	233837	250	7
1100	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	228643	250	7
1101	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	226369	250	7
1102	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	222450	250	7
1103	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	221115	250	7
1104	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	220244	250	7
1105	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	220221	250	7
1106	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	219715	250	7
1107	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	214950	250	7
1108	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	212489	250	7
1109	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	204363	250	7
1110	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	201119	250	7
1111	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	199672	250	7
1112	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	198742	250	7
1113	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	190940	250	7
1114	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	190920	250	7
1115	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	190290	250	7
1116	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	189564	250	7
1117	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	188659	250	7
1118	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	183470	250	7
1119	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	181962	250	7
1120	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	177760	250	7
1121	NCMT	SD Local Sample 2	2018	Freightliner	114SD	Diesel	172853	250	7
1122	NCMT	SD Local Sample 2	2022	Peterbuilt	0	Diesel	0	400	7
1123	NCMT	SD Local Sample 2	2022	Peterbuilt	0	Diesel	0	400	7
1124	NCMT	SD Local Sample 2	2020	peterbuilt	389	Diesel	123278	250	123
1125	NCMT	LA Sample	2014	Peterbuilt	389	Diesel	509134	300	197
1126	NCMT	LA Sample	2014	Peterbuilt	389	Diesel	512669	250	197
1127	NCMT	LA Sample	2014	Peterbuilt	389	Diesel	367283	250	197
1128	NCMT	LA Sample	2014	Peterbuilt	389	Diesel	681562	250	197
1129	NCMT	LA Sample	2009	Peterbuilt	388	Diesel	673812	250	197
1130	NCMT	LA Sample	2009	Peterbuilt	388	Diesel	732456	250	197
1131	NCMT	LA Sample	2013	Volvo	Volvo	Diesel	476633	100	79
1132	NCMT	LA Sample	2013	Volvo	Volvo	Diesel	504852	300	197
1133	NCMT	LA Sample	2018	BYD	Electric Truck	Battery Electric	928	100	118
1134	NCMT	LA Sample	2018	BYD	Electric Truck	Battery Electric	1003	100	118
1135	NCMT	LA Sample	2017	BYD	Electric Truck	Battery Electric	406	50	39
1136	NCMT	LA Sample	2013	Freightliner	N/A	Diesel	500000	200	2
1137	NCMT	LA Sample	2011	International	N/A	Diesel	500000	200	2
1138	NCMT	LA Sample	2018	Peterbilt	N/A	Diesel	350000	200	2
1139	NCMT	LA Sample	2015	Peterbilt	N/A	Diesel	300000	200	2
1140	NCMT	LA Sample	2014	Peterbilt	N/A	Diesel	500000	200	2
1141	NCMT	LA Sample	1999	Freightliner	N/A	Diesel	1000000	200	2
1142	NCMT	LA Sample	2015	Peterbilt	N/A	Diesel	300000	200	2
1143	NCMT	LA Sample	2014	Peterbilt	N/A	Diesel	500000	200	2
1144	NCMT	LA Sample	1998	Volvo	N/A	Diesel	1000000	200	2
1145	NCMT	LA Sample	2016	Peterbilt	N/A	Diesel	300000	200	2
1146	NCMT	LA Sample	2019	Peterbilt	N/A	Diesel	200000	200	2
1147	NCMT	LA Sample	2007	Peterbilt	N/A	Diesel	650000	200	2
1148	NCMT	LA Sample	2015	Peterbilt	N/A	Diesel	300000	200	2
1149	NCMT	LA Sample	2018	Peterbilt	N/A	Diesel	250000	200	2
1150	NCMT	LA Sample	2019	Peterbilt	N/A	Diesel	200000	200	2
1151	NCMT	LA Sample	2018	Peterbilt	N/A	Diesel	250000	200	2
1152	NCMT	LA Sample	2020	Peterbilt	N/A	Diesel	200000	200	2
1153	NCMT	LA Sample	2015	Peterbilt	N/A	Diesel	300000	200	2
1154	NCMT	LA Sample	2018	Peterbilt	N/A	Diesel	250000	200	2
1155	NCMT	LA Sample	2011	International	N/A	Diesel	600000	200	2
1156	NCMT	LA Sample	2017	RAM	3500	Diesel	220000	300	590
1157	NCMT	LA Sample	2018	RAM	5500	Diesel	130000	300	197
1158	NCMT	LA Sample	2022	FORD	650	Diesel	26	200	197
1159	NCMT	LA Sample	2020	Dodge RAM	0	Diesel	165665	200	157
1160	NCMT	LA Sample	2018	RAM	5500	Diesel	141000	250	197
1161	NCMT	LA Sample	2014	VOLVO	vnm42T200	Diesel	453256	350	136
1162	NCMT	LA Sample	2019	RAM	5500	Diesel	84022	200	157
1163	NCMT	LA Sample	2017	PETERBILT	389	Diesel	497470	350	79
1164	NCMT	LA Sample	2020	peterbuilt	389	Diesel	123278	250	1968
1165	NCMT	LA Sample	2016	chevy	silverado	Diesel	351241	150	27
1166	NCMT	LA Sample	2011	chevy	silverado	Diesel	218356	150	27
1167	NCMT	LA Sample	2022	RAM	3500	Diesel	7350	500	55
1168	NCMT	LA Sample	2022	ram	3500	Diesel	3000	500	55
1169	NCMT	LA Sample	2018	Freightliner	cascadia	Diesel	608000	500	55

