THE EASTERN TRANSPORTATION COALITION

CONNECTING FOR SOLUTIONS

Future of Transportation Funding

2025/26 Motor Carrier Work: Unwrapping Complexities

Phase 5 Final Report · July 2026

Prepared by NEWROAD CONSULTING

Executive Summary

Introduction

Highway transportation is the backbone of the U.S. economy, and roads are the workplace for more than 3.5 million[1] men and women who operate trucks every day to move goods across the country.

Investing in transportation is investing in opportunity, resilience, and the wellbeing of all Americans. Concerningly, **the funds that the country's roads, bridges, and highways rely on are under pressure.** Fuel tax revenues face long-term decline as vehicles become more efficient and as electric vehicle adoption grows. At the same time, the cost of maintaining and operating the transportation network continues to increase.

Poor road conditions, congestion, delays, and unreliable infrastructure directly affect truck operations, safety, and costs.

Trucking is a significant user and funder of the transportation system. **Nationwide, trucks make up about 5% of all vehicles and account for about 10% of vehicle miles traveled, yet the trucking industry contributes an estimated 42% of Highway Trust Fund revenue[2].** The industry recognizes the need to pay to keep the transportation system viable. At the same time, motor carriers have been clear that future funding solutions should not place the burden on trucks alone.

The complex motor carrier regulatory requirements designed to ensure highway safety and to support interstate commerce must be considered when evaluating any changes to the existing funding mechanism. The goal should be to **keep the system simple and avoid adding burden to the diverse and complex operating realities of the trucking industry.**

The Eastern Transportation Coalition (Coalition), under the U.S. Department of Transportation's Surface Transportation Systems Funding Alternative (STSFA) program, has brought motor carrier stakeholders to the table under four grant cycles. This work has included real-world pilots with motor carriers to examine the issues, challenges, and needs that must be considered in developing and evaluating a future transportation funding framework.

The Coalition's role is to provide policymakers with real-world data, practical analysis, and stakeholder-informed insights rather than advocate for a single preferred solution.

This report shares the results from the Phase 5 STSFA grant program[3] work, which focused on operational impacts and governance considerations of potential future transportation funding solutions for trucks, informed by perspectives from motor carriers, agencies, technology providers, and key stakeholders.

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[1] American Trucking Association. Economics and Industry Data. Retrieved June 17th, 2026. https://www.trucking.org/economics-and-industry-data

[2] Calculations based on 2023 FHWA Highway Statistics.

[3] FHWA STSFA Grant Program Page: https://ops.fhwa.dot.gov/ubarm/

Project Overview

The Phase 5 work was organized under the project theme **Unwrapping Complexities**. The theme reflects the purpose of the work: to look beyond whether a future truck funding approach can be technically measured or calculated, and to examine what would be required for it to work in practice. This grant phase also broadened the discussion by comparing a mileage-based approach with other emerging approaches, including a kWh-based fee and flat annual fees.

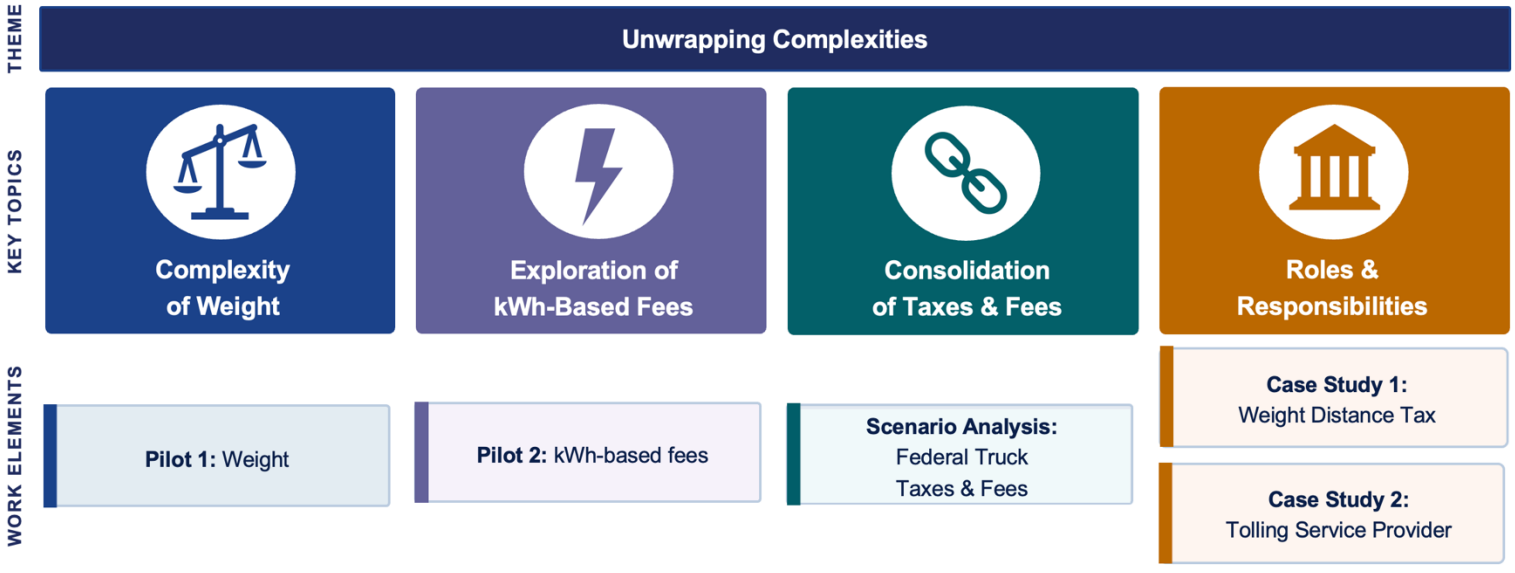
The project was centered around four topics: **Complexity of Weight, Exploration of kWh-based Fees, Consolidation of Taxes and Fees, and Roles and Responsibilities**.

To address these topics, Phase 5 included **five distinct work elements: two pilots, one scenario analysis, and two case studies.** The two pilots focused on weight and kWh-based fees. The scenario analysis examined federal truck-related taxes and fees. The two case studies supported the roles and responsibilities work. Together, these work elements examined how future truck funding approaches could affect motor carriers, agencies, and other entities involved in reporting, payment, audit, enforcement, and system administration.

The weight pilot analyzed data from three different carrier operations, across 670 trips to examine how weight changes in real-world operations and what weight-related data and records are available in practice. The kWh pilot collected operational data from 12 electric trucks across Classes 3, 7, and 8, representing four truck manufacturers and five models in both intrastate and interstate operations. These data supported the analysis of mileage, energy consumption, charging data availability, and the practical considerations of a kWh-based fee.

The federal truck tax and fee scenario analysis examined where administrative burden sits today and how different simplified structures could affect motor carriers. The roles and responsibilities work included two case studies. One reviewed a state weight-distance tax to understand how a state-administered truck fee operates in practice. The other reviewed a tolling service provider to understand account management, customer service, billing, and operational support functions that may be relevant to a future multi-state truck funding framework.

PHASE 5 WORK PROGRAM: Four Topics, Five Work Elements



Key Findings

#1 Registered Weight Remains the Most Practical Basis for Rate Setting

Weight matters in truck rate setting because trucking operations differ widely, and vehicle weight is one way to recognize those differences. For trucks, however, weight is not a single simple value. A truck's weight can vary by trip, within a trip, and across normal daily operations.

Actual operating weight would most closely reflect what a truck weighs at a given point in time. However, that precision is difficult to use as a rate-setting basis at scale today. The Phase 5 weight pilot showed that the data needed to support an actual-weight-based rate structure is not consistently available or verifiable through existing systems and processes. Registered weight is less precise because it does not capture real-time load variation. However, for interstate heavy commercial vehicles, it is already documented, relatively stable, and verifiable through existing records. Based on the Phase 5 work and previous STSFA grant work, registered weight remains the most practical basis currently available for weight-based rate setting.

#2 A kWh-Based Fee Is Not a Practical Transportation Funding Solution Under Current Conditions

A kWh-based fee can appear attractive because it feels familiar. A fee on electricity can look like the electric version of the fuel tax model: energy is used, energy is taxed, and the tax supports the transportation system. The Phase 5 kWh-based fee pilot showed that the concept would be difficult to operate at scale under current conditions. A kWh-based fee can be calculated, but the charging data needed to support it was not consistently available, reliable, or standardized across vehicles and reporting systems. A trucks energy consumption also reflects more than road use, including weather, charging conditions, route, payload, and driving patterns. Compared with a distance-based approach, where a mile remains a mile regardless of operating conditions, a kWh-based fee would be more variable and harder to administer consistently.

#3 Flat Fees May Simplify Payment, but They Weaken the Link Between Road Use and Payment

Consolidation is attractive because motor carriers manage many taxes, fees, filings, records, accounts, and audits. But the value of consolidation depends on what is being consolidated and how a new structure is designed. The Phase 5 work showed that reducing the number of taxes or fees does not automatically reduce administrative burden, especially where taxes or fees are already collected upstream or do not require recurring carrier reporting.

In addition, administrative burden is only one part of the consolidation question. The structure of the tax or fee also determines how costs are distributed. The scenario analysis showed that revenue-neutral does not mean impact-neutral. Flat annual fees make this tradeoff most visible. They may be simpler to explain and administer, but they assign the same amount of fees regardless of actual miles traveled. This can shift cost responsibility between different operating profiles, with lower-mileage operations facing a higher effective cost per mile than higher-mileage operations.

#4 System Design Determines Administrative Cost, Burden, and Acceptance

A future truck funding framework will not be judged simply by whether miles can be measured or transactions can be processed. The roles and responsibilities work showed that administrative cost and burden are shaped by system design. Carriers want simplicity at the front end. Agencies need control, auditability, revenue assurance, and enforceability at the back end. A workable framework must do both.

Phase 5 identified design decisions that need to be worked through before a broader implementation path is considered, including where key functions sit, how responsibilities are assigned, how service providers or clearinghouse functions may be included, and who remains accountable. The work also showed that simplicity depends on perspective and that upstream clarity reduces downstream burden. Working through these questions collaboratively and early can help reduce downstream burden, protect revenue, balance risk, and support a framework that is manageable for both motor carriers and agencies.

Future Work

Any change to the existing transportation funding structure must be tested against real operating conditions before broader implementation is considered. A seemingly simple approach can create unintended consequences if the requirements, responsibilities, data needs, audit functions, enforcement processes, and impacts on motor carriers and agencies are not fully understood.

Future work should test governance and coordination, compliance and enforcement, and explore the potential impact on intrastate and smaller commercial vehicles that are not currently included in existing interstate reporting structures. Exploring these areas will help define what is needed for a future truck funding framework to work in practice.

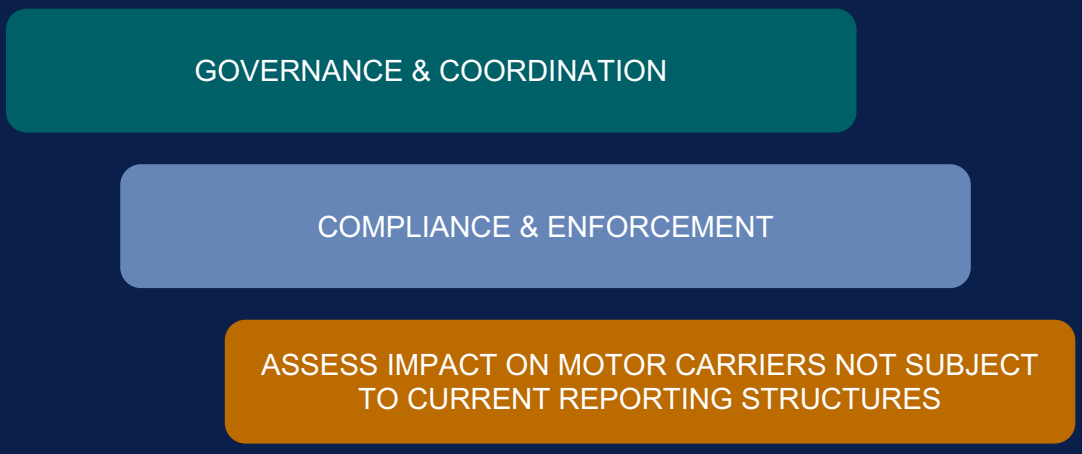


Figure 1. Key future work areas.

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2025/26 Future Funding Truck Pilot

Background

Since 2018, the Coalition has highlighted the need to include the trucking industry in the national discussion on future transportation funding solutions. Trucking is a significant user and funder of the nation's roadways and is vital to meeting daily needs and supporting the U.S. economy. However, **due to the industry's complex and highly regulated nature, any changes to the funding system require careful consideration**.

Before this Phase 5 grant work, the Coalition conducted three truck-focused pilots under the STSFA grant program to examine different elements of a potential mileage-based user fees (MBUF) approach. Table 1 summarizes the key findings from those pilots.

Multi-State Truck Pilot 2018/19	National Truck Pilot 2020/21	International Truck Pilot 2022/23
1. Bringing the Trucking Industry's Voice to the Table is Essential	1. Understanding the Complexity of the User Matters	1. MBUF Can Be Applied to All Commercial Vehicles Regardless of Weight, Fuel Type, International Travel, and Type of Operation
2. Trucks Cannot Simply be Treated as Big Cars in an MBUF System	2. Real -World Pilots Reduce Privacy Concerns	2. A Weight-Based MBUF has the Potential to Provide a More Transparent Link Between usage and Cost of Road Use
3. Existing Regulations Provide Guidance for MBUF Implementation	3. Leveraging Technology Creates Solutions	3. Uniformity Does Not Have to be Identical to be Scalable and Has the Potential to Substantially Decrease Administrative Costs on both Motor Carrier and Agency Side
4. One Rate for All Trucks Doesn't work	4. A Tiered Rate Based on MPG Doesn't Work	4. Clearinghouse Frameworks Can be Adapted to Handle MBUF But Roles and Responsibilities Need to be Clearly Defined
5. Further Need for Education and Outreach	5. Customized Outreach Needed to Move MBUF Forward	

Table 1. Key findings from the Coalition's previous truck pilots.

Through real-world pilots, stakeholder engagement, and technical analysis, the Coalition continues to examine the issues, challenges, and practical needs that must be considered when evaluating future funding approaches for commercial vehicles.

The Coalition is neutral on which transportation funding solution, or combination of solutions, will ultimately be best to provide the country with a sustainable transportation funding source, but believes that real-world pilot projects and data, combined with a systems level analysis, will serve to inform and advance the evaluation process.

Key Stakeholder Engagement

The Coalition is committed to ensuring that any potential shifts in the transportation funding model prioritize fairness, sustainability, and the long-term interests of all parties involved. To support this, the Coalition fosters open dialogue and transparency throughout the decision-making process. Utilizing a collaborative approach, the Coalition seeks to identify practical solutions that address the challenges faced by the trucking industry and the broader transportation network.

As a leader in the exploration of practical future funding approaches, the Coalition seeks to provide decision makers with real-world data and analysis that can support a robust and adaptable transportation system. **The Coalition invites stakeholders to engage in this conversation, recognizing that any future framework will need to reflect the practical realities of those affected by, responsible for, and involved in operating the system.**

Strategic stakeholder engagement provides an opportunity to address questions, concerns, and misconceptions about future transportation funding options. To determine the viability of these options, each approach, whether MBUF, a kWh-based fee, a flat annual fee, or some combination of approaches, needs to be tested against real-world questions: Would this work in practice? Who would carry the burden? What would it mean for motor carriers, agencies, and the systems that support them?

For Phase 5, stakeholder engagement continued through presentations, hearings, meetings, workshops, media outreach, and discussions with targeted stakeholder groups.

As in previous phases, the work was guided by the Motor Carrier Working Group (MCWG) and the TETC MBUF Steering Committee.

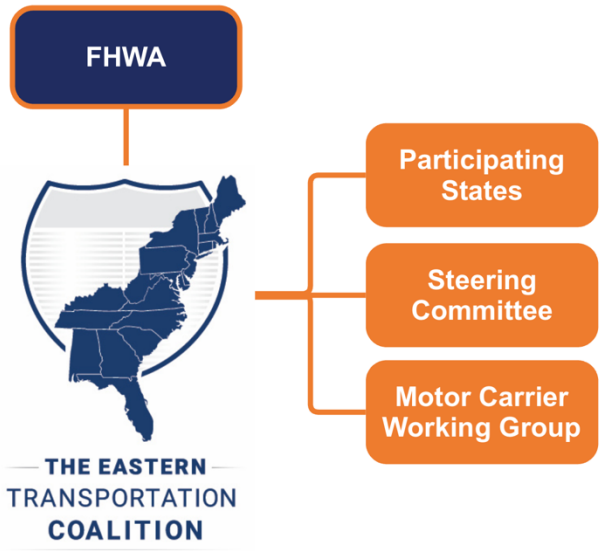


Figure 2. Project governance structure for the TETC motor carrier work.

Motor Carrier Working Group (MCWG)

The MCWG serves as a critical stakeholder group, offering guidance and input on trucking needs, operational realities, and commercial vehicle pilot concepts. Established by the Coalition during the 2018/19 Multi-State Truck Pilot, this group provides a forum to raise and evaluate diverse viewpoints, concerns, and recommendations about future transportation funding solutions.

since 2018

15

MOTOR CARRIER WORKING GROUP MEETINGS

~2 meetings / year

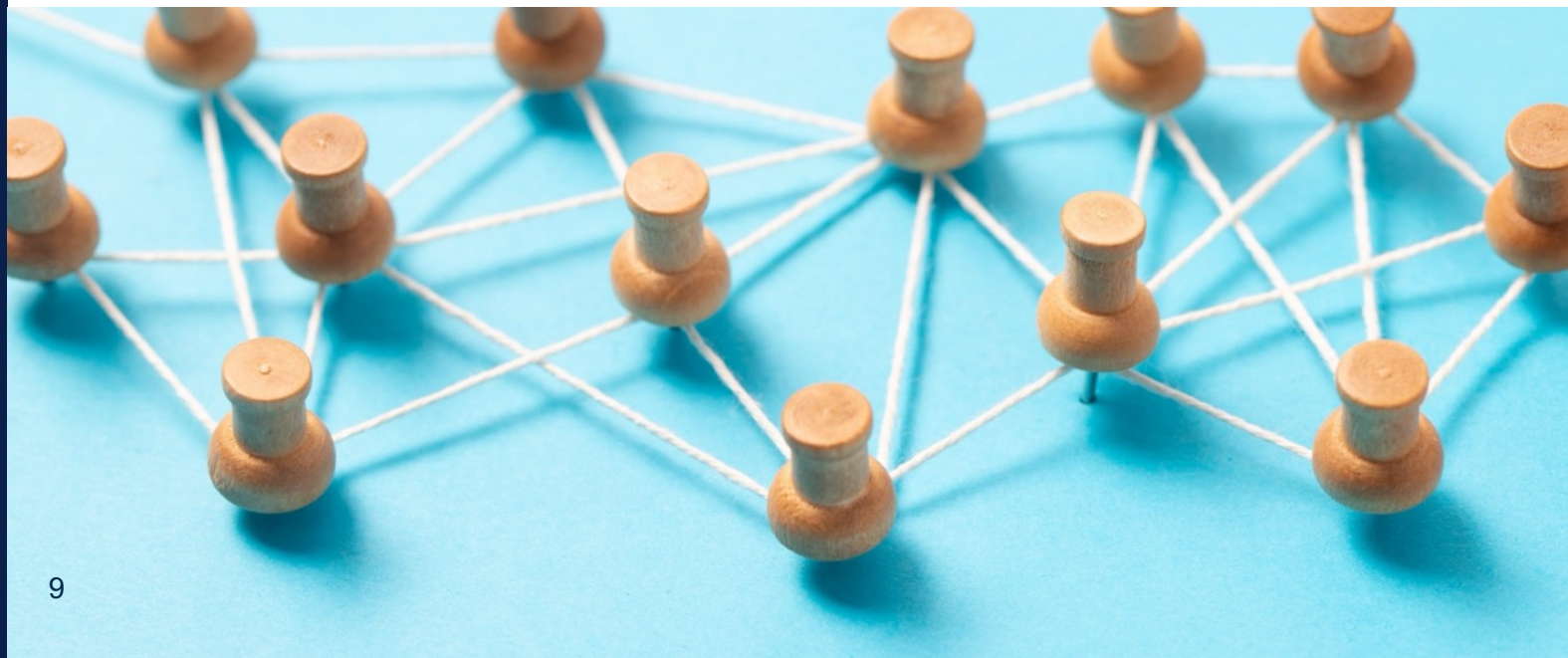
To ensure a broad range of perspectives, the MCWG includes approximately 25 stakeholders from across the motor carrier and transportation community. Members include representatives from major trucking associations, shippers, regulators, trucking companies, and trucking manufacturers. Notable members include the American Trucking Association (ATA), Truckload Carriers Association (TCA), Owner-Operator's Independent Drivers Association (OOIDA), Coalition State motor transport agencies, International Registration Plan (IRP), International Fuel Tax Agreement (IFTA), and motor carrier companies, encompassing rental, leasing, and logistics companies. Due to the sensitive nature of transportation funding discussions, individual members and discussions are kept confidential.

Since its inception, the MCWG met 15 times. During the Phase 5 grant the MCWG convened three times to share and discuss project work. Further information on the meetings can be found in Appendix A.

TETC MBUF Steering Committee

The Coalition's MBUF Steering Committee was established in Phase 1 of the STSFA grants to direct and support the exploration of future funding approaches for both passenger vehicles and commercial motor vehicles. Members of the Committee include Coalition member states, national organizations with a vested interest in sustainable transportation funding, and organizations that would be integral to implementation of an MBUF program.

The Committee meets up to twice per year and offers input, feedback and direction on the Coalition's future funding work.



Phase 5 Objectives

The Phase 5 grant objectives and work topics were developed with input from the Steering Committee and Motor Carrier Working Group, building on findings from the Coalition's previous truck pilot work. Across all phases, the aim has been to address the key issues identified through the Coalition's truck pilot work, identify solutions to implementation barriers, and put proposed solutions to a practical test.

Previous phases showed that motor carrier MBUF transactions can be measured, processed, and reported. Phase 5 built on that foundation but broadened the discussion beyond MBUF alone. This grant phase compared mileage-based approaches with other emerging future funding approaches, including a kWh-based fee and flat annual fees.

The Phase 5 theme, **Unwrapping Complexities**, reflects this shift from testing whether concepts can work technically to examining what would be required for them to work in practice. The work focused on where complexity lies, where burden shows up, and what that means for motor carriers, agencies, and other entities involved in reporting, payment, audit, enforcement, and administration.

The work was centered around four topics, each focused on a practical question for a future truck funding framework.

1

Topic 1 | Complexity of Weight

Weight has been a consistent issue across the Coalition's truck-focused work. Phase 5 used **real-world carrier weight records to examine how truck weight varies in normal operations and whether more detailed weight data would improve rate setting or add reporting, audit, and administrative complexity.**

2

Topic 2 | Exploration of kWh-Based Fees

As electric trucks enter commercial service, a kWh-based fee has become one concept under consideration for future road funding. Phase 5 **used real-world electric truck data to compare a kWh-based fee with MBUF and the fuel tax, including data availability, energy use, and administrative practicality.**

3

Topic 3 | Consolidation of Taxes & Fees

Motor carriers already pay a range of federal, state, and local taxes and fees. Phase 5 **examined whether truck-related taxes and fees could be simplified or consolidated, and what that would mean for administrative burden and cost distribution.**

4

Topic 4 | Roles & Responsibilities

Previous pilots showed that MBUF transactions can be measured, processed, and reported, but also that roles and responsibilities need to be clearly understood before any broader implementation path is considered. Phase 5 **identified key functions and reviewed existing structures to understand how different governance models and allocations of responsibilities could affect motor carriers, agencies, service providers, and other system participants.**

Real-World Pilots, Analysis & Case Studies

A key principle of the Coalition's future funding work is to use real-world data. For STFA Phase 5, the project included two real-world pilots, one scenario analysis, and two case studies.

Pilot #1: Complexity of Weight

Purpose: Use real-world carrier records to understand how weight changes in normal operations, what weight-related data and records are available in practice, and how different weight definitions could affect rate setting, reporting, auditability, enforcement, and administration.

Pilot #2: kWh-Based Fee

Purpose: Gather real-world data on energy consumption from electric trucks to explore the practical considerations of a kWh-based fee and compare it with both the fuel tax and MBUF.

Scenario Analysis: Federal Truck Tax and Fee

Purpose: Examine federal truck-related taxes and fees to understand where administrative burden sits today and how different simplified structures could affect motor carriers.

Case Study 1: Weight Distance Tax

Purpose: Review an existing weight distance tax system to understand the roles, responsibilities, reporting processes, and governance considerations that may be relevant to a future truck funding framework.

Case Study 2: Tolling Service Provider

Purpose: Review account management, customer service, billing, and operational support functions that may be relevant to a future multi-state truck funding framework.

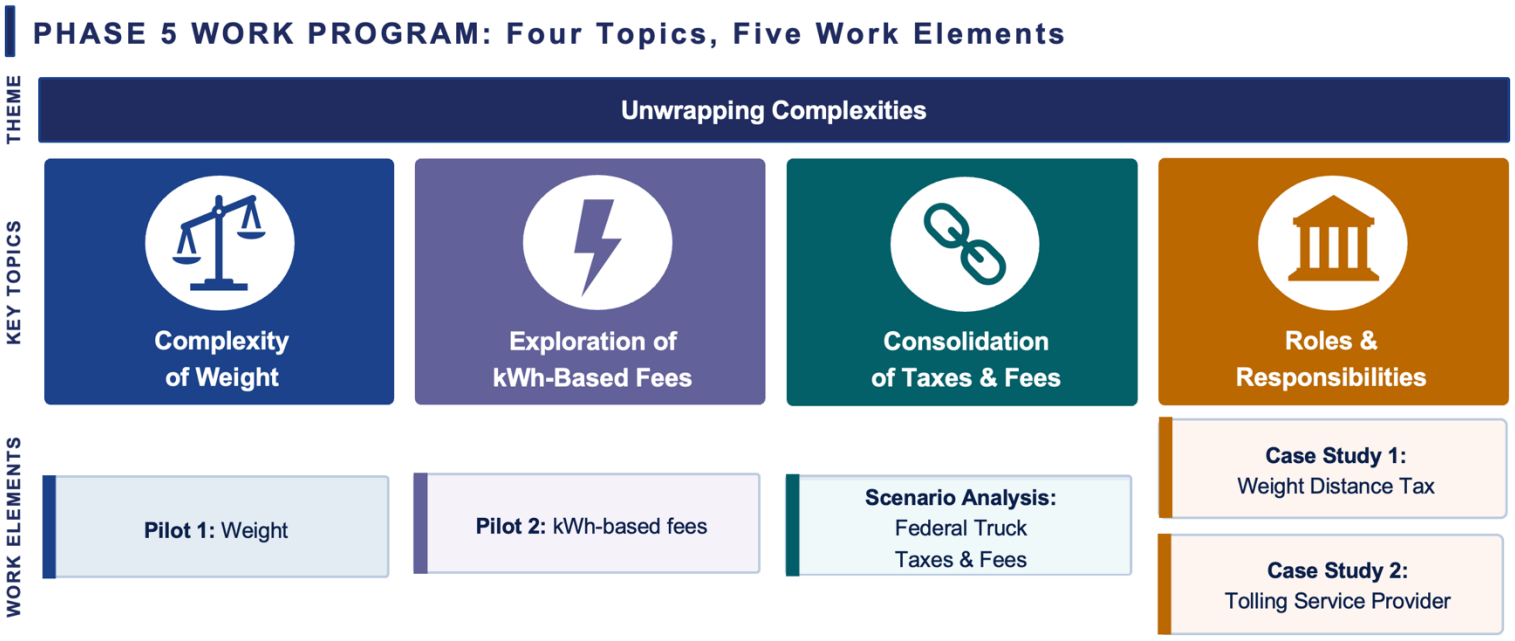


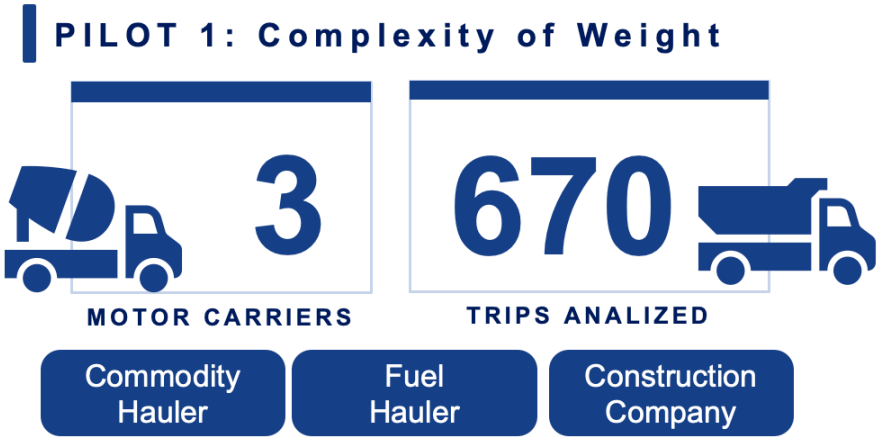
Figure 3. Phase 5 work program: four topics and five work elements.

Recruitment & Pilot Trucks

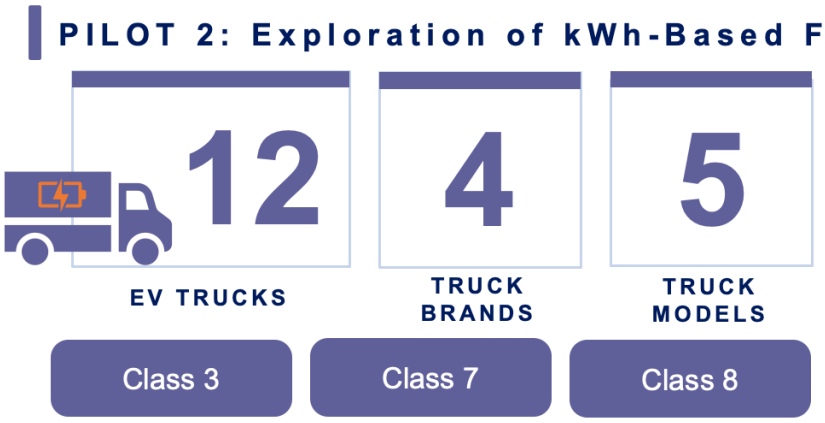
To enable access to real-world data, the project team conducted targeted recruitment for the two Phase 5 truck pilots.

Recruitment included development of flyers, direct outreach, and coordination with MCWG members and other industry stakeholders to identify interested participants.

For pilot 1, which focused on weight data, recruitment targeted carriers with operational records that could show how weight varies in real-world truck operations. Weight data was accessed through records received from participating carriers. Three carriers representing different types of operations participated, and together they shared data for a total of 670 trips.



For pilot 2, which explored kWh-based fees, recruitment focused on companies with commercial electric trucks already operating in real-world service and able to provide usable telematics data without adding significant burden to the participant. Given the pool of eligible electric truck fleets was limited, the strategy was to only engage with one company and to keep the number of vehicles small.



At the peak of the pilot, data was collected from 12 electric trucks across FHWA classes 3, 7, and 8.

The vehicles represented four different manufacturers and five different electric truck models and included both intra- and interstate operations.

To capture a broad range of operating conditions, including sustained winter conditions, data was collected for 11 months, from March 2025 to January 2026.

Account Manager & Data Collection

ClearRoad served as the account manager for the Phase 5 pilot. In this role, ClearRoad supported participant onboarding, device distribution where a device was not already installed, monthly pilot reporting, data validation, and clarification of data issues.

ClearRoad also provided the pseudonymized vehicle-level datasets used for the analysis. Data was accessed through integrations with pilot participants' telematics providers using an open API arrangement. An API is a standardized software interface that allows data to be exchanged between systems.

The account manager platform was configured to receive electronic weight data where available, in addition to mileage and charging data. Mileage and charging data were collected through on-board diagnostics (OBD)-based telematics or original equipment manufacturer (OEM) telematics.

OBD-based telematics use a device plugged into the truck's OBD port to collect vehicle data. OEM telematics provide vehicle data through the vehicle manufacturer's own data systems.