1170	NCMT	LA Sample	2019	DODGE	RAM	DIESEL	208904	350	79
1171	NCMT	LA Sample	2017	DODGE	RAM 5500	Diesel	178900	400	79
1172	NCMT	LA Sample	2017	PETERBILT	389	Diesel	632545	350	197
1173	NCMT	LA Sample	2018	PETERBILT	389	Diesel	572788	350	197
1174	NCMT	LA Sample	2018	PETERBILT	389	Diesel	548796	350	197
1175	NCMT	LA Sample	2019	PETERBILT	389	Diesel	564535	350	197
1176	NCMT	LA Sample	2016	PETERBILT	389	Diesel	679990	350	197
1177	NCMT	LA Sample	2013	VOLVO	VAH	Diesel	824401	250	36
1178	NCMT	LA Sample	2012	VOLVO	D-11	Diesel	573631	300	27
1179	NCMT	LA Sample	2015	FREIGHTLINER	CASCADIA	Diesel	466443	100	197
1180	NCMT	LA Sample	2019	FORD	F450	Diesel	187898	650	118
1181	NCMT	LA Sample	2014	Freightliner	cascadia	Diesel	609381	450	18
1182	NCMT	LA Sample	2012	VOLVO	VNL	Diesel	520000	450	118
1183	NCMT	LA Sample	2020	FORD	F350	Diesel	112651	600	55
1184	NCMT	LA Sample	2014	KENWORTH	T680	Diesel	783286	600	55
1185	NCMT	LA Sample	2018	Peterbilt	579	Diesel	447255	700	79
1186	NCMT	LA Sample	2019	Peterbilt	579	Diesel	413022	700	79
1187	NCMT	LA Sample	2013	International	Prostar Plus	Diesel	875527	700	79
1188	NCMT	LA Sample	2012	Peterbilt	389	Diesel	559053	700	79
1189	NCMT	LA Sample	2017	Peterbilt	579	Diesel	4332789	700	79
1190	NCMT	LA Sample	2017	Peterbilt	579	Diesel	393494	700	79
1191	NCMT	LA Sample	2017	Kenworth	T680	Diesel	469500	700	79
1192	NCMT	LA Sample	2014	Kenworth	T660	Diesel	1151303	700	79
1193	NCMT	LA Sample	2017	Kenworth	W900	Diesel	649255	700	79
1194	NCMT	LA Sample	2015	Kenworth	T660	Diesel	600156	700	79
1195	NCMT	LA Sample	2013	International	Prostar	Diesel	567551	700	79
1196	NCMT	LA Sample	2013	Western Star	4900	Diesel	698829	700	79
1197	NCMT	LA Sample	2019	Peterbilt	0	Diesel	236161.54	325	157
1198	NCMT	LA Sample	2007	Sterling	0	Diesel	911714.86	225	79
1199	NCMT	LA Sample	2007	Peterbilt	0	Diesel	911714.86	300	157
1200	NCMT	LA Sample	2007	Peterbilt	0	Diesel	911714.86	100	157
1201	NCMT	LA Sample	2020	Peterbilt	0	Diesel	149828.54	275	79
1202	NCMT	LA Sample	2014	Peterbilt	0	Diesel	598510.64	175	157
1203	NCMT	LA Sample	2014	Peterbilt	0	Diesel	598510.64	240	157
1204	NCMT	LA Sample	2017	Peterbilt	0	Diesel	394964.36	435	39
1205	NCMT	LA Sample	2014	Peterbilt	0	Diesel	598510.64	570	39
1206	NCMT	LA Sample	2012	Peterbilt	0	Diesel	711102.86	155	157
1207	NCMT	LA Sample	2022	Peterbilt	0	Diesel	0	320	157
1208	NCMT	LA Sample	2007	Sterling	0	Diesel	911714.86	120	236
1209	NCMT	LA Sample	2017	Peterbilt	0	Diesel	394964.36	400	39
1210	NCMT	LA Sample	2006	Peterbilt	0	Diesel	937974.08	400	18
1211	NCMT	LA Sample	1999	Peterbilt	0	Diesel	992398.94	450	9
1212	NCMT	LA Sample	2007	Peterbilt	0	Diesel	911714.86	400	9
1213	NCMT	LA Sample	2016	Peterbilt	0	Diesel	467434.18	500	18
1214	NCMT	LA Sample	2016	Volvo	0	Diesel	467434.18	500	18
1215	NCMT	LA Sample	2013	Peterbilt	0	Diesel	657117.28	500	9
1216	NCMT	LA Sample	2014	Peterbilt	0	Diesel	598510.64	500	18
1217	NCMT	LA Sample	2014	Peterbilt	0	Diesel	598510.64	375	18
1218	NCMT	LA Sample	2014	Peterbilt	0	Diesel	598510.64	350	27
1219	NCMT	LA Sample	2014	Peterbilt	0	Diesel	598510.64	450	18
1220	NCMT	LA Sample	2022	Peterbilt	0	Diesel	0	400	18
1221	NCMT	LA Sample	2020	Peterbilt	0	Diesel	149828.54	400	18
1222	NCMT	LA Sample	2019	Peterbilt	0	Diesel	236161.54	500	18
1223	NCMT	LA Sample	2019	Volvo	0	Diesel	236161.54	450	18
1224	NCMT	LA Sample	2020	Peterbilt	0	Diesel	149828.54	500	18
1225	NCMT	LA Sample	2019	Peterbilt	0	Diesel	236161.54	600	9
1226	NCMT	LA Sample	2020	Peterbilt	0	Diesel	149828.54	400	27
1227	NCMT	LA Sample	2015	Peterbilt	0	Diesel	535282.94	400	9
1228	NCMT	LA Sample	2020	Peterbilt	0	Diesel	149828.54	450	27
1229	NCMT	LA Sample	2014	Peterbilt	0	Diesel	598510.64	400	18
1230	NCMT	LA Sample	2021	Peterbilt	0	Diesel	58874.48	450	18
1231	NCMT	LA Sample	2021	Peterbilt	0	Diesel	58874.48	650	18
1232	NCMT	LA Sample	2022	Peterbilt	0	Diesel	0	650	27
1233	NCMT	LA Sample	2020	Peterbilt	0	Diesel	149828.54	375	36
1234	NCMT	LA Sample	2010	Peterbilt	0	Diesel	805210.84	450	18
1235	NCMT	LA Sample	2016	Peterbilt	0	Diesel	467434.18	400	18
1236	NCMT	LA Sample	2006	Peterbilt	0	Diesel	937974.08	400	9
1237	NCMT	LA Sample	2013	Freightliner	0	Diesel	657117.28	400	18
1238	NCMT	LA Sample	2020	Peterbilt	0	Diesel	149828.54	400	18
1239	NCMT	LA Sample	2007	Peterbilt	0	Diesel	911714.86	425	9
1240	NCMT	LA Sample	2016	Peterbilt	0	Diesel	467434.18	500	9
1241	NCMT	LA Sample	2013	Peterbilt	0	Diesel	657117.28	400	18
1242	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	240424	250	118
1243	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	247410	250	118
1244	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	239330	250	118
1245	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	236459	250	118
1246	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	234215	250	118
1247	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	218326	250	118
1248	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	153362	250	118
1249	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	204137	250	118
1250	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	208527	250	118
1251	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	201633	250	118
1252	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	227325	250	118
1253	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	173734	250	118
1254	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	197926	250	118
1255	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	158429	250	118
1256	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	152609	250	118
1257	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	205919	250	118
1258	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	197450	250	118
1259	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	173492	250	118
1260	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	141020	250	118
1261	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	165259	250	118
1262	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	265341	250	118
1263	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	242779	250	118
1264	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	234895	250	118
1265	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	233837	250	118
1266	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	228643	250	118
1267	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	226369	250	118
1268	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	222450	250	118
1269	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	221115	250	118
1270	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	220244	250	118
1271	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	220221	250	118
1272	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	219715	250	118
1273	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	214950	250	118
1274	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	212489	250	118
1275	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	204363	250	118
1276	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	201119	250	118
1277	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	199672	250	118
1278	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	198742	250	118
1279	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	190940	250	118
1280	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	190920	250	118
1281	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	190290	250	118
1282	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	189564	250	118
1283	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	188659	250	118
1284	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	183470	250	118
1285	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	181962	250	118
1286	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	177760	250	118