Figure 4 illustrates the data flow for collecting kWh data from the charger and vehicle to the motor carrier, telematics provider, account manager, and project team. Additional detail about ClearRoad can be found in Appendix B.

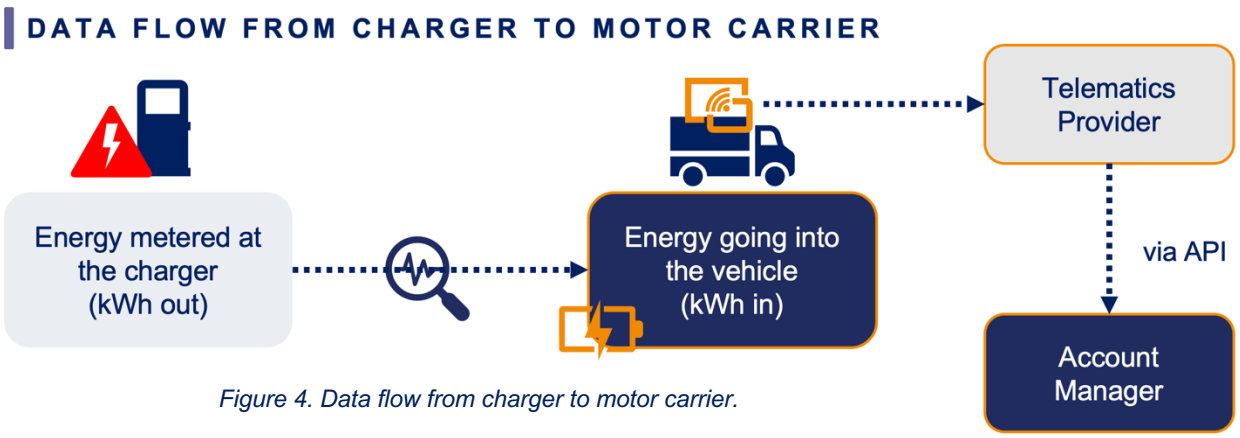


Figure 4. Data flow from charger to motor carrier.

T O P I C

01

THE EASTERN TRANSPORTATION COALITION

CONNECTING FOR SOLUTIONS

The Complexity of Weight

Phase 5 examined whether a more precise basis, such as actual operating weight, would be a feasible basis for rate-setting.

TOPIC

01

WEIGHT

The Complexity of Weight

Overview

Weight has been a consistent topic across all phases of the Coalition's truck-focused exploratory MBUF work. When considering MBUF rate setting, the MCWG emphasized that **weight is an important factor** because it reflects differences between commercial vehicle types and operating realities. However, members were clear that any new transportation funding system **cannot add complexity through burdensome reporting requirements.** Any rate-setting basis needs to be analytically sound and workable across different fleets, operating models, vehicle types, and jurisdictions.

In the 2020/21 National Truck Pilot, the Rate Setting Working Group concluded that **rate setting should remain simple and identified registered weight as a practical basis** because it is already documented and verifiable.

In the 2022/23 International Truck Pilot, the Coalition tested a weight-based rate structure using registered weight and four weight categories. The work showed that a **weight-based MBUF can provide a more transparent link between usage and cost of road use** than the current fuel tax. At the same time, it left an open question about whether a more precise weight basis would improve outcomes or simply add complexity without being workable in practice.

Building on that, the 2025/26 STSFA work examined how weight fluctuates across different types of operations and what data and records are available in practice.

KEY QUESTION
Would a more precise weight basis improve rate setting, or would it add complexity without being workable in practice?

WHAT THE WEIGHT PILOT EXAMINED

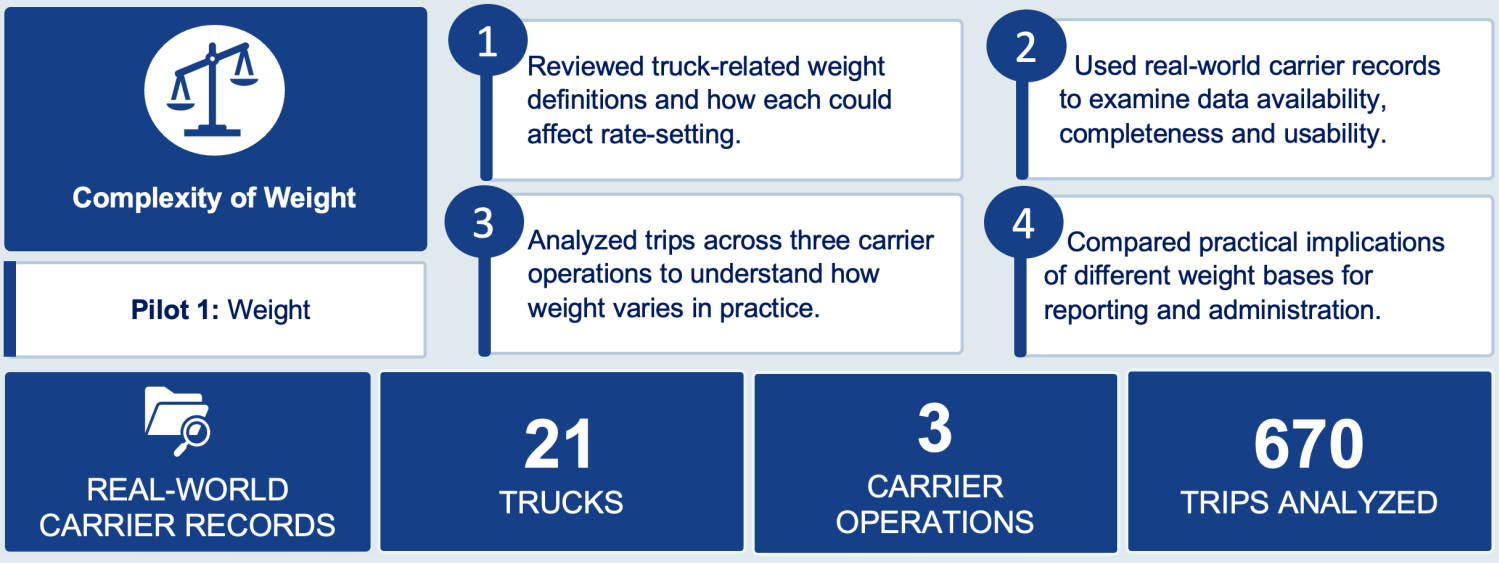


Figure 5. Overview of the Phase 5 weight pilot activities and data analyzed.

What We Did

The Phase 5 weight pilot used real-world carrier records to examine how truck weight varies in normal operations and whether more precise weight information could support practical rate setting.

The work began by reviewing the main weight definitions relevant to trucking and rate setting and considering what practical issues each could raise for motor carriers and agencies.

The pilot then assessed what weight information is available across different carrier operations and how complete and usable that information is in practice. The analysis considered electronically captured weight data, where available, as well as carrier records that could help document vehicle weight or explain changes in weight across normal operations.

The pilot samples were intentionally limited and designed to test practical implementation questions. The findings should therefore be interpreted as operational evidence rather than statistically representative industry estimates. The value of the pilot data lies in showing where data, reporting, validation, and administrative challenges appear in real-world settings.

Using those records, the analysis compared different approaches to using weight in rate setting, considering data availability, operational variability, validation, and administrative burden for motor carriers and agencies.

Pilot Records Reviewed

The pilot used operational records from three different carrier operations to examine weight data availability and weight fluctuation in practice:

Commodity Hauler
Mixed delivery and intermittent drop operations.

Construction Company
Dump trucks operating on direct delivery routes.

Bulk Fuel Hauler
Transporting methanol between a rail yard and a terminal.

Across the three operations, **670 trips were analyzed**.

Table 2 summarizes the carrier operations and records analyzed in the weight pilot.

Pilot detail	Carrier 1	Carrier 2	Carrier 3
Type of carrier	Commodity hauler	Construction company	Bulk fuel hauler
Type of operation	Mixed delivery and intermittent drop operations	Dump truck operations with direct delivery to customers	Methanol transport from rail yard to terminal, crossing state lines
Vehicle class	Class 8	Class 8	Class 8
Vehicles analyzed	6 trucks	3 trucks	12 trucks
Timeframe analyzed	January–December, 2024	May 19–23, 2025	April 1–30, 2025
Trips analyzed	475	54	141
Type of data received	Operational weight records	Operational weight records	Shipping summary

Table 2. Overview of weight pilot carrier records.

The pilot was not intended to represent the full trucking industry. The data was used to examine how weight fluctuates in real-world operations, what information is available from existing records, and whether more detailed weight information could support a practical rate-setting approach.

Results & Learnings

Weight is a Complicated Topic

Truck weight may sound straightforward, but it is not a single fixed number. Different weight concepts describe the vehicle itself, the load it carries, the weight it is rated for, and the weight at which it is licensed to operate.

The simplest place to start is the truck without cargo. This is the **unladen weight**. It refers to the weight of the vehicle itself before a load is added. Unladen weight is not always the same for trucks of the same make and model. Commercial vehicles can be configured, equipped, or modified in different ways, and those changes can affect the vehicle's empty weight. As a result, two trucks that appear similar in make and model may have different unladen weights.

Once cargo is added that cargo becomes the **payload**. Payload is the weight of the load carried by the vehicle, excluding the vehicle. Together, the vehicle, fuel, driver, equipment, and payload make up the truck's **actual or operational weight** (also called gross weight) at a specific point in time. Actual weight changes as the truck is loaded, unloaded, partially loaded, or operated in different configurations.

Other weight concepts describe limits rather than the weight of the truck at a specific moment. **Gross Vehicle Weight Rating, or GVWR**, is the manufacturer-rated maximum loaded weight of a single vehicle or unit. **Gross Combination Weight Rating, or GCWR**, is the manufacturer-rated maximum loaded weight of the tractor unit and trailing unit or units operating together. These are rated limits, not measures of what the truck weighs at a specific point in time.

Carriers also must consider how weight is distributed. A load may be within the vehicle's total weight limit but still creates an issue if too much weight is carried on one axle. **Gross Axle Weight Rating, or GAWR**, refers to the manufacturer-rated load-carrying capacity of a single axle system. Other axle, bridge, route, and jurisdictional limits may also apply. GAWR was not explored further in this pilot because it reflects axle-level load distribution, rather than total vehicle or combination weight usable for rate setting.

Registered weight is different again. It is the maximum weight at which the vehicle or combination is licensed to operate. For interstate carriers, it can be verified through existing records, such as the IRP (International Registration Plan) cab card. Once selected, it remains fixed for that vehicle or combination unless changed through the registration process. In normal legal operation, actual weight must remain within the applicable registered, rated, axle, and other legal limits.

Figure 6 summarizes the main weight concepts for trucks.

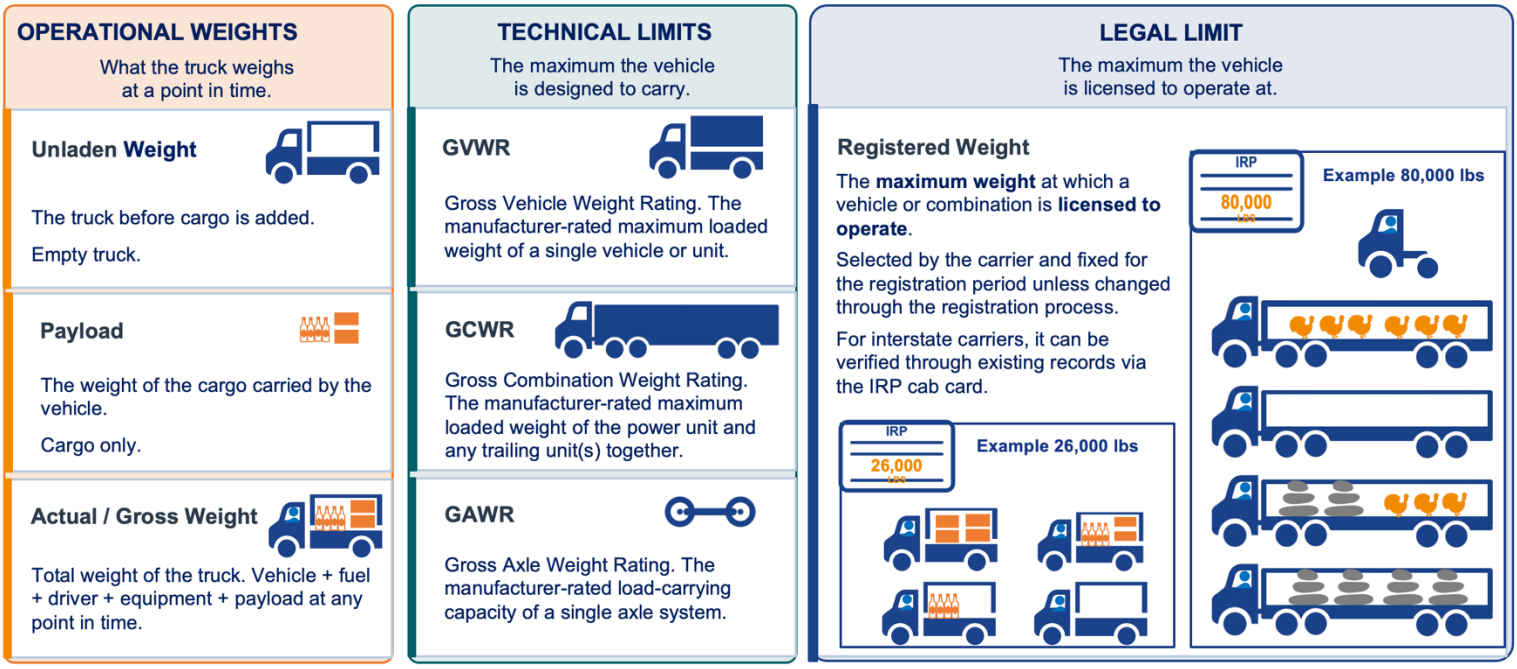


Figure 6. Overview truck weight concepts.

Truck Configuration Adds to Weight Complexity

Trucks come in many shapes and sizes. For national reporting and analysis, trucks are often grouped into two broad categories: **single-unit trucks** and **combination trucks**. Single-unit trucks are built on a single frame, where the cargo-carrying body is part of the vehicle itself rather than a separate trailer. Combination trucks include a tractor unit and one, or more, trailers. Within both categories, there is substantial variation in vehicle size, weight, configuration, body type, operation, mileage, and use.

Figure 7 illustrates the basic distinction between single-unit and combination trucks.

Figure 7. Single-unit vs. combination truck.

The main weight concepts are easier to see for a single-unit truck because the vehicle is one fixed unit. Figure 8 shows the key weight classifications for a single-unit truck graphically.

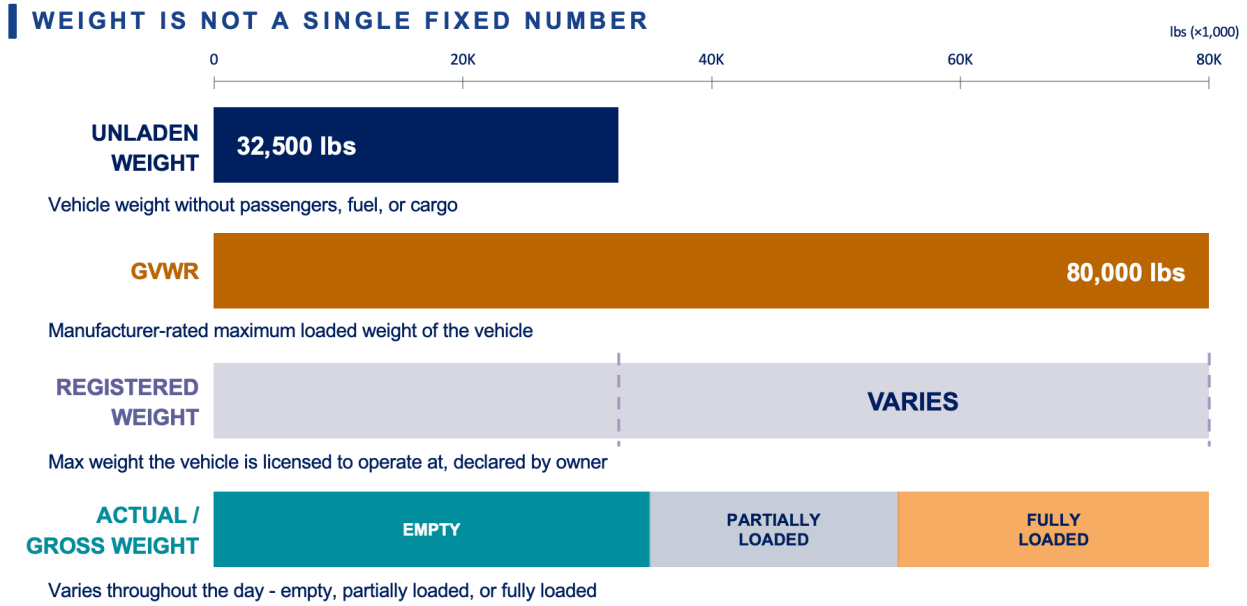


Figure 8. Example of different truck weight concepts for a Class 8 single-unit truck.