1287	NCMT	LA Sample	2018	Freightliner	114SD	Diesel	172853	250	118
1288	NCMT	LA Sample	2022	Peterbuilt	0	Diesel	0	400	118
1289	NCMT	LA Sample	2022	Peterbuilt	0	Diesel	0	400	118
1290	NCMT	LA Sample	2020	peterbuilt	389	Diesel	123278	250	1968
1291	NCMT	Phoenix Sample	2014	Peterbuilt	389	Diesel	509134	300	37
1292	NCMT	Phoenix Sample	2014	Peterbuilt	389	Diesel	512669	250	37
1293	NCMT	Phoenix Sample	2014	Peterbuilt	389	Diesel	367283	250	37
1294	NCMT	Phoenix Sample	2014	Peterbuilt	389	Diesel	681562	250	37
1295	NCMT	Phoenix Sample	2009	Peterbuilt	388	Diesel	673812	250	37
1296	NCMT	Phoenix Sample	2009	Peterbuilt	388	Diesel	732456	250	37
1297	NCMT	Phoenix Sample	2013	Volvo	Volvo	Diesel	476633	100	15
1298	NCMT	Phoenix Sample	2013	Volvo	Volvo	Diesel	504852	300	37
1299	NCMT	Phoenix Sample	2018	BYD	Electric Truck	Battery Electric	928	100	22
1300	NCMT	Phoenix Sample	2018	BYD	Electric Truck	Battery Electric	1003	100	22
1301	NCMT	Phoenix Sample	2017	BYD	Electric Truck	Battery Electric	406	50	7
1302	NCMT	Phoenix Sample	2017	RAM	3500	Diesel	220000	300	111
1303	NCMT	Phoenix Sample	2018	RAM	5500	Diesel	130000	300	37
1304	NCMT	Phoenix Sample	2022	FORD	650	Diesel	26	200	37
1305	NCMT	Phoenix Sample	2020	Dodge RAM	0	Diesel	165665	200	30
1306	NCMT	Phoenix Sample	2018	RAM	5500	Diesel	141000	250	37
1307	NCMT	Phoenix Sample	2014	VOLVO	vnm42T200	Diesel	453256	350	26
1308	NCMT	Phoenix Sample	2019	RAM	5500	Diesel	84022	200	30
1309	NCMT	Phoenix Sample	2017	PETERBILT	389	Diesel	497470	350	15
1310	NCMT	Phoenix Sample	2020	peterbuilt	389	Diesel	123278	250	369
1311	NCMT	Phoenix Sample	2016	chevy	silverado	Diesel	351241	150	5
1312	NCMT	Phoenix Sample	2011	chevy	silverado	Diesel	218356	150	5
1313	NCMT	Phoenix Sample	2022	RAM	3500	Diesel	7350	500	10
1314	NCMT	Phoenix Sample	2022	ram	3500	Diesel	3000	500	10
1315	NCMT	Phoenix Sample	2018	Freightliner	cascadia	Diesel	608000	500	10
1316	NCMT	Phoenix Sample	2019	DODGE	RAM	DIESEL	208904	350	15
1317	NCMT	Phoenix Sample	2017	DODGE	RAM 5500	Diesel	178900	400	15
1318	NCMT	Phoenix Sample	2017	PETERBILT	389	Diesel	632545	350	37
1319	NCMT	Phoenix Sample	2018	PETERBILT	389	Diesel	572788	350	37
1320	NCMT	Phoenix Sample	2018	PETERBILT	389	Diesel	548796	350	37
1321	NCMT	Phoenix Sample	2019	PETERBILT	389	Diesel	564535	350	37
1322	NCMT	Phoenix Sample	2016	PETERBILT	389	Diesel	679990	350	37
1323	NCMT	Phoenix Sample	2013	VOLVO	VAH	Diesel	824401	250	7
1324	NCMT	Phoenix Sample	2012	VOLVO	D-11	Diesel	573631	300	5
1325	NCMT	Phoenix Sample	2015	FREIGHTLINER	CASCADIA	Diesel	466443	100	37
1326	NCMT	Phoenix Sample	2019	FORD	F450	Diesel	187898	650	22
1327	NCMT	Phoenix Sample	2014	Freightliner	cascadia	Diesel	609381	450	3
1328	NCMT	Phoenix Sample	2012	VOLVO	VNL	Diesel	520000	450	22
1329	NCMT	Phoenix Sample	2020	FORD	F350	Diesel	112651	600	10
1330	NCMT	Phoenix Sample	2014	KENWORTH	T680	Diesel	783286	600	10
1331	NCMT	Phoenix Sample	2018	Peterbilt	579	Diesel	447255	700	15
1332	NCMT	Phoenix Sample	2019	Peterbilt	579	Diesel	413022	700	15
1333	NCMT	Phoenix Sample	2013	International	Prostar Plus	Diesel	875527	700	15
1334	NCMT	Phoenix Sample	2012	Peterbilt	389	Diesel	559053	700	15
1335	NCMT	Phoenix Sample	2017	Peterbilt	579	Diesel	4332789	700	15
1336	NCMT	Phoenix Sample	2017	Peterbilt	579	Diesel	393494	700	15
1337	NCMT	Phoenix Sample	2017	Kenworth	T680	Diesel	469500	700	15
1338	NCMT	Phoenix Sample	2014	Kenworth	T660	Diesel	1151303	700	15
1339	NCMT	Phoenix Sample	2017	Kenworth	W900	Diesel	649255	700	15
1340	NCMT	Phoenix Sample	2015	Kenworth	T660	Diesel	600156	700	15
1341	NCMT	Phoenix Sample	2013	International	Prostar	Diesel	567551	700	15
1342	NCMT	Phoenix Sample	2013	Western Star	4900	Diesel	698829	700	15
1343	NCMT	Phoenix Sample	2019	Peterbilt	0	Diesel	236161.54	325	30
1344	NCMT	Phoenix Sample	2007	Sterling	0	Diesel	911714.86	225	15
1345	NCMT	Phoenix Sample	2007	Peterbilt	0	Diesel	911714.86	300	30
1346	NCMT	Phoenix Sample	2007	Peterbilt	0	Diesel	911714.86	100	30
1347	NCMT	Phoenix Sample	2020	Peterbilt	0	Diesel	149828.54	275	15
1348	NCMT	Phoenix Sample	2014	Peterbilt	0	Diesel	598510.64	175	30
1349	NCMT	Phoenix Sample	2014	Peterbilt	0	Diesel	598510.64	240	30
1350	NCMT	Phoenix Sample	2017	Peterbilt	0	Diesel	394964.36	435	7
1351	NCMT	Phoenix Sample	2014	Peterbilt	0	Diesel	598510.64	570	7
1352	NCMT	Phoenix Sample	2012	Peterbilt	0	Diesel	711102.86	155	30
1353	NCMT	Phoenix Sample	2022	Peterbilt	0	Diesel	0	320	30
1354	NCMT	Phoenix Sample	2007	Sterling	0	Diesel	911714.86	120	44
1355	NCMT	Phoenix Sample	2017	Peterbilt	0	Diesel	394964.36	400	7
1356	NCMT	Phoenix Sample	2006	Peterbilt	0	Diesel	937974.08	400	3
1357	NCMT	Phoenix Sample	1999	Peterbilt	0	Diesel	992398.94	450	2
1358	NCMT	Phoenix Sample	2007	Peterbilt	0	Diesel	911714.86	400	2
1359	NCMT	Phoenix Sample	2016	Peterbilt	0	Diesel	467434.18	500	3
1360	NCMT	Phoenix Sample	2016	Volvo	0	Diesel	467434.18	500	3
1361	NCMT	Phoenix Sample	2013	Peterbilt	0	Diesel	657117.28	500	2
1362	NCMT	Phoenix Sample	2014	Peterbilt	0	Diesel	598510.64	500	3
1363	NCMT	Phoenix Sample	2014	Peterbilt	0	Diesel	598510.64	375	3
1364	NCMT	Phoenix Sample	2014	Peterbilt	0	Diesel	598510.64	350	5
1365	NCMT	Phoenix Sample	2014	Peterbilt	0	Diesel	598510.64	450	3
1366	NCMT	Phoenix Sample	2022	Peterbilt	0	Diesel	0	400	3
1367	NCMT	Phoenix Sample	2020	Peterbilt	0	Diesel	149828.54	400	3
1368	NCMT	Phoenix Sample	2019	Peterbilt	0	Diesel	236161.54	500	3
1369	NCMT	Phoenix Sample	2019	Volvo	0	Diesel	236161.54	450	3
1370	NCMT	Phoenix Sample	2020	Peterbilt	0	Diesel	149828.54	500	3
1371	NCMT	Phoenix Sample	2019	Peterbilt	0	Diesel	236161.54	600	2
1372	NCMT	Phoenix Sample	2020	Peterbilt	0	Diesel	149828.54	400	5
1373	NCMT	Phoenix Sample	2015	Peterbilt	0	Diesel	535282.94	400	2
1374	NCMT	Phoenix Sample	2020	Peterbilt	0	Diesel	149828.54	450	5
1375	NCMT	Phoenix Sample	2014	Peterbilt	0	Diesel	598510.64	400	3
1376	NCMT	Phoenix Sample	2021	Peterbilt	0	Diesel	58874.48	450	3
1377	NCMT	Phoenix Sample	2021	Peterbilt	0	Diesel	58874.48	650	3
1378	NCMT	Phoenix Sample	2022	Peterbilt	0	Diesel	0	650	5
1379	NCMT	Phoenix Sample	2020	Peterbilt	0	Diesel	149828.54	375	7
1380	NCMT	Phoenix Sample	2010	Peterbilt	0	Diesel	805210.84	450	3
1381	NCMT	Phoenix Sample	2016	Peterbilt	0	Diesel	467434.18	400	3
1382	NCMT	Phoenix Sample	2006	Peterbilt	0	Diesel	937974.08	400	2
1383	NCMT	Phoenix Sample	2013	Freightliner	0	Diesel	657117.28	400	3
1384	NCMT	Phoenix Sample	2020	Peterbilt	0	Diesel	149828.54	400	3
1385	NCMT	Phoenix Sample	2007	Peterbilt	0	Diesel	911714.86	425	2
1386	NCMT	Phoenix Sample	2016	Peterbilt	0	Diesel	467434.18	500	2
1387	NCMT	Phoenix Sample	2013	Peterbilt	0	Diesel	657117.28	400	3
1388	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	240424	250	22
1389	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	247410	250	22
1390	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	239330	250	22
1391	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	236459	250	22
1392	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	234215	250	22
1393	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	218326	250	22
1394	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	153362	250	22
1395	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	204137	250	22
1396	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	208527	250	22
1397	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	201633	250	22
1398	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	227325	250	22
1399	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	173734	250	22
1400	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	197926	250	22
1401	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	158429	250	22
1402	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	152609	250	22
1403	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	205919	250	22