Combination trucks add another layer of complexity. The tractor unit and each trailer are separate units, and each unit has its own Gross Vehicle Weight Rating, or GVWR.

Figure 9 illustrates the difference between GVWR and GCWR for a combination truck Each unit in the configuration has its own GVWR, while Gross Combination Weight Rating, or GCWR, applies to the tractor unit and trailer or trailers operating together. However, the full combination rating cannot be determined by simply adding the individual unit ratings, because part of the trailer's loaded weight may be carried by the tractor unit through the fifth wheel, while the rest is carried by the trailer axles. The level of weight transfer depends on the vehicle configuration. This means the tractor unit alone does not fully describe the vehicle combination operating on the road.

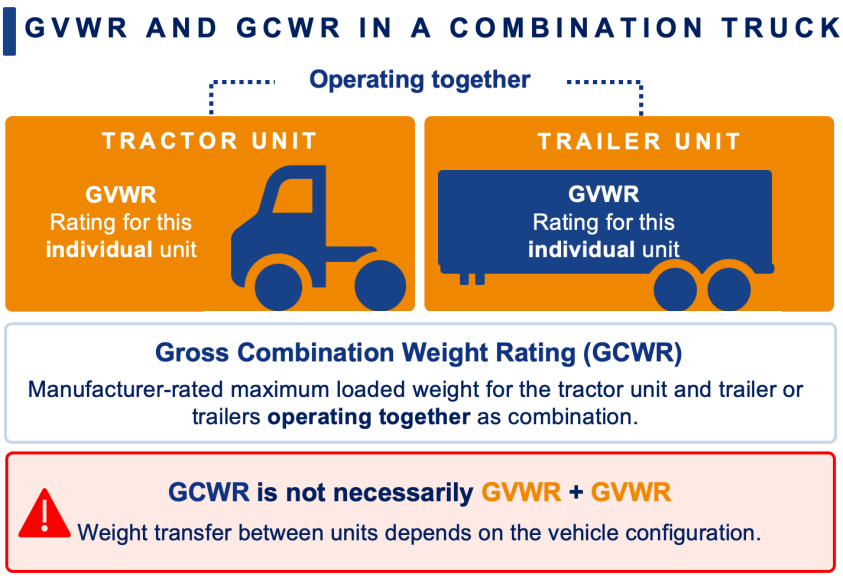


Figure 9. GVWR and GCWR in a combination truck.

For combination trucks, the tractor unit, trailer or trailers, and operating configuration may change from trip to trip.

After establishing the main weight concepts and the role of truck configuration, the pilot explored whether more detailed weight information is available in practice and how weight fluctuates across normal operations.

Precise Weight Data Was Difficult to Access and Use

One important finding emerged during pilot setup. The initial approach was to use electronically captured weight data from fleets equipped with onboard mass or onboard scale (OBM) systems.

The intent was to observe how weight changed in normal operations using data that could, in theory, support a more automated reporting approach.

Recruitment Was Broad, but Usable Electronic Weight Data Was Limited

The project team pursued several recruitment paths, including direct carrier contacts, outreach via project partners, and MCWG-related industry networks, to identify fleets with onboard mass or onboard scale equipment. The outreach showed that usable electronic weight data was not broadly available among the fleets contacted.

While more precise weight data may exist in some operations, it is not broadly available in a form that can support automated rate setting today. Telematics systems are used for electronic logging, location tracking, and fleet management, but actual operating weight is rarely part of the standard data stream, especially among general freight haulers. In addition, telematics is not as universally utilized across the industry as may be perceived (see Figure 10).

Capturing weight usually requires additional equipment, such as onboard scales, which adds cost and is generally adopted only when the carrier has a direct business need for it, such as in bulk transport, waste, or aggregate hauling.

Because **usable electronic weight data was not available**, the pilot shifted to existing carrier records. With support from MCWG members and industry partners, weight-related records were ultimately obtained from three carriers representing different types of operations.

Participating carriers provided available records, including load tickets, billing records, trip records, shipping summaries, or other documentation showing what weight information is maintained in practice. These records allowed the project team to analyze how weight fluctuates in normal operations and assess whether information already maintained by carriers could support rate setting.

Industry Context: Telematics Use Is Uneven Across Fleet Sizes

Telematics use may be common in parts of the trucking industry, but it is not universal, especially among smaller fleets. As shown in Figure 10, the Penske 2024 Telematics Use and Trends Survey found that **32% of small fleets, 61% of medium fleets, and 71% of large fleets reported using telematics solutions**.

The survey did not address onboard weight systems specifically, but it helps illustrate that onboard weight data would require a more specialized data source than standard telematics.

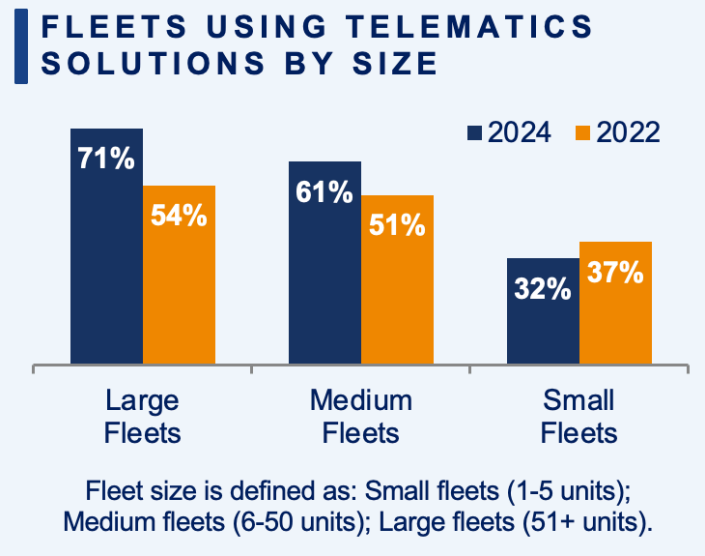


Figure 10. Telematics use by fleet size, 2022 and 2024. Source: Penske 2024 Telematics Use and Trends Survey.

Real-World Carrier Records Showed Both Useful Data and Important Gaps

The records differed by operation and reflected the information each carrier maintained for its own business purposes.

Some records included registered weight, unladen weight, gross weight, load tickets, billing records, trip records, shipping summaries, or volume-based load information. Other information, such as GVWR, GCWR, detailed vehicle specifications, or stop-level weight changes, was not included in the operational records reviewed. GVWR and GCWR are typically known or obtainable from vehicle specifications or equipment records, but they were not generally maintained in the same records used to document normal trip activity.

Table 3 summarizes the types of weight information available in the pilot carrier records and the main data gaps identified for each carrier operation.

Availability of weight information	Carrier 1: Commodity hauler	Carrier 2: Construction dump trucks	Carrier 3: Bulk fuel hauler
Registered weight	Available	Available	Available
Unladen weight	Not provided	Available	Not provided
Actual / Gross Weight	Partially available	Limited availability based on load tickets; no partial-load trips in records reviewed	Estimated load weight only
Main data gap	Weight was not broken down by stop, so intra-trip weight changes could not be determined.	Limited one-week sample	Load weight was estimated from reported gallons. Without unladen weight, full operational weight could not be determined.

Table 3. Weight data availability in pilot carrier records.

The records showed that weight-related information exists in carrier records, but it is not generally maintained as a consistent, trip-level data element. In the pilot, usable operational weight-related information was available only where the carrier's business model already required weight or volume data, such as billing by tonnage or gallons. Even then, the records were often incomplete or not structured to reflect real-time operations.

Stop-level or intra-trip weight changes were not available for any of the three operations. This limited the ability to show how weight changed within a trip, especially where loads may have been delivered incrementally.

The commodity hauler, Carrier 1, provided the largest initial dataset. Records were available for more than 600 vehicles, but only 18 trucks had complete weight data fields. From that group, six trucks were selected for analysis. This showed that even where large amounts of operational data exist, data on actual operating weight is not consistently available.

The records reviewed for the construction company, Carrier 2, only included trips where the full load was delivered to one location. This made it possible to observe operational weight using load tickets, but the records did not show partial-load or intra-trip weight changes.

The bulk fuel hauler, Carrier 3, provided records that included reported gallons, but not unladen weight, detailed vehicle specifications, or full operating weight. Load weight therefore had to be estimated from the volume of methanol reported, using 6.5 pounds per gallon. The carrier noted that actual operating weight is not always available. Some trips involve the pickup of pre-loaded trailers, and **weighing each load is not common practice**. While it may be possible to calculate actual operating weight after the fact, **doing so would add significant administrative complexity**.

Overall, the carrier records provided useful insight into how weight is documented in normal operations, but they also showed the limits of using actual operating weight for rate setting. **Registered weight was the only data point available consistently across all carriers.**

> *"Unless we were to weigh each load, we would not and do not always have an actual operating weight.*
>
> *We could calculate the weight after the fact but that would be a time-consuming and laborious task."*
>
> -- Pilot Carrier

Actual operating weight is not broadly maintained by motor carriers in a consistent, usable way unless the business model already requires weight or volume information.

Weight Variability is Continuous and Operationally Driven

Actual operating weight is a condition at a point in time, not a fixed value. It changes as the truck operates. The **balance between loaded and unloaded travel can differ sharply** and the nature of the variations depends on the type of operation.

Table 4 summarizes the weight variability observed across the three pilot carrier operations.

Weight variability detail	Carrier 1 Commodity hauler	Carrier 2 Construction dump trucks	Carrier 3 Bulk fuel hauler
Registered weight	80,000 lbs.	71,000 lbs.	80,000 lbs.
Unladen weight	Not provided	25,100 to 28,640 lbs.	Not provided
Average gross weight per mile	61,924 lbs.	55,018 lbs.	Not available
Estimated load weight	n/a	n/a	44,623 to 58,175 lbs., calculated from reported methanol gallons
Operating pattern	Mixed delivery and intermittent drop operations.	Direct delivery to customer; approximately 50% loaded and 50% unloaded travel.	Methanol delivery from rail yard to terminal; approximately 50% loaded / 50% unloaded travel over a 77-mile route.
What it showed about weight variability	Weight varied across trips and could not be fully traced within trips because stop-level data was not available.	Even a simple loaded / unloaded cycle creates substantial weight variation, depending on the load carried.	Volume-based records can estimate load weight, but do not provide full vehicle-level weight detail.

Table 4. Examples of weight variation by carrier operation.

In the construction and bulk fuel examples, the patterns were relatively simple, with trucks generally loaded in one direction and unloaded in the other (~50% loaded / 50% unloaded split). However, **even where a simple loaded-unloaded pattern exists, the actual weight while loaded will typically still vary from trip to trip and from load to load**. The bulk fuel carrier also noted that typically fuel or gas delivery routes involve multiple stops and drops, causing the vehicle's weight to change throughout the day.

The commodity hauler example showed more variation. Depending on the truck, vehicles operated at or near registered weight between 42% and 79% of the time, accounting for 42% to 52% of miles traveled. Other operations, particularly longer-haul movements, may have a much lower share of empty miles, with ATRI reporting the national average at ~17%.[4]

[4] https://truckingresearch.org/2025/07/new-atri-report-shows-trucking-profitability-severly-squeezed-by-high-costs-low-rates/

None of the carriers were able to provide multiple weight measurements within a single trip where partial deliveries occurred. As a result, it was not possible to fully determine how weight changed throughout the day and if loads were delivered incrementally.

The weight of a truck fluctuates throughout normal operations, from trip to trip and from load to load. Reporting and auditing operational weight data would be administratively challenging.

The Choice of Weight Basis Affects Both Precision and Workability

Together, the data availability and weight variability findings show why the choice of weight basis is important. Each option offers a different balance between precision, fairness, availability, and administrative burden.

For rate setting, the question is not only which weight basis is most precise, but which basis can be applied consistently supported by available records and verified in practice. A more precise approach may better reflect whether a truck is loaded, unloaded, or partially loaded. But that precision is only useful if the data can be captured and audited without creating too much burden for motor carriers or agencies.

Actual operating weight offers precision, but at a high cost.

Actual operating weight is the closest measure of how the vehicle operated on the road. It can reflect whether a truck was loaded, unloaded, partially loaded, or operated in different configurations. In theory, this creates the closest link between weight, road use, and payment.

However, the pilot showed why **actual operating weight is difficult to use in practice**. Actual weight information was not consistently available. Stop-level or intra-trip weight changes were not available for any of the three operations reviewed. In some cases, operating weight had to be estimated from other records, such as load tickets, billing records, or reported gallons.

Using actual operating weight for rate setting would add too much operational burden under current conditions. Carriers would need to capture, retain, validate, and report weight information that changes throughout normal operations. Agencies would need rules and processes to review, validate, audit, and enforce that information. This would work against the goal of a simple, verifiable, and scalable truck funding framework.

GVWR and GCWR are stable, but do not reflect use.

GVWR and GCWR offer a different type of information. They are stable manufacturer-rated limits, not measures of what a truck weighs during a specific trip. That makes them easier to document than actual operating weight, but less connected to how the truck is used in practice.

For combination trucks, GCWR creates additional complexity because it applies to the tractor unit and trailer, or trailers, operating together. A GCWR-based rate structure would need to know the applicable combination rating for the equipment used on each trip. That information is not usually captured through the tractor unit alone and could require trailer-level information to be reported and matched to mileage.

This would add reporting and validation burden, especially because trailers are generally less likely than tractor units to be equipped with telematics or other reporting technology and are frequently hauled by different tractor units.

VINs can provide useful information about a vehicle, including the manufacturer and, in many cases, vehicle class and GVWR. However, for combination vehicles, the VIN of the tractor unit is only part of the picture. **The same tractor unit may pull different trailers or operate in different combinations, and a single trailer may be hauled by different tractor units**. A VIN-based approach would therefore need to account for multiple pieces of equipment and changing configurations, adding complexity for reporting and validation.

GVWR and GCWR can also differ from the weight at which a vehicle or combination is licensed to operate, and the difference can be substantial.

A vehicle combination may be rated for a much higher weight than the weight at which it is registered.

Figure 11 shows an illustrative example where GCWR and registered weight differ substantially.

GCWR AND REGISTERED WEIGHT CAN DIFFER SUBSTANTIALLY

Note: Values shown are illustrative. Actual GCWR and registered weight vary by vehicle, configuration, and registration.

Figure 11. Illustrative comparison of gross combination weight rating and registered weight.

This difference is relevant for fairness across operations. A rate based on rated capacity would reflect what the vehicle or combination is technically rated to carry, even if it is registered or operated at a lower weight. This could affect carriers differently depending on how they configure, register, and use their equipment.

Registered weight is less precise, but more workable.

Registered weight is less precise than actual operating weight because it does not show whether the truck was loaded, unloaded, or partially loaded on a specific trip. It also does not describe the exact configuration used on each trip.

Its advantage is workability. Registered weight is steady, documented, and verifiable through existing records, such as the IRP cab card for interstate carriers. It provides a stable basis that already exists in current registration processes.

For interstate combination vehicles registered under IRP, registered weight is applied to the tractor unit. The IRP cab card reflects the combination weight at which that tractor unit is licensed to operate, but it does not identify the specific trailer or trailers attached for a particular trip. Trailers are registered separately under applicable state rules, and the same tractor unit may pull different trailers, provided the combination operates within its registered weight and other legal requirements.

Registered weight provides a stable, documented, and verifiable weight basis that can be applied without requiring trailer-level matching or trip-by-trip weight reporting.

Table 5 compares the practical tradeoffs between weight bases for rate setting.