1404	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	197450	250	22
1405	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	173492	250	22
1406	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	141020	250	22
1407	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	165259	250	22
1408	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	265341	250	22
1409	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	242779	250	22
1410	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	234895	250	22
1411	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	233837	250	22
1412	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	228643	250	22
1413	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	226369	250	22
1414	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	222450	250	22
1415	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	221115	250	22
1416	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	220244	250	22
1417	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	220221	250	22
1418	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	219715	250	22
1419	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	214950	250	22
1420	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	212489	250	22
1421	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	204363	250	22
1422	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	201119	250	22
1423	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	199672	250	22
1424	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	198742	250	22
1425	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	190940	250	22
1426	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	190920	250	22
1427	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	190290	250	22
1428	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	189564	250	22
1429	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	188659	250	22
1430	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	183470	250	22
1431	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	181962	250	22
1432	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	177760	250	22
1433	NCMT	Phoenix Sample	2018	Freightliner	114SD	Diesel	172853	250	22
1434	NCMT	Phoenix Sample	2022	Peterbuilt	0	Diesel	0	400	22
1435	NCMT	Phoenix Sample	2022	Peterbuilt	0	Diesel	0	400	22
1436	NCMT	Phoenix Sample	2020	peterbuilt	389	Diesel	123278	250	369
1437	NCMT	Bulk Goods Sample	2014	Peterbuilt	389	Diesel	509134	300	7
1438	NCMT	Bulk Goods Sample	2014	Peterbuilt	389	Diesel	512669	250	7
1439	NCMT	Bulk Goods Sample	2014	Peterbuilt	389	Diesel	367283	250	7
1440	NCMT	Bulk Goods Sample	2014	Peterbuilt	389	Diesel	681562	250	7
1441	NCMT	Bulk Goods Sample	2009	Peterbuilt	388	Diesel	673812	250	7
1442	NCMT	Bulk Goods Sample	2009	Peterbuilt	388	Diesel	732456	250	7
1443	NCMT	Bulk Goods Sample	2013	Volvo	Volvo	Diesel	476633	100	3
1444	NCMT	Bulk Goods Sample	2013	Volvo	Volvo	Diesel	504852	300	7
1445	NCMT	Bulk Goods Sample	2018	BYD	Electric Truck	Battery Electric	928	100	4
1446	NCMT	Bulk Goods Sample	2018	BYD	Electric Truck	Battery Electric	1003	100	4
1447	NCMT	Bulk Goods Sample	2017	BYD	Electric Truck	Battery Electric	406	50	1
1448	NCMT	Bulk Goods Sample	2017	RAM	3500	Diesel	220000	300	21
1449	NCMT	Bulk Goods Sample	2018	RAM	5500	Diesel	130000	300	7
1450	NCMT	Bulk Goods Sample	2022	FORD	650	Diesel	26	200	7
1451	NCMT	Bulk Goods Sample	2020	Dodge RAM	0	Diesel	165665	200	6
1452	NCMT	Bulk Goods Sample	2018	RAM	5500	Diesel	141000	250	7
1453	NCMT	Bulk Goods Sample	2014	VOLVO	vnm42T200	Diesel	453256	350	5
1454	NCMT	Bulk Goods Sample	2019	RAM	5500	Diesel	84022	200	6
1455	NCMT	Bulk Goods Sample	2017	PETERBILT	389	Diesel	497470	350	3
1456	NCMT	Bulk Goods Sample	2020	peterbuilt	389	Diesel	123278	250	69
1457	NCMT	Bulk Goods Sample	2016	chevy	silverado	Diesel	351241	150	1
1458	NCMT	Bulk Goods Sample	2011	chevy	silverado	Diesel	218356	150	1
1459	NCMT	Bulk Goods Sample	2022	RAM	3500	Diesel	7350	500	2
1460	NCMT	Bulk Goods Sample	2022	ram	3500	Diesel	3000	500	2
1461	NCMT	Bulk Goods Sample	2018	Freightliner	cascadia	Diesel	608000	500	2
1462	NCMT	Bulk Goods Sample	2019	DODGE	RAM	DIESEL	208904	350	3
1463	NCMT	Bulk Goods Sample	2017	DODGE	RAM 5500	Diesel	178900	400	3
1464	NCMT	Bulk Goods Sample	2017	PETERBILT	389	Diesel	632545	350	7
1465	NCMT	Bulk Goods Sample	2018	PETERBILT	389	Diesel	572788	350	7
1466	NCMT	Bulk Goods Sample	2018	PETERBILT	389	Diesel	548796	350	7
1467	NCMT	Bulk Goods Sample	2019	PETERBILT	389	Diesel	564535	350	7
1468	NCMT	Bulk Goods Sample	2016	PETERBILT	389	Diesel	679990	350	7
1469	NCMT	Bulk Goods Sample	2013	VOLVO	VAH	Diesel	824401	250	1
1470	NCMT	Bulk Goods Sample	2012	VOLVO	D-11	Diesel	573631	300	1
1471	NCMT	Bulk Goods Sample	2015	FREIGHTLINER	CASCADIA	Diesel	466443	100	7
1472	NCMT	Bulk Goods Sample	2019	FORD	F450	Diesel	187898	650	4
1473	NCMT	Bulk Goods Sample	2014	Freightliner	cascadia	Diesel	609381	450	1
1474	NCMT	Bulk Goods Sample	2012	VOLVO	VNL	Diesel	520000	450	4
1475	NCMT	Bulk Goods Sample	2020	FORD	F350	Diesel	112651	600	2
1476	NCMT	Bulk Goods Sample	2014	KENWORTH	T680	Diesel	783286	600	2
1477	NCMT	Bulk Goods Sample	2018	Peterbilt	579	Diesel	447255	700	3
1478	NCMT	Bulk Goods Sample	2019	Peterbilt	579	Diesel	413022	700	3
1479	NCMT	Bulk Goods Sample	2013	International	Prostar Plus	Diesel	875527	700	3
1480	NCMT	Bulk Goods Sample	2012	Peterbilt	389	Diesel	559053	700	3
1481	NCMT	Bulk Goods Sample	2017	Peterbilt	579	Diesel	4332789	700	3
1482	NCMT	Bulk Goods Sample	2017	Peterbilt	579	Diesel	393494	700	3
1483	NCMT	Bulk Goods Sample	2017	Kenworth	T680	Diesel	469500	700	3
1484	NCMT	Bulk Goods Sample	2014	Kenworth	T660	Diesel	1151303	700	3
1485	NCMT	Bulk Goods Sample	2017	Kenworth	W900	Diesel	649255	700	3
1486	NCMT	Bulk Goods Sample	2015	Kenworth	T660	Diesel	600156	700	3
1487	NCMT	Bulk Goods Sample	2013	International	Prostar	Diesel	567551	700	3
1488	NCMT	Bulk Goods Sample	2013	Western Star	4900	Diesel	698829	700	3
1489	NCMT	Bulk Goods Sample	2019	Peterbilt	0	Diesel	236161.54	325	6
1490	NCMT	Bulk Goods Sample	2007	Sterling	0	Diesel	911714.86	225	3
1491	NCMT	Bulk Goods Sample	2007	Peterbilt	0	Diesel	911714.86	300	6
1492	NCMT	Bulk Goods Sample	2007	Peterbilt	0	Diesel	911714.86	100	6
1493	NCMT	Bulk Goods Sample	2020	Peterbilt	0	Diesel	149828.54	275	3
1494	NCMT	Bulk Goods Sample	2014	Peterbilt	0	Diesel	598510.64	175	6
1495	NCMT	Bulk Goods Sample	2014	Peterbilt	0	Diesel	598510.64	240	6
1496	NCMT	Bulk Goods Sample	2017	Peterbilt	0	Diesel	394964.36	435	1
1497	NCMT	Bulk Goods Sample	2014	Peterbilt	0	Diesel	598510.64	570	1
1498	NCMT	Bulk Goods Sample	2012	Peterbilt	0	Diesel	711102.86	155	6
1499	NCMT	Bulk Goods Sample	2022	Peterbilt	0	Diesel	0	320	6
1500	NCMT	Bulk Goods Sample	2007	Sterling	0	Diesel	911714.86	120	8
1501	NCMT	Bulk Goods Sample	2017	Peterbilt	0	Diesel	394964.36	400	1
1502	NCMT	Bulk Goods Sample	2006	Peterbilt	0	Diesel	937974.08	400	1
1503	NCMT	Bulk Goods Sample	2016	Peterbilt	0	Diesel	467434.18	500	1
1504	NCMT	Bulk Goods Sample	2016	Volvo	0	Diesel	467434.18	500	1
1505	NCMT	Bulk Goods Sample	2014	Peterbilt	0	Diesel	598510.64	500	1
1506	NCMT	Bulk Goods Sample	2014	Peterbilt	0	Diesel	598510.64	375	1
1507	NCMT	Bulk Goods Sample	2014	Peterbilt	0	Diesel	598510.64	350	1
1508	NCMT	Bulk Goods Sample	2014	Peterbilt	0	Diesel	598510.64	450	1
1509	NCMT	Bulk Goods Sample	2022	Peterbilt	0	Diesel	0	400	1
1510	NCMT	Bulk Goods Sample	2020	Peterbilt	0	Diesel	149828.54	400	1
1511	NCMT	Bulk Goods Sample	2019	Peterbilt	0	Diesel	236161.54	500	1
1512	NCMT	Bulk Goods Sample	2019	Volvo	0	Diesel	236161.54	450	1
1513	NCMT	Bulk Goods Sample	2020	Peterbilt	0	Diesel	149828.54	500	1
1514	NCMT	Bulk Goods Sample	2020	Peterbilt	0	Diesel	149828.54	400	1
1515	NCMT	Bulk Goods Sample	2020	Peterbilt	0	Diesel	149828.54	450	1
1516	NCMT	Bulk Goods Sample	2014	Peterbilt	0	Diesel	598510.64	400	1
1517	NCMT	Bulk Goods Sample	2021	Peterbilt	0	Diesel	58874.48	450	1
1518	NCMT	Bulk Goods Sample	2021	Peterbilt	0	Diesel	58874.48	650	1
1519	NCMT	Bulk Goods Sample	2022	Peterbilt	0	Diesel	0	650	1
1520	NCMT	Bulk Goods Sample	2020	Peterbilt	0	Diesel	149828.54	375	1