Rate-setting approach	Potential benefit	Practical limitation	Administrative impact	Overall assessment
Actual or operational weight	More precise in theory; reflects loaded and unloaded conditions	Not commonly available; changes frequently; difficult to verify	High effort reporting, equipment, audit, and enforcement burden	Not practical at scale under current conditions
GVWR / GCWR	Stable manufacturer-rated values	Does not show registered operating weight or actual trip weight; combination vehicles require trailer/configuration information	Moderate to high. Would require matching tractor units, trailers, configurations, and registration records	Not a practical standalone basis for rate setting or vehicle classification
Registered weight	Stable, documented, and verifiable through existing records	Does not reflect real-time load variation	Low reporting and verification burden	Most practical existing basis for rate setting

Table 5. Comparison of weight bases for rate setting.

Registered weight reduces reporting and verification burden.

The comparison points back to the same practical issue raised in earlier phases: **greater precision is only useful if it can be implemented consistently and verified without creating disproportionate burden.**

A more precise weight basis would require more data, more frequent reporting, and more verification. That would affect both motor carriers and agencies. Carriers would need to capture and retain more detailed information, while agencies would need rules and processes to review, validate, audit, and enforce that information.

Registered weight avoids much of that burden. It does not require carriers to report how weight changes during a trip, identify partial load changes, match trailers to tractor units by mile, or install new weight-measurement equipment. It uses a weight basis that is already part of the registration process and can be checked against existing records.

For interstate carriers, that process is already established. The picture may be different for smaller or intrastate commercial vehicles. Federal law does not currently require a state to capture registered weight for intrastate vehicles, although each state may choose to include registered weight on the registration document. Future work should explore how many states already collect registered weight for intrastate vehicles and what that could mean for those carriers.

Oregon Weight Mileage Tax Shifting to Registered Weight

Oregon's weight-mile tax provides a useful example of a weight-based mileage tax that uses declared weight by configuration. The declared weight is not the vehicle's actual weight at every point in time. It is the heaviest weight the vehicle and load will operate at, in a given configuration during the reporting period, which typically is one month.

This creates a middle ground between registered weight and actual operating weight. It can reflect operating configuration more closely than a single registration weight, but it also requires more recordkeeping. If a trailer is dropped, the driver or back office must identify the configuration change and the miles traveled in the new configuration. If different commodities are hauled with the same equipment, the declared weight must reflect the heavier operating weight for that configuration.

Beginning July 1, 2027, **Oregon is simplifying the structure so that tax weight will be the same as registration weight** and each vehicle will pay WMT based only on registered weight. Carriers will no longer need to declare and report multiple weights for different configurations. The Oregon Department of Transportation (ODOT) describes the change as making compliance, recordkeeping, and administration easier for both carriers and ODOT.

Registered weight is not perfect, but it is practical.
For a future truck funding framework, practicality is critical.

The system would need to work across many types of carriers, vehicles, operating models, and jurisdictions. Based on the Phase 5 analysis, registered weight remains the most practical existing basis for a weight-based rate structure.

KEY FINDING 1

Registered Weight Remains the Most Practical Basis for Rate Setting

Weight matters in truck rate setting because trucking operations differ widely, and vehicle weight is one way to recognize those differences. A weight-based approach can help create a clearer connection between road use and payment. But the basis used for weight-based rate setting must be operationally feasible.

The Phase 5 weight pilot showed that while actual operating weight is the most precise conceptually, it is not an operationally practical basis at scale. Actual weight changes throughout normal operations, and the data needed to support an actual-weight-based rate structure is not consistently available today. None of the pilot participants provided continuous or intra-trip weight data that would be needed to apply this approach, especially where partial loads were involved.

The administrative structure needed to measure, report, validate, audit, and enforce actual weight would be substantial. The added burden and cost would likely outweigh the benefit of greater precision.

GVWR and GCWR provide stable manufacturer-rated values, but they can vary significantly from the truck's registered weight and actual operating weight. For combination vehicles, they may also require additional information about the trailer, or trailers, attached.

Registered weight does not capture real-time load variation and is therefore less precise than actual operating weight, it shows the maximum legal operating weight. However, for interstate heavy commercial vehicles, it is already documented and verifiable through existing records, such as the IRP cab card, and is commonly used in several state and federal programs, including IRP and the Heavy Vehicle Use Tax. While not perfect, registered weight is an accepted practice within the motor carrier industry and, based on the Phase 5 work, remains the most practical basis currently available for weight-based rate setting.

Future work should confirm whether registered weight is consistently available for smaller or intrastate commercial vehicles that are not currently part of interstate reporting frameworks.

SECTION

02

THE EASTERN TRANSPORTATION COALITION

CONNECTING FOR SOLUTIONS

Exploration of kWh-Based Fees

Phase 5 explored this concept using real-world energy consumption data and compared it with both the fuel tax and mileage-based fee.

TOPIC

02

kWh-based Fees

Exploration of kWh-Based Fees

Overview

For over a century, fuel taxes have been the primary way roads are funded. Vehicles use fuel, fuel is taxed, and that tax helps pay for the transportation system. As electric vehicles enter commercial service, several states have begun applying a similar concept to electricity used for vehicle charging.

At first glance, a kWh-based fee can appear to be the electric equivalent of the fuel tax. Instead of taxing the gallons of gasoline or diesel purchased, the fee is based on the electricity used to charge the vehicle. That makes the kWh-based concept familiar and attractive.

For some motor carriers, kWh-based reporting is already a reality. As shown in Figure 12, 10 states have kWh-based fees in place, one pending.

Eight apply kWh-based fees at public charging stations, and five have truck-specific kWh-based fees reported through IFTA (IA, NM, ND, PA, WY).

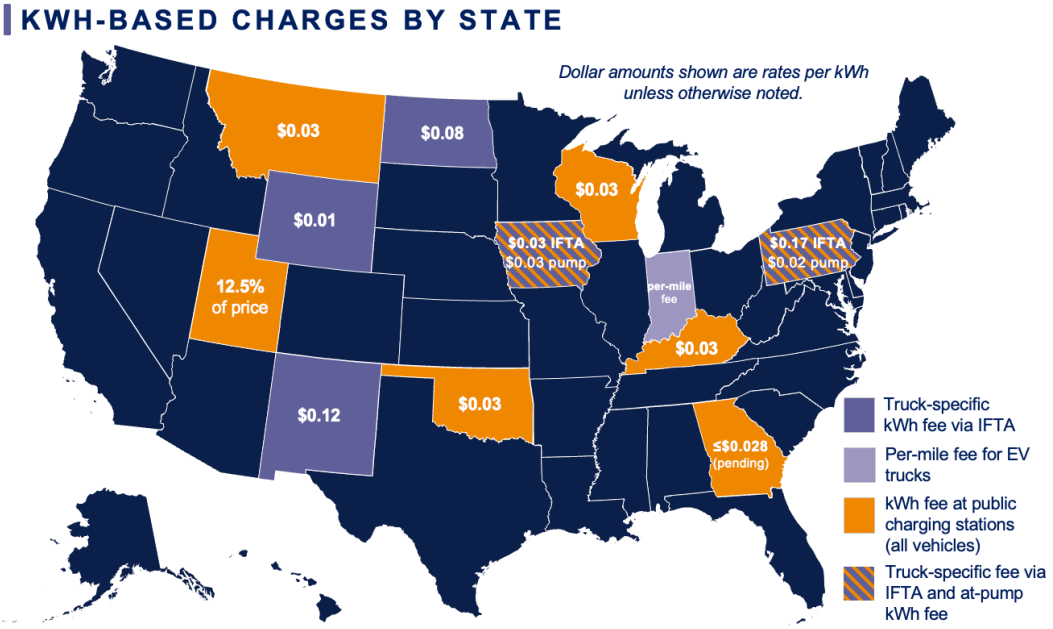


Figure 12. States with kWh-based fees.

For motor carriers, the more direct compliance issue comes from truck-specific fees reported through IFTA. Those carriers must comply with IFTA reporting, recordkeeping, and audit requirements for the reported kWh. Depending on how and where a vehicle charges, supporting records may come from public stations, depot chargers, fleet systems, telematics, or another charging arrangement.

Phase 5 conducted a real-world electric truck pilot to examine whether a kWh-based fee could provide a practical basis for future truck funding. The work focused on the availability and reliability of the data needed to support this approach, and whether electricity consumption provides a consistent connection to road use.

KEY QUESTION

Can a kWh-based fee serve as a practical and administratively workable user-based funding approach for electric trucks, and how does it compare with the fuel tax and MBUF?

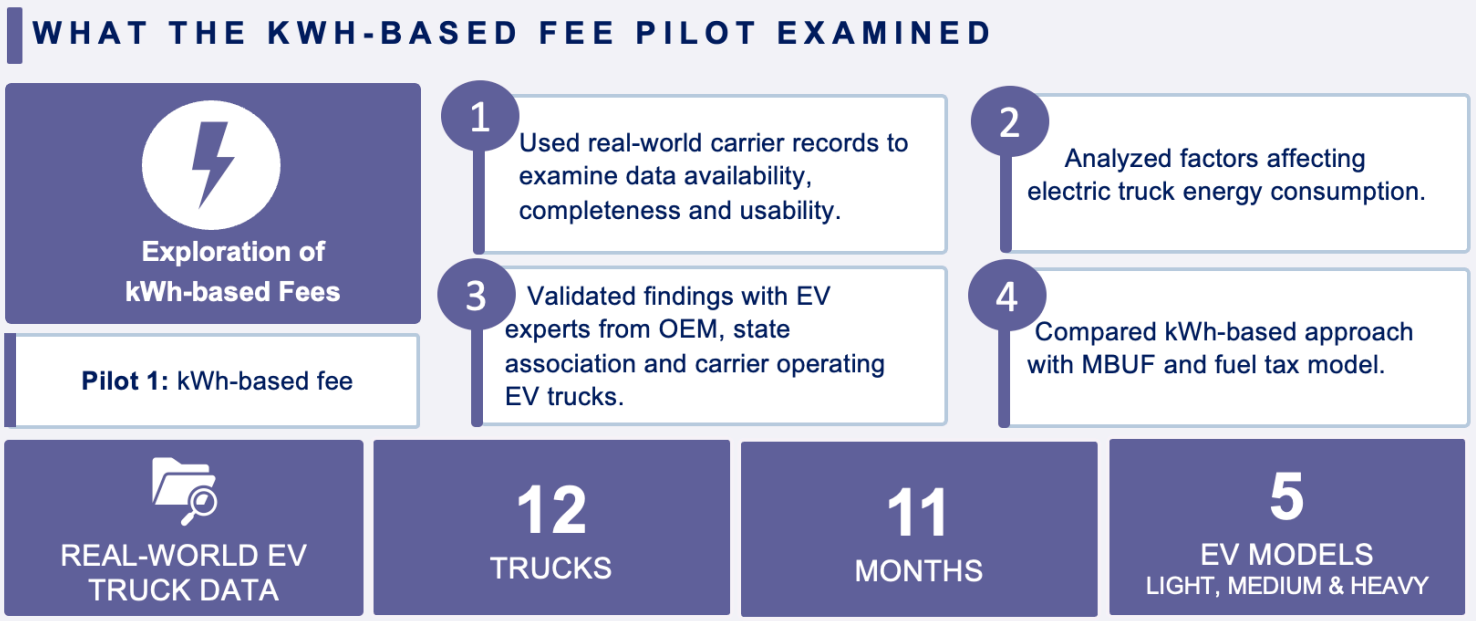


Figure 13. Overview of the Phase 5 kWh-based fee pilot activities and data analyzed.

What We Did

To assess kWh-based fees as a potential truck funding approach, Phase 5 combined a policy review with a real-world electric truck pilot.

The work reviewed current state kWh-based fee approaches, including fees at public or commercial charging stations and truck-specific fees reported through IFTA. It then used electric truck data to examine whether the information needed to support a kWh-based fee was available, accessible, reliable, and usable for reporting.

The analysis also examined factors that affect electric truck energy consumption, including temperature, vehicle type, route, operating conditions, and driver behavior. This helped assess whether electricity use is a practical basis for a user-based funding approach for trucks.

The work further compared kWh-based fees with the existing fuel tax and MBUF, including how each approach relates to road use, motor carrier reporting, administration, auditability, and practical implementation.

Pilot Records Reviewed

The pilot used charging and mileage data obtained through the account manager for 12 electric trucks operating in regular commercial service. The vehicles included light-, medium-, and heavy-duty electric trucks across Classes 3, 7, and 8, operating in both intrastate and interstate service.

This range was valuable because electric truck deployment remains limited, especially in the heavier vehicle classes. The pilot provided real-world data from different vehicle sizes, technologies, and operating profiles rather than relying only on assumptions or modeled examples.

Table 6 provides an overview of the pilot data and timeframe.

Pilot data element	Description
Vehicles	12 electric trucks
Vehicle classes	Classes 3, 7, and 8
Vehicle types	Light-, medium-, and heavy-duty electric trucks
Vehicle variety	Four vehicle manufacturers and five vehicle models
Operations	Intrastate and interstate commercial service
Data access	Data obtained through the account manager from vehicle telematics and OEM data sources
Analysis period	March 2025 – January 2026
Validation	Final dataset validated with the pilot participant and adjusted for known data anomalies

Table 6. Overview of kWh pilot electric trucks and data reviewed.

Results & Learnings

Measuring kWh Is Not as Simple as It First Appears

The initial question was which kWh value could be used for the pilot. As shown in Figure 14, energy can be measured at different points in the charging and vehicle operation process: at the charger as kWh out (A), as energy going into the vehicle as kWh in (B), or as energy used by the vehicle during operation (C).

These values do not necessarily reconcile because each reflects a different system boundary. They can also be affected by charging losses, temperature, battery condition, charging speed, vehicle systems, and how raw data is processed. Interviews with EV experts confirmed that different measurement points can produce different results.

For the pilot, DC kWh-in data, shown as point B, from OEM in-vehicle telematics or OBD devices was used. Charger-side kWh-out data, shown as point A, was not available, so the project team could not directly compare charger output, energy entering the vehicle, and energy used during operation.

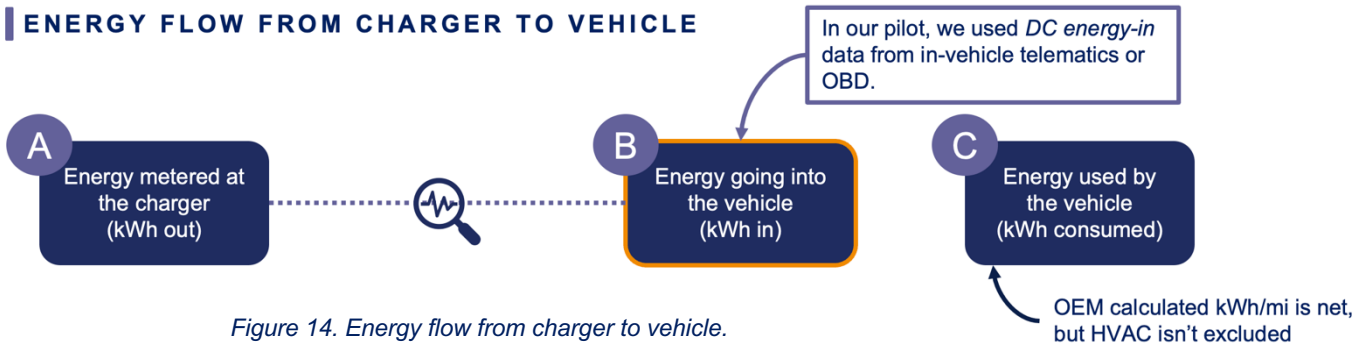


Figure 14. Energy flow from charger to vehicle.

Data Availability and Reliability Were Not Consistent

Data was accessed through the account manager, ClearRoad, using data from the pilot carrier's telematics provider through an API. The pilot carrier was an existing telematics customer and only two vehicles needed new devices installed.

Before the pilot started, the available data fields from the telematics providers were reviewed using API documentation, and the relevant pilot data fields were defined. Table 7 summarizes the initial assessment of kWh-related data availability. It reflects what was expected to be available, computed, or derived at the start of the project, not the completeness or reliability of the data ultimately received.