1521	NCMT	Bulk Goods Sample	2010	Peterbilt	0	Diesel	805210.84	450	1
1522	NCMT	Bulk Goods Sample	2016	Peterbilt	0	Diesel	467434.18	400	1
1523	NCMT	Bulk Goods Sample	2013	Freightliner	0	Diesel	657117.28	400	1
1524	NCMT	Bulk Goods Sample	2020	Peterbilt	0	Diesel	149828.54	400	1
1525	NCMT	Bulk Goods Sample	2013	Peterbilt	0	Diesel	657117.28	400	1
1526	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	240424	250	4
1527	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	247410	250	4
1528	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	239330	250	4
1529	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	236459	250	4
1530	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	234215	250	4
1531	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	218326	250	4
1532	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	153362	250	4
1533	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	204137	250	4
1534	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	208527	250	4
1535	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	201633	250	4
1536	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	227325	250	4
1537	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	173734	250	4
1538	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	197926	250	4
1539	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	158429	250	4
1540	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	152609	250	4
1541	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	205919	250	4
1542	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	197450	250	4
1543	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	173492	250	4
1544	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	141020	250	4
1545	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	165259	250	4
1546	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	265341	250	4
1547	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	242779	250	4
1548	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	234895	250	4
1549	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	233837	250	4
1550	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	228643	250	4
1551	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	226369	250	4
1552	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	222450	250	4
1553	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	221115	250	4
1554	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	220244	250	4
1555	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	220221	250	4
1556	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	219715	250	4
1557	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	214950	250	4
1558	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	212489	250	4
1559	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	204363	250	4
1560	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	201119	250	4
1561	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	199672	250	4
1562	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	198742	250	4
1563	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	190940	250	4
1564	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	190920	250	4
1565	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	190290	250	4
1566	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	189564	250	4
1567	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	188659	250	4
1568	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	183470	250	4
1569	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	181962	250	4
1570	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	177760	250	4
1571	NCMT	Bulk Goods Sample	2018	Freightliner	114SD	Diesel	172853	250	4
1572	NCMT	Bulk Goods Sample	2022	Peterbuilt	0	Diesel	0	400	4
1573	NCMT	Bulk Goods Sample	2022	Peterbuilt	0	Diesel	0	400	4
1574	NCMT	Bulk Goods Sample	2020	peterbuilt	389	Diesel	123278	250	69

APPENDIX B

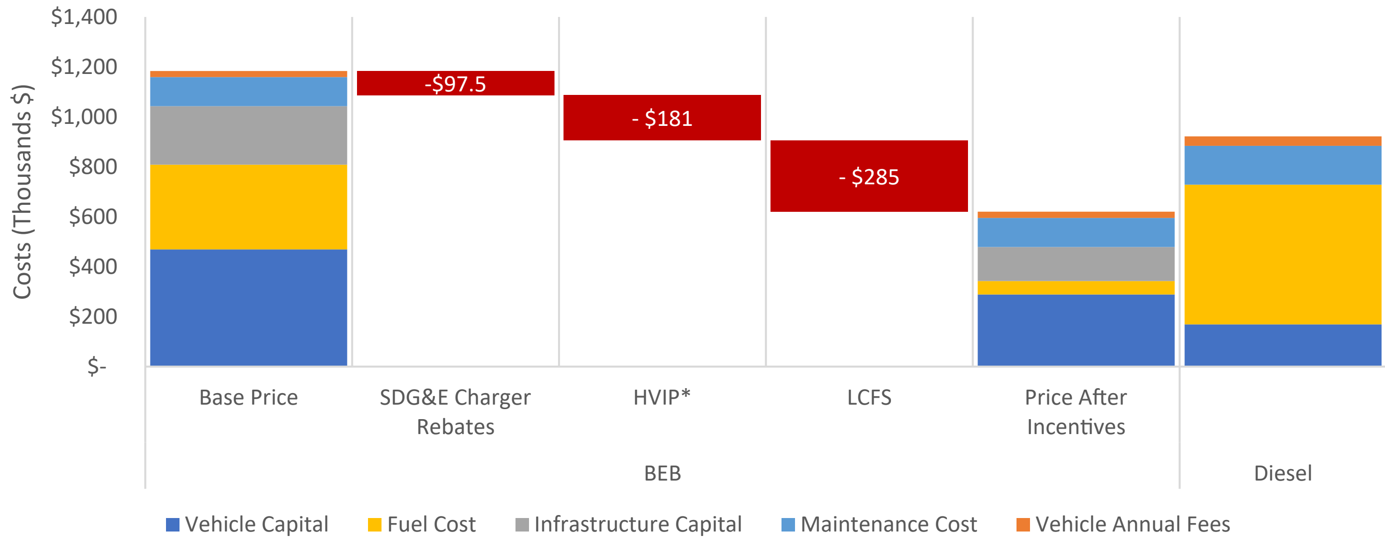
TOTAL COST OF OWNERSHIP AND PORT INCENTIVE ANALYSES

TOTAL COST OF OWNERSHIP AND PORT INCENTIVE ANALYSES

1.1 TOTAL COST OF OWNERSHIP

The higher initial capital cost of BETs, as compared to diesel trucks, is one of the main barriers to entry for truck owners. As shown in Figure 1, the cost of a BET (over a 13-year useful life) is forecasted to be $262,000 higher than that of a diesel truck, assuming no incentives. This $262,000 can be reduced and potentially save truck owners money if a sufficient amount of incentives are applied. In the best-case scenario, in which truck owners can secure all available state and local funding, the TCO of a BET can be reduced to 67% of a diesel truck.

Figure 1. Total Cost of Ownership of a BET and a Diesel Truck

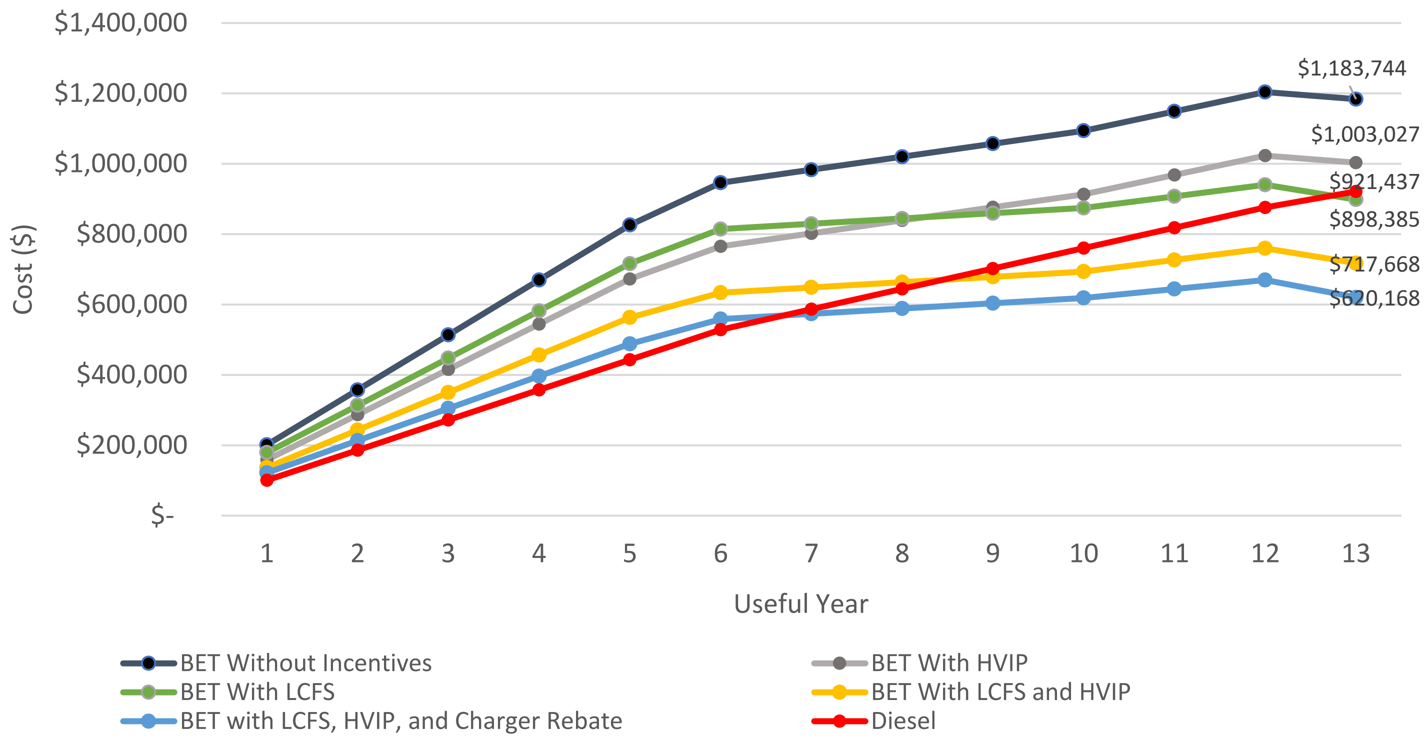


Source: WSP

Figure 2 illustrates the TCO of a BET over its lifetime for different incentives scenarios. At the end of its lifetime, the TCO of a BET will be less than that of a diesel truck if it can at least utilize LCFS credits. The TCO parity will improve if the BET can receive more incentives, such as HVIP and SDG&E charger rebates. Hence, incentives are essential to make a BET a cost-competitive alternative to its diesel counterpart. Upfront capital incentives will decrease the initial barrier to BET adoption. However, long-term fuel credit incentives are essential to reduce the overall TCO.

It is important to note that these funding programs are not guaranteed for each truck because of the limited funding and the programs' competitiveness. Therefore, the Port can consider adding incentive program(s) on top of currently available incentives to further reduce the cost-anxiety of transitioning to BETs.