Type of data	Data field	Initial data availability assessment
Trip data	Location	Available through OBD telematics and OEM API.
Trip data	Distance	Available through OBD telematics and OEM API.
Trip data	Date and time	Available through OBD telematics and OEM API.
Charging data	AC charging	Available through OBD telematics. Not available through the OEM API.
Charging data	DC charging	Available through OBD telematics and OEM API.
Charging data	Date and time	Available through OBD telematics and OEM API.
Charging data	Location	Available through OBD telematics. For OEM API, location needs to be derived from vehicle location at the time of charging.
Charging data	Duration	Available through OBD telematics. For OEM API, duration needs to be computed.
Charging data	Distance traveled between charging events	Needs to be computed from charge event odometer data, trip data between charges, or vehicle odometer readings.
Charging data	Battery percent at start of charge	Available through OBD telematics. For OEM API, needs to be derived from state of charge at the time of charging.
Charging data	Average energy consumed per month/day (rolling)	Available through OBD telematics and OEM API.

Table 7. Initial kWh data availability assessment.

The pilot included 12 electric trucks, ranging from light-duty vans to medium- and heavy-duty trucks. Most reported through OBD telematics, while two medium-duty trucks used an OEM API. Table 8 shows the vehicle groups and data sources included in the kWh data review.

Vehicle type	Vehicle count	Registered weight	Data source
Light-duty van	2	10,001 lbs.	OBD
Medium-duty vehicle	2	32,500 lbs.	OEM API
Medium-duty vehicle	5	33,000 lbs.	OBD
Heavy-duty vehicle	3	65,000 lbs.	OBD

Table 8. Pilot vehicles and data sources included in the kWh data review.

While the charging data was expected to be available from all pilot trucks in theory, either directly or through computation, the **data received during the pilot was not consistent**. There were data access challenges and inconsistencies in the kWh charge data received. In addition, because the EVs were still new to the motor carrier, some vehicles had periods of repair and testing during the pilot. Multiple reporting devices also needed replacement.

Table 9 summarizes the month-by-month data availability issues by vehicle from February through November. December and January were not included in this table because the analysis for those months focused on seasonal variability rather than kWh data availability.

Truck Type	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Light	n/a	n/a	start / no data	no access	no access	no access	no access	no access	no access	no access
Light	n/a	n/a	start / no data	no access	no access	no access	no access	no access	no access	no access
Medium	start / faults	no access	no access	in repair	in repair	data gaps	data	data	data	in repair
Medium	start	data	data	data gaps	no data	in repair	in repair	data	data	data
Medium	start	device swap	in repair	offline	offline	data	0kWh (2)	0kWh (2)	data	0kWh (3)
Medium	start	device swap	in repair	offline	offline	data	0kWh (1)	0kWh (4)	data	0kWh (1)
Medium	n/a	n/a	n/a	n/a	start / no data	0kWh (3)	0kWh (1)	data	0kWh (1)	0kWh (2)
Medium	n/a	n/a	n/a	n/a	start / no data	data	data	data	in repair	0kWh (1)
Medium	n/a	n/a	n/a	n/a	n/a	Start	data	data	0kWh (1)	data
Medium	n/a	n/a	n/a	n/a	start / no data	data	data	data	0kWh (1)	data
Medium	n/a	n/a	n/a	n/a	start / no data	data	0kWh (1)	data	0kWh (2)	data
Medium	n/a	n/a	n/a	n/a	start / no data	data	data	data	0kWh (1)	data

Table 9. Overview of kWh data received by vehicle and month.

Table note: *Light = light-duty van; Medium = medium-duty truck; Heavy = heavy-duty truck; N/A = vehicle not yet added to the pilot. "Data" means kWh data was received for that month. "0 kWh (#)" shows the number of recorded zero-kWh charging events. Colors are used as a visual aid only.*

Data availability and consistency varied by vehicle, make, model, and reporting method. Some vehicles experienced delayed or incomplete charging data. OBD-based reporting was affected by device and vehicle system limitations. OEM telematics showed some differences in reported mileage compared with vehicle Engine Control Module (ECM) readings. In some cases, competing OBD connections interfered with access to charging data.

This experience cautions that even with seemingly compatible vehicles, data collection may be affected by competing OBD connections or other system limitations. This underscores the importance of data standardization and system interoperability when evaluating a potential kWh-based reporting framework.

The **most prevalent data issue** during the pilot, affecting approximately **3% of charging events**, involved charging transactions that showed an increase in battery state of charge while reporting zero energy added. Table 10 provides examples of such transactions.

Data source	Start Date	End Date	Duration	Start charge %	End charge %	Energy added (kWh)	Battery charge increase %
OBD	10/13/25	10/14/25	13:17	30%	99%	**0**	68%
OBD	10/20/25	10/21/25	10:49	49%	88%	**0**	39%
OBD	10/6/25	10/6/25	2:42	73%	100%	**0**	27%
OBD	10/14/25	10/14/25	2:32	76%	100%	**0**	24%
OBD	11/17/25	11/17/25	4:05	55%	100%	**0**	45%

Table 10. Examples of zero-kWh charge events with battery charge percentage increasing.

The telematics provider indicated that some charging events were missed when the device was in “sleep” mode. Correcting this issue would require manual action by the carrier, adding operational burden and increasing the risk of accidental non-compliance.

Overall, the pilot showed that there are significant challenges in accessing charging data.

The pilot participant confirmed that this was not only a pilot data issue. In day-to-day operations, **the carrier cannot rely on one data source for kWh data reporting**. The carrier originally selected its telematics provider specifically to have all data from one source, expecting it would be able to provide the needed data. After several months of work with the provider to structure the data fields, the carrier also needed to subscribe to its charger provider’s software to access all charging data.

For the three heavy-duty EVs in the pilot that are interstate vehicles subject to IFTA reporting, the carrier must compile charging data from multiple sources. Most charging data come from charging station software, but one depot has ongoing access limitations. For charging events at that location, telematics data is used as a substitute. **The participant described the process as manual and administratively challenging.**

> *“You have to be resourceful to get the data.”*
>
> -- Pilot Carrier

Available in theory does not mean reliable in practice.

A kWh-based fee can only work if charging data is complete, reliable, and auditable. The kWh pilot showed that this **cannot be assumed under current conditions**. When charging data is missing, delayed, inconsistent, or dependent on manual workarounds, the burden shifts to carriers and agencies to identify exceptions, correct records, reconcile data sources, and support audits. At scale, this would add meaningful administrative burden and **increase the risk of reporting errors or accidental non-compliance**.

Seasonal Variability in Energy Use Is Real and Material

A kWh-based fee uses electricity consumption as the basis for charging for road use. Phase 5 therefore used real-world data to examine whether kWh-per-mile consumption remains reasonably consistent across operating conditions or varies for reasons beyond mileage.

Based on pilot participant input and project team research, the starting hypothesis was that energy use per mile would be higher in winter than in summer.

To test this hypothesis, pilot data was analyzed across different seasons. The analysis used an August-to-January dataset that had been validated with the pilot participant and adjusted for known anomalies.

This dataset allowed comparison of summer and sustained winter operating conditions. Figure 15 shows average daily temperature and average fleet energy use.

The results showed measurable increases in consumption across all vehicle classes during sustained cold temperatures, particularly below approximately **30°F**.

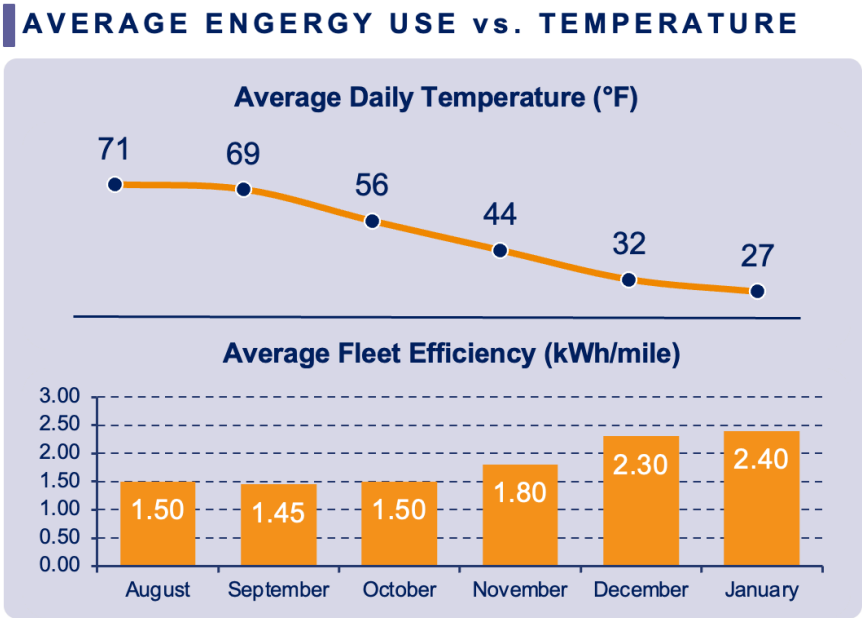


Figure 15. Average fleet energy use and average daily temperature by month.

The magnitude varied by vehicle, route, class, and operating profile.

For Class 8 trucks, kWh-per-mile consumption increased by approximately **21% to 45%** between warmer and colder months. These trucks generally recorded the larger absolute increases in kWh-per-mile.

Medium-duty trucks showed a wider range of results, with increases from **10% to 126%.** Two trucks recorded comparatively moderate increases, while one truck showed a much more pronounced increase under sustained cold-weather conditions.

Figure 16 shows the profile of that truck, which recorded the largest proportional increase observed in the pilot, reaching 126%.

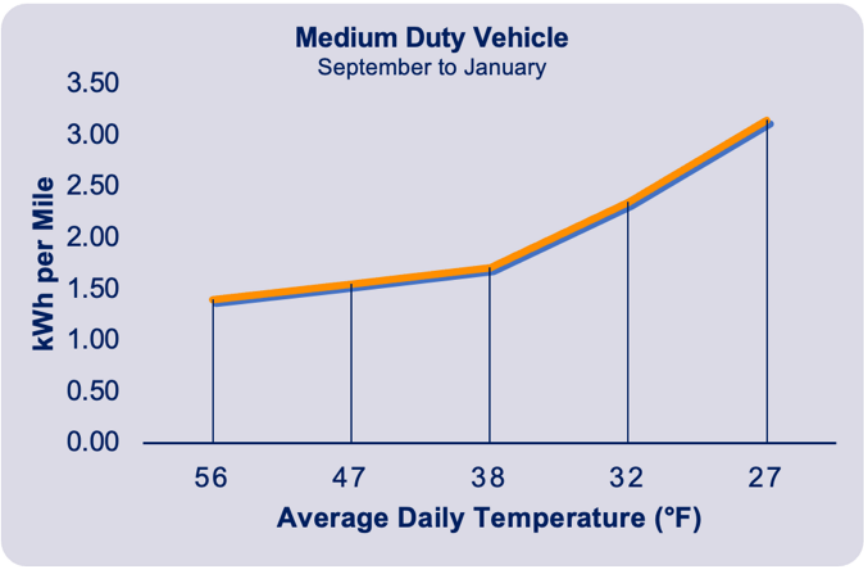


Figure 16. Medium-duty vehicle energy use at different average daily temperatures.

Seasonal variability was the clearest factor observed in the pilot, but it was not the only factor affecting kWh consumption. The next section looks more broadly at the operational and environmental factors that affect electric truck energy use.

kWh Consumption Reflects More Than Road Use

To better understand what affects electric truck energy use in real operations, the project supplemented the pilot data with input from the pilot participant and EV experts with operational and technical experience. These discussions included perspectives from carriers operating electric trucks, an OEM, and a state trucking association. The interviews focused on how kWh consumption is measured, what affects energy consumption, how reliable the data is, and how charging works in day-to-day operations.

The pilot data, pilot participant validation, and EV expert interviews **identified several factors that can affect kWh consumption beyond distance traveled**. The following discussion summarizes the main factors and how they can affect electric truck energy use in real-world operations.

Weather and temperature. KWh-per-mile increased during sustained cold-weather conditions. The pilot participant confirmed that winter range limitations affected operations, resulting in the need for route adjustments, and noted that energy consumption can, in some cases, nearly double in very cold conditions. EV experts explained that cold and hot conditions can affect energy use because of battery management needs. **Temperature was the most pronounced factor observed in the pilot data.**

Payload and operating profile. Payload, route, vehicle use, and operating profile can all affect kWh consumption. During the pilot, payloads and routes changed, and several operational factors affected consumption at the same time. The pilot participant noted that the electric trucks were operating with different payloads, including approximately 14,000 pounds, 13,000 pounds, and 8,800 pounds depending on the vehicle type. Because consumption is influenced by several factors, changes in kWh-per-mile cannot always be isolated to one factor. This reinforces that **energy use reflects how the truck is operated, not only how far it travels.**

Route and terrain. Terrain, elevation, headwinds, and whether a route is primarily urban, regional, or highway can change energy use even when mileage stays the same. These route characteristics were repeatedly identified in the pilot participant validation and EV expert interviews as factors affecting kWh consumption. As a result, **two trucks traveling the same number of miles may use different amounts of energy depending on the route and operating environment.**

Speed and driving pattern. Sustained highway speeds were described as less efficient for EVs, with speeds about 60 miles per hour significantly increasing energy consumption and reducing range. By contrast, urban and multi-stop operations were described as a stronger EV use case because frequent braking allows the vehicle to recover energy through regenerative braking. The pilot participant noted that regenerative braking in multi-stop delivery environments can improve efficiency by up to about 25%, while internal combustion engine vehicles typically use more fuel in stop-and-go traffic. This shows how **speed and driving pattern can shape how efficiently electric trucks use energy.**

Driver behavior and familiarity. Driving style and familiarity with the equipment affected energy use during the pilot. Drivers were still learning the equipment, and improved use of regenerative braking and other best practices likely affected energy consumption over time. EV experts also noted that **operating electric trucks efficiently can require significant training for drivers and operational adjustment before fleets reach optimal vehicle performance.**

Vehicle systems and charging conditions. Electric trucks use energy for more than propulsion. Heating, ventilation, and air conditioning (HVAC), battery thermal management, and auxiliary equipment can draw power without adding miles. Charging conditions can also affect the amount of energy recorded, including how cold the battery is, and how quickly it is charged. The pilot participant noted that some vehicles allow preconditioning, while others require significant energy to bring systems up to temperature. The carrier was also experimenting with reduced charging speeds during winter to preserve battery condition and improve cold-weather readiness. As a result, **recorded kWh may include energy used for systems and equipment, not only for moving the truck.**

Taken together, the pilot data, participant validation, and EV expert interviews showed that electric **trucks operating the same number of miles may consume different amounts of electricity** depending on weather, payload, route, speed, driver behavior, vehicle systems, charging conditions, and vehicle-specific performance. Some of these factors are related to how and where the vehicle operates, others can affect recorded kWh without changing the number of miles driven.

This does not mean electric trucks are less suitable for commercial operations. Electric truck adoption remains limited today, especially in heavier vehicle classes, but the technology is changing quickly. Fleets are still learning where electric trucks work best, and as range, charging options, costs, and day-to-day operations improve, adoption could move quickly in the segments where the business case makes sense.

For the Phase 5 work, the **question was not whether electric trucks can work for commercial operations, but whether electricity consumption is the right basis for a road-use fee.** The data and interviews showed that recorded kWh can change for reasons that are not directly tied to miles traveled.

Under a kWh-based fee, the amount paid could change even when road use does not, weakening the user-pays principle.

Comparison: kWh-Based Fee, Fuel Tax, and MBUF

A kWh-based fee is similar to the fuel tax because both are consumption-based: the fuel tax is based on gallons of fuel consumed, and a kWh-based fee is based on electricity consumed. That makes a kWh-based fee relatively easy to explain as the electric equivalent of the fuel tax, but it also carries forward the fuel tax's core limitation: **energy consumption is only an indirect proxy for road use.**

Table 11 compares the basic structure, data needs, and road-use connection of the three approaches.

Comparison factor	Fuel tax	kWh-based fee	MBUF
Basis for fee or tax	Fuel consumed	Electricity consumed	Miles traveled
Relationship to road use	Indirect	Indirect; with stronger sensitivity to non-road-use factors	Direct
Primary data needed	Gallons of fuel	kWh used for charging or vehicle energy use	Miles traveled
Administrative structure	Mature and established	Not established	Developing; potential to build on existing mileage and compliance systems
Data availability	Generally available through established fuel tax systems	Challenging; varies by charger, vehicle, OEM, telematics provider, and fleet system	Generally available for other business and compliance purposes
Data standardization	Established	Not yet consistent across systems	A mile is a fixed unit

Table 11. Comparing Fuel Tax, kWh-Based Fee, and MBUF.