Figure 2. BET TCO by Various Incentives Scenarios



Source: WSP

1.2 PORT-PROVIDED INCENTIVES

The TCO analysis (Figure 1) concludes that in the worst-case scenario in which the truck does not receive any incentives, the TCO of a BET is approximately $262K higher than that of a diesel truck. Meanwhile, if the truck receives HVIP, LCFS credits, and charger rebates, the TCO can be significantly lower – potentially resulting in cost savings. However, truck owners will still experience higher costs in the first five years of ownership due to the amortization of the vehicle and charger costs.

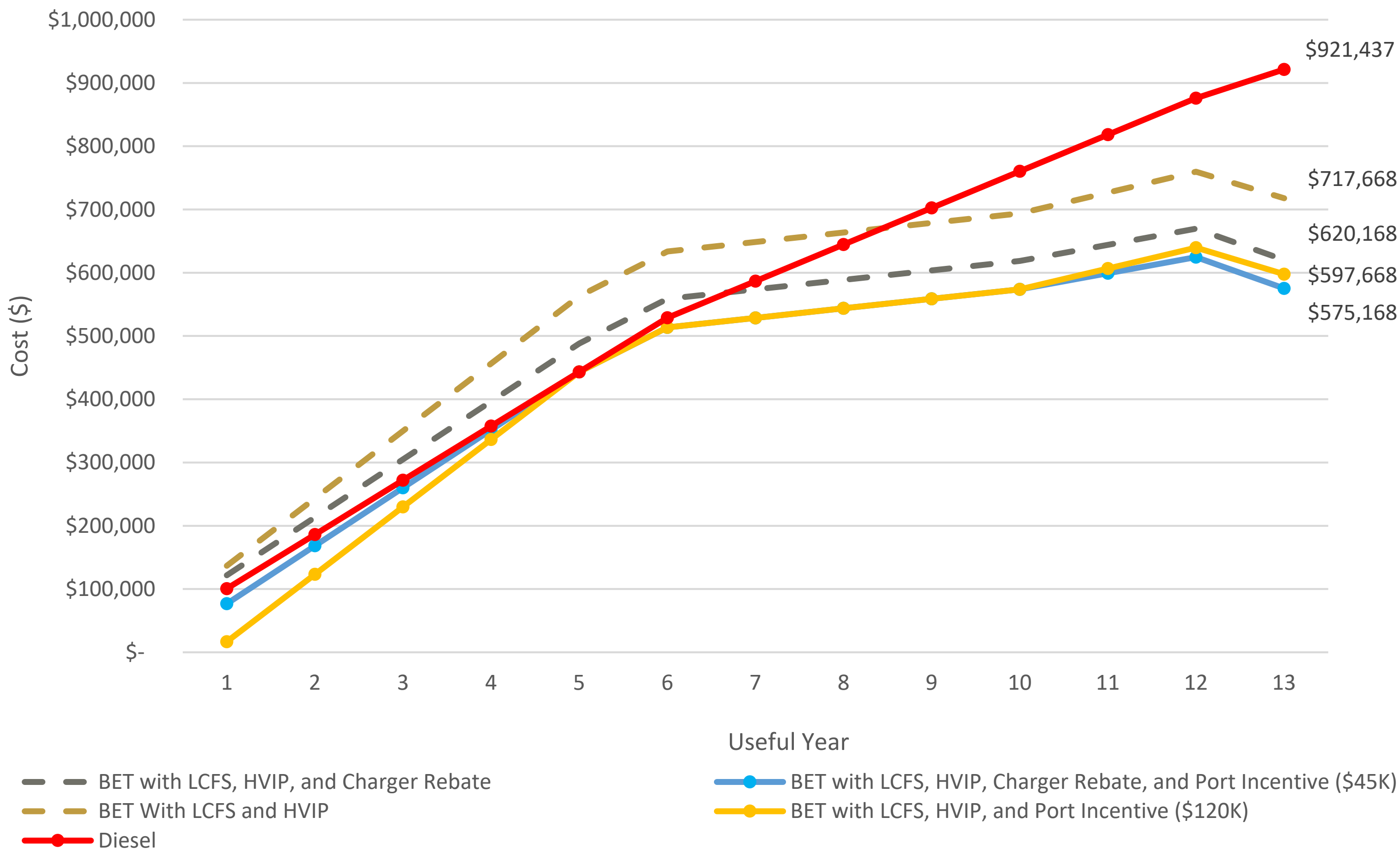
To further reduce the costs of BETs, the Port can target incentives that will reduce the cost gap identified in the TCO analysis. If truck owners can secure other incentives (e.g., LCFS, HVIP, and a charger rebate) and the Port can provide an incentive between $45K (Option 1) and $120K (Option 2) per truck, the funding will cover the higher costs experienced by truck owners during the first five years of BET ownership (Table 1). In the worst-case scenario, no incentives, the same amounts can cover between 17% and 46% of the TCO difference between a BET and a diesel truck. The total costs of the programs are approximately $4-7M and $10-18M in 2026 for Option 1 and Option 2, respectively. Figure 3 illustrates how port incentives will lower the upfront costs of BET adoption.

Table 1. Proposed Incentives

Truck Owner Incentives	Port-Provided Incentives		
	Option 1: $4-7 million ($45K/BET)	Option 2: $10-18 million ($120K/BET)	Option 3: $23-40 million ($262K/BET)
LCFS + HVIP + Charger Rebate	Fully covers the cost. gap in the first five years of adoption	TCO savings	TCO savings
LCFS + HVIP	Covers approximately 30% of the cost gap in the first five years of adoption	Fully covers the cost. gap in the first five years of adoption	TCO savings
No Incentives	Covers 17% of the TCO difference	Covers 46% of the TCO difference	Fully covers the TCO difference

Source: WSP
Note: Costs do not include public opportunity charging stations. Costs rounded to the nearest million.

Figure 3. BET TCO with Port Incentives



1.2.1 CONSIDERATIONS

An incentive program will likely require new forms of legal and business arrangements between the Port and the truck operators who receive an incentive. An incentive can be provided upfront to help a truck operator procure a ZET, or it can be paid based on performance metrics such as the number of truck trips that are conducted by a ZET which enters the marine terminals to load/unload freight.

The structure of the incentive program should consider equal opportunity enhancements based on small business status, veteran- and woman-owned tuck operators, and ADA status of the potential recipients. Other enhancements could consider higher incentives based on early retirement of existing diesel trucks.