The fuel tax worked historically because fuel consumption was a practical proxy for road use. Over time, that proxy has weakened as vehicles have become more fuel efficient and fuel consumption varies more widely. **For a kWh-based fee, the pilot data showed that this limitation is already evident because kWh consumption can vary sharply for reasons beyond road use.**

The collection structure of the fuel tax is highly efficient, having matured over more than a century. Currently a kWh-based fee does not have the same administrative structure for trucks, especially where charging may occur through public chargers, private depot chargers, vehicle-reported data, or multiple charging platforms. The pilot participant reported that **collecting and collating charging data across systems can be cumbersome, manual, and prone to error.**

Table 12 focuses on the factors that can affect the amount paid. Under both the fuel tax and a kWh-based fee, the amount paid can change because of operating conditions. The pilot data showed that this effect can be more pronounced for kWh consumption, especially in winter conditions.

Operational factor	Fuel tax	kWh-based fee	MBUF (per-mile charge)
Driver behavior	Yes	Yes	No
Weather and temperature	Yes	Yes, materially in winter	No
Route and terrain	Yes	Yes	No
Vehicle age or condition	Yes	Yes	No
Vehicle systems and charging conditions	Yes, varies by vehicle + operation	Yes, materially	No

Table 12. Operational factors that can affect the amount paid.

A kWh-based fee would reflect energy consumed, not miles traveled. Because energy consumption varies with climate and operating conditions, costs may significantly change even when road use does not.

A distance-based fee is more directly tied to road use because the amount owed is based on miles traveled, not energy consumed. **This better supports the user-pays principle because payment changes with use of the road network, rather than with energy consumption that may be affected by weather, charging conditions, vehicle systems, or driving style.** For trucks, the rate structure would still need to address policy choices such as vehicle class, weight, and administrative approach. But the underlying measure is clearer: **a mile is a fixed unit, and distance traveled is directly linked to road use.**

> *A mile, is a mile, is a mile.*
>
> -- MCWG member

KEY FINDING 2

A kWh-based Fee Is Not a Practical Transportation Funding Solution Under Current Conditions

A kWh-based fee is attractive because it feels familiar. For over a century, fuel taxes have linked road funding to energy consumption. A charge on electricity can look like the electric version of that model: energy is used, energy is charged, and the charge supports the transportation system.

The Phase 5 pilot showed that the concept would be difficult to apply at scale under current conditions. A kWh-based fee can be calculated, but the charging data needed to support it was not consistently available, reliable, or standardized across vehicles and reporting systems. Unlike the fuel tax, where the collection structure has matured over a time, a kWh-based fee carries the same consumption-based logic into an electric truck environment with an immature collection structure and limited data standardization.

kWh consumption also reflects more than road use. The pilot showed that operational volatility in kWh consumption is material and can be substantial, especially in colder conditions. Stakeholder interviews reinforced that electric truck efficiency depends heavily on operating profile. In some cases, electric trucks can be more efficient than comparable internal combustion engine vehicles, particularly in urban operations where regenerative braking can provide an advantage. In others, especially rural and highway travel, that advantage may be less clear.

At the current state of technology, the sensitivity of kWh consumption to short-term operational effects raises concerns about using kWh as the basis for charging for road use. Compared with a distance-based approach, which is not affected by short-term operating conditions, a kWh-based fee would be more variable and harder to administer consistently.

In the current environment, a kWh-based fee is not a practical solution. A kWh-based fee may remain part of future policy discussions as electric truck data and charging systems mature, but based on the pilot findings, it is not ready to serve as the primary basis for a truck road funding framework.

SECTION

03

THE EASTERN TRANSPORTATION COALITION

CONNECTING FOR SOLUTIONS

Consolidation of Taxes & Fees

Phase 5 examined whether truck-related taxes and fees could be simplified or consolidated, and what that would mean for administrative burden and cost distribution.

TOPIC

03

Consolidation

Consolidation of Taxes & Fees

Overview

Motor carriers pay a range of federal, state, and local taxes and fees. Some are built into the cost of fuel, equipment, or tires. Others require carriers to file, report, pay, keep records, reconcile accounts, and support audits. Reducing reporting burdens and keeping requirements simple and straightforward have been key priorities for motor carrier stakeholders throughout previous STSFA grant work.

For motor carriers, simplification means fewer fees, fewer filings, fewer payment points, and fewer records to manage. It does not mean reducing overall contributions to maintaining the transportation system. Rather, it is a request to keep the complex operating and regulatory environment of the motor carrier industry in mind when considering any funding changes.

MCWG members identified this topic as a high-priority area for continued exploration. Their input focused on the practical burden motor carriers face today. Members noted that not all taxes and fees create the same type of burden. Some are tied to specific purposes, dedicated funds, or existing obligations, while others require recurring filing, payment, recordkeeping, and audit support from carriers.

Members also emphasized the need for greater transparency around how much motor carriers already contribute to the transportation system. Any consolidation approach would need to be evaluated based on feasibility and practical application, including whether it could fit within existing systems, reduce work in practice, and avoid creating new burdens for carriers or agencies.

Phase 5 examined what consolidation of taxes and fees could mean in practice by looking at how truck-related taxes and fees are administered today, where the processing and reporting work sits, how revenue flows, and what may happen when federal taxes and fees are translated into simplified illustrative rate structures.

KEY QUESTION

Can consolidation of motor carrier taxes and fees reduce practical administrative work, while preserving a reasonable connection between road use and payment?

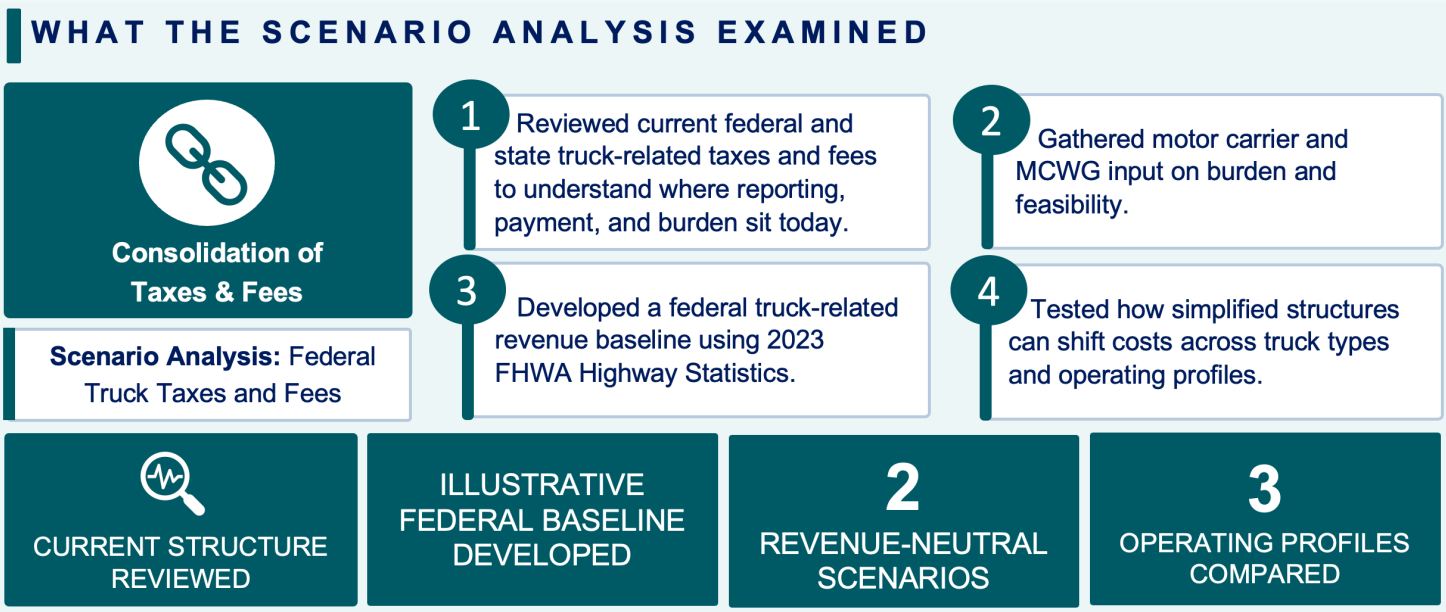


Figure 17. Overview of the Phase 5 consolidation scenario analysis.

What We Did

Phase 5 examined consolidation from both an administrative and rate-structure perspective. The work reviewed federal truck-related taxes and fees to understand how they are collected, who administers them, where revenue flows, and where motor carriers have direct filing, payment, recordkeeping, or audit responsibilities.

Motor carrier input was gathered to understand where administrative burden is perceived today, and which requirements may be viewed as more complex or time-consuming. This input was used alongside MCWG discussions and the technical review of existing taxes and fees.

The work also developed illustrative revenue-neutral scenarios using federal truck-related taxes and fees. These scenarios were used to test how simplified structures could affect administrative burden, cost distribution, and the relationship between road use and payment.

Scenario Inputs and Design

A central part of the consolidation work was an illustrative scenario analysis of federal truck-related taxes and fees. The purpose was to test how existing revenue could be translated into simplified structures and what those structures could mean for administrative burden, cost distribution, and the connection between road use and payment.

The scenario analysis used federal truck-related taxes and fees as the baseline because they provide a consistent national reference point. State and local taxes and fees were reviewed as part of the broader consolidation discussion, but they were not included in the scenario calculations because they vary widely by jurisdiction and require separate state-by-state assumptions.

The project team **designed scenarios to isolate the effect of different structures, not to model every policy option that could be considered in a real implementation**. This allowed the analysis to compare how cost responsibility changes when the same revenue target is collected through different approaches, including mileage-based structures and flat annual fees.

The scenario analysis used five main inputs: the revenue to be recovered, vehicle and mileage base used for the calculation, structure used to allocate the cost, and example operating profiles to show potential impacts.

Table 13 summarizes the components used for the federal truck tax and fee scenario analysis.

Element	Data source / basis	Purpose
Revenue baseline	HTF / truck-related revenue estimate	Defines amount to be recovered
Number of vehicles	FHWA 2023 vehicle counts	Defines tax/fee base
Mileage assumptions	FHWA 2023 average annual mileage	Converts revenue into per-mile equivalents
Scenario structure	Single rate, segmented rate, flat annual fee	Shows how structure affects allocation
Operating profiles	Long-haul, regional, lower-mileage examples	Shows effect on different carriers

Table 13. Calculation components for the federal truck tax and fee scenario analysis.

The scenario analysis tested how the same revenue target could be allocated differently depending on the structure used. A mileage-based structure keeps payment tied to miles traveled, while a flat annual fee assigns the same amount within a vehicle group regardless of actual annual mileage.

This difference becomes visible when the results are applied to different operating profiles. A long-haul truck, a regional truck, and a lower-mileage truck may fall within the same vehicle group, but they do not travel the same number of miles each year.

Results & Learnings

Motor Carrier Input

Phase 5 included a survey to ground the consolidation analysis in motor carrier experience and to identify where carriers perceive administrative burden and complexity. The results also informed the review of which taxes and fees may be stronger or weaker candidates for consolidation.

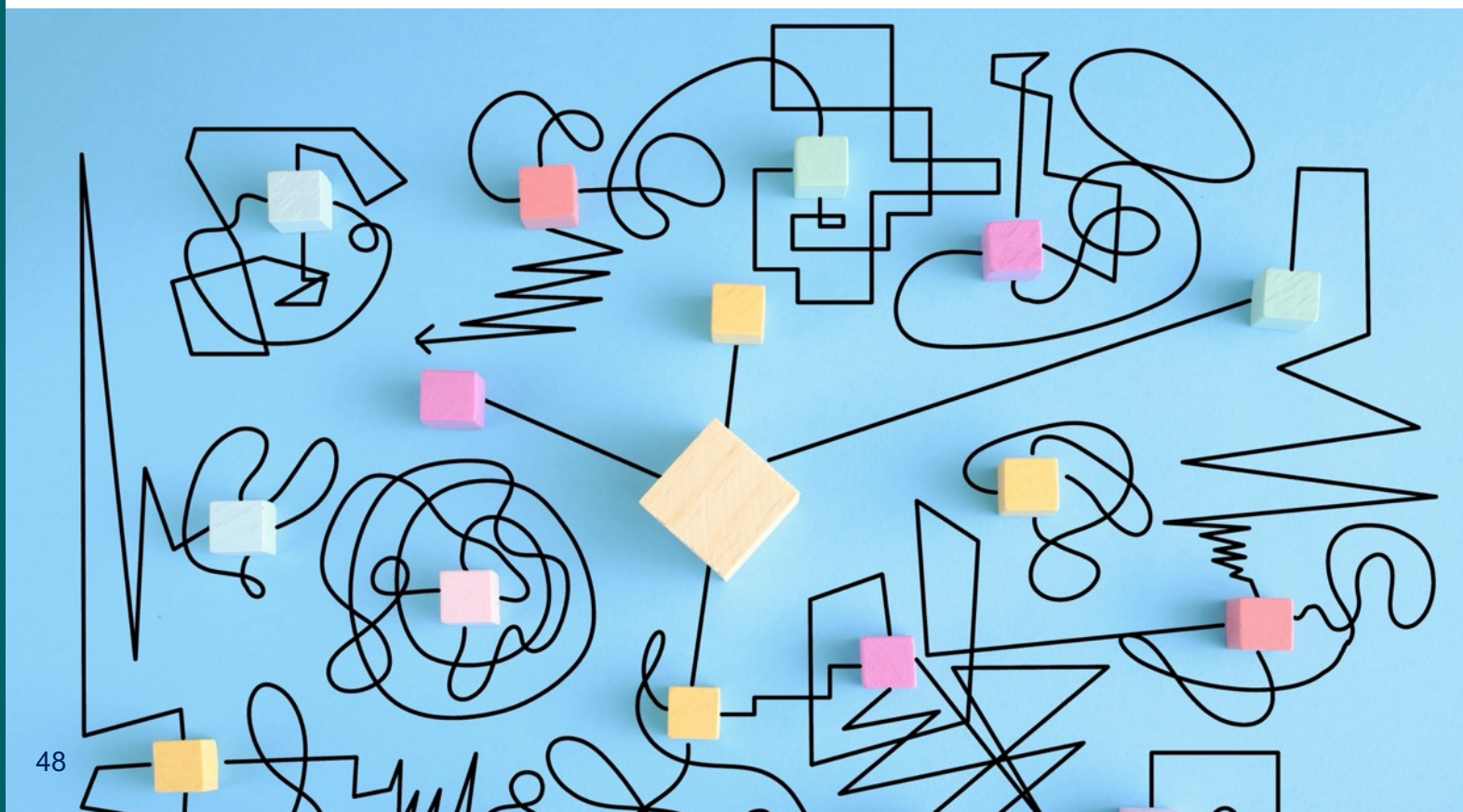
The survey was distributed to almost 15,000 motor carrier stakeholders and 104 responses were received. Given the low response rate, the results were treated as directional input rather than a statistically representative industry finding. They were used alongside MCWG input, stakeholder discussions, and the technical review of existing taxes and fees.

However, the survey provided an important lesson. Many respondents were unable to provide detailed estimates of compliance time and cost by tax or fee.

This does not mean the burden is not real. Rather, it suggests that information about **tax and fee compliance costs is often fragmented across motor carrier operations**. The staff who manage payments, filings, permits, registrations, fuel tax reporting, accounting, and audit support may not sit in one place within a company or be the person receiving or completing a survey.

This result was consistent with what we heard from the MCWG. Members reported that it can be difficult to obtain front-line input from the motor carrier industry, especially where participation is voluntary and the people closest to day-to-day compliance have limited time to respond.

As a result of the survey effort and MCWG guidance, the analysis shifted from ranking individual taxes and fees to examining the structure of the current system, where administrative work sits, how revenue flows, and how different simplified structures could affect cost distribution.



Current Structure of Taxes and Fees

Before testing any simplified structure, the first step was to understand the current one. **The existing truck tax and fee environment is a collection of taxes, fees, filings, payment points, and records that sit in different places and serve a range of purposes.**

Truck-related taxes and fees are collected through different mechanisms. Some are collected through the fuel supply chain, at the point of sale, or through manufacturers. Others require direct filing, reporting, payment, recordkeeping, or audit support by the motor carrier. Understanding where these activities sit today is necessary when assessing the practical value of consolidation.

A full list of the federal and state taxes and fees reviewed is provided in Appendix C.

Some taxes and fees create more direct burden than others.

At the federal level, most truck-related taxes create limited direct filing burden for motor carriers. The federal diesel tax is collected through the fuel supply chain and embedded in the retail price. Federal excise taxes on trucks and trailers are collected at the point of sale. Tire excise taxes are collected through manufacturers or importers. Carriers pay these taxes or fees directly or indirectly but generally do not report or remit them as a separate task.

There are federal exceptions. The Heavy Vehicle Use Tax (HVUT) and Unified Carrier Registration (UCR) require direct filing and payment by carriers.

At the state level, the structure is different. Interstate motor carriers reconcile state fuel taxes through IFTA. State registration fees are reported and reconciled through IRP for heavy vehicles traveling interstate. State weight-distance taxes, where applicable, require direct interaction with the administering state. Other taxes or fees, such as oversize and overweight permits, tolls, local fees, or special access charges, may also require direct carrier action depending on the structure.

This structure shows why consolidation is not just a question of combining more taxes and fees into fewer line items. **The key questions are whether consolidation would reduce recurring filing, reporting, payment, audit, or administrative work for motor carriers and agencies, and whether changes to the collection or calculation method could change how costs fall across different types of carriers, operations, or jurisdictions.**

Initial Screening of Administrative Consolidation Potential

Based on the current-structure review, the taxes and fees were screened for their potential to reduce carrier-facing administrative burden. The screening considered whether they require recurring carrier reporting, payment, recordkeeping, reconciliation, or audit support, and whether changing the collection or calculation method could create cost-distribution impacts.

Table 14 summarized the initial screening of the taxes and fees reviewed based on their potential to reduce carrier-facing reporting burden and the need for cost-distribution analysis if the collection or calculation structure changes.

This screening reflects administrative consolidation potential only. It is not a recommendation to consolidate any specific tax or fee. If consolidation changes the calculation basis, such as moving to a per-mile fee, flat fee, or averaged rate, cost impacts would need to be tested separately.

Administrative consolidation potential	Taxes & fees reviewed	Potential reduction in carrier-facing reporting burden	Need for cost distribution analysis
Higher	State weight-distance taxes; state or local truck fees; recurring state-administered taxes and fees	Higher	Lower if rate structure remains unchanged
Moderate	UCR; HVUT; tolls; opportunities to better align with or build on existing IFTA and IRP processes	Medium	Depends on rate structure (per mile/flat/averaging)
Lower	Federal truck/trailer excise taxes; tire excise tax	Lower	Depends on rate structure (per mile/flat/averaging)

Table 14. Administrative consolidation potential by type of tax or fee.

The screening shows that **state-level and recurring carrier-facing taxes and fees may offer greater potential to reduce reporting burden**. However, the clearest way to examine the risk of cost shifts is through federal truck-related revenue streams. The scenario analysis therefore used federal revenue as the illustrative baseline, both because the data was more readily available and because it provided a consistent national basis for showing how a change in calculation structure could change who pays, how much they pay, and how costs are distributed across truck types and operating profiles.

The value of consolidation depends on what is being consolidated. Combining taxes and fees that already create limited carrier-facing reporting burden may reduce the number of revenue streams on paper but may not reduce much day-to-day administrative work for motor carriers. At the same time, **changing the way those taxes or fees are calculated or assigned can still shift costs between carriers, even if total revenue stays the same.**

Taxes and fees that require direct carrier reporting and ongoing compliance may offer greater practical value as consolidation candidates, provided the new structure does not simply move the work elsewhere or disrupt revenue flows tied to specific uses, funds, or obligations.

Revenue Baseline for Scenario Analysis

To calculate the illustrative consolidation scenarios, the project team first needed to establish the revenue, vehicle, and mileage baselines for hypothetical rate calculations.

The baseline was developed using 2023 FHWA Highway Statistics data and included:

1. the current truck share of vehicles and mileage;
2. the estimated truck-related contribution to the Highway Trust Fund; and
3. the vehicle and mileage assumptions used in the hypothetical scenarios.

The scenario analysis was limited to federal truck-related taxes and fees. State-level taxes and fees were reviewed as part of the current structure and burden discussion, but they were not included in the scenario calculations.

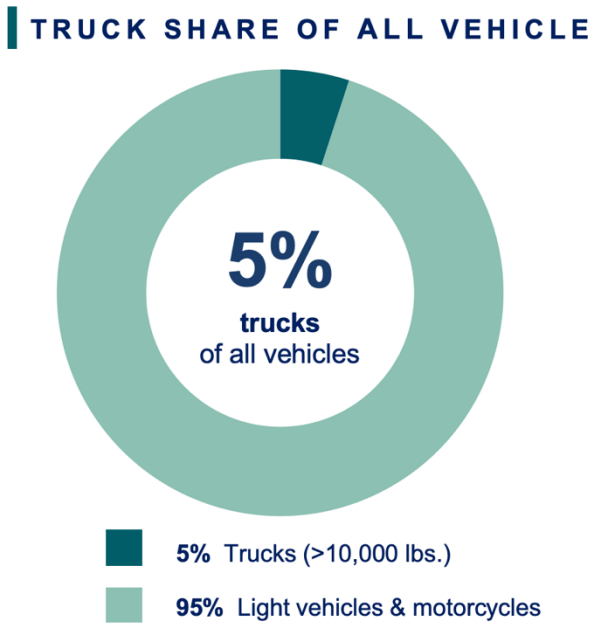


Figure 18. Number of vehicles by type. 2023 FHWA VM-1.

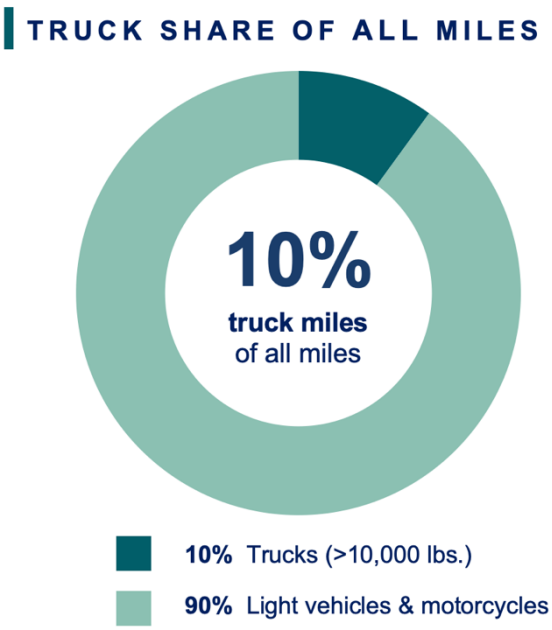


Figure 19. Annual mileage by vehicle type. 2023 FHWA VM-1.

According to the 2023 Federal Highway Statistics, trucks >10,000 pounds represent approximately **5%** of all vehicles nationwide. Light-duty vehicles and motorcycles make up the remaining **95%**.

Trucks account for approximately **10%** of annual miles traveled nationwide. The remaining **90%** is driven by light-duty vehicles and motorcycles.

Truck Share of Highway Trust Fund Revenue

The Highway Trust Fund (HTF) is funded through several federal taxes and fees. Some apply broadly across the vehicle fleet, while others apply specifically to trucks or to fuels, equipment, and use patterns associated with commercial trucking.

HIGHWAY TRUST FUND REVENUE BY SOURCE

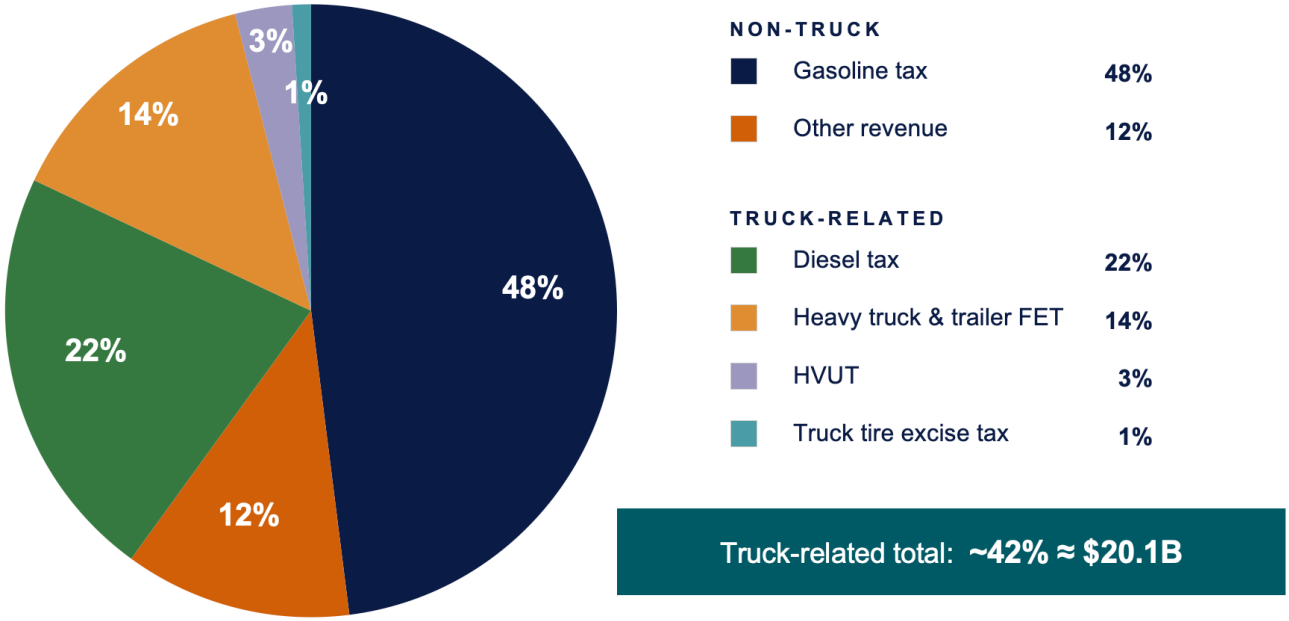


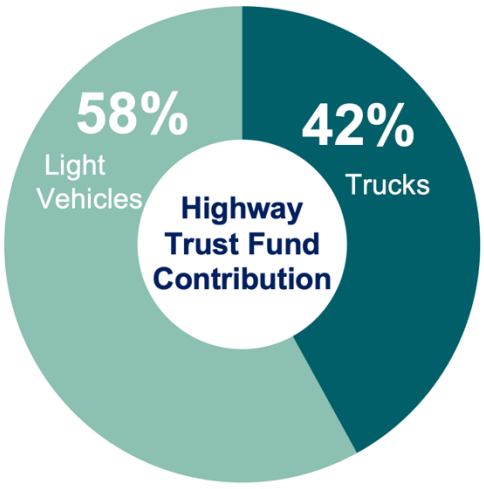
Figure 20. Calculated HTF revenue split. 2023 FHWA FE-9 and FE-210.

For this analysis, the project team used 2023 FHWA Highway Statistics data for HTF receipts as the starting point and identified the portions of revenue most closely associated with truck activity to develop an illustrative truck-related revenue baseline. **Total HTF receipts were approximately $48 billion. The estimated truck-related share was approximately 42%, or about $20.1 billion.** Figure 20 provides a visual overview.

Despite representing only a small share of vehicles and miles, **trucks contribute substantially more to the HTF than their numbers or mileage alone would suggest**. The current federal revenue structure also recognizes that heavier vehicles place greater demands on the transportation network than lighter vehicles.

The truck-related revenue baseline includes diesel fuel tax, HVUT, federal excise taxes on trucks and trailers, truck tire excise tax, and other minor truck-related receipts, such as fines and penalties.

TRUCKING SHARE OF HTF



This is a revenue-neutral 2023 baseline. It reflects revenue under the current system and does not include additional future funding needs or policy-driven adjustments. Actual future rates could therefore be higher or lower depending on the specific revenue target, which taxes or fees are selected for consolidation, and which vehicles are included.

Table 15 summarizes the federal truck-related revenue streams included in the illustrative 2023 baseline calculations, the approximate revenue associated with each source, and how each source was treated in the scenario analysis.

Revenue source	Approximate 2023 revenue	Treatment in scenario	Notes
Diesel fuel tax	$10.95B	Included	Major revenue source
HVUT	$1.38B	Included	Direct truck-specific federal tax
FET on trucks/trailers	$7.1B	Included	Equipment-related revenue
Truck tire excise tax	$0.6B	Included	Truck-related equipment tax
Other (motor carrier fines / penalties)	$0.1B	Included	Interest, fines
Total illustrative truck-related baseline	$20.1 B	Used for scenario analysis	Not proposed revenue target

Table 15. Highway trust fund revenue baseline used for scenario modeling.

Table note: *The attribution of fuel tax revenue was based on a simplifying assumption, whereby the diesel fuel tax is treated as truck-related, while gasoline tax is treated as light-duty vehicle and motorcycle-related. This allowed the analysis to establish an illustrative truck-related revenue baseline, while recognizing that in practice, some trucks over 10,000 pounds use gasoline, and some diesel vehicles may fall below the 10,000-pound threshold. FHWA does not publish federal fuel tax receipts by vehicle weight class and fuel type in a way that allows a precise split for this analysis. A full list of all assumptions used for all calculations can be found in Appendix C.*

Vehicle and Mileage Baseline

The scenarios also required a vehicle and mileage baseline. **The analysis used trucks over 10,000 pounds as the group of vehicles included in the calculation.** The commercial vehicle population was divided into three reference points:

1. all trucks over 10,000 pounds;
2. single-unit trucks; and
3. combination trucks.

As shown in Table 16, this allowed the analysis to compare a single all-truck structure with a segmented structure that recognizes broad differences between single-unit and combination trucks.

Vehicle category	Number of vehicles	Average annual mileage	Estimated total annual miles	Share of truck vehicles	Share of truck miles
All trucks >10,000 lbs.	14,891,540	22,151	329.9B	100%	100%
Single-unit trucks	11,567,428	11,593	134.1B	78%	41%
Combination trucks	3,324,112	58,890	195.8B	22%	59%

Table 16. Vehicle and mileage baseline.

The available FHWA data reports vehicle numbers and annual mileage for single-unit and combination trucks separately. **This split is useful for the scenario analysis because single-unit and combination trucks make up different shares of the truck population and truck miles traveled.**

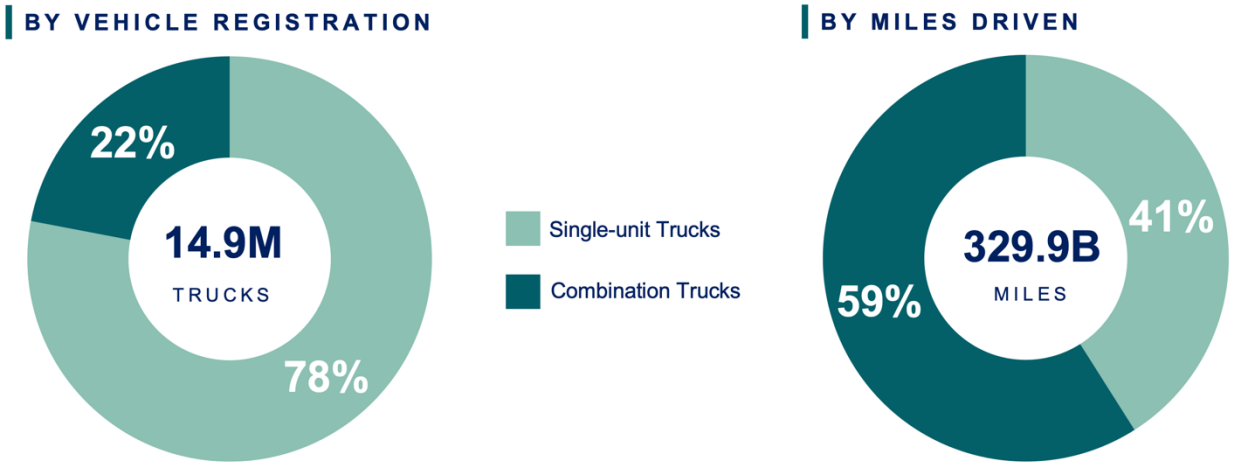


Figure 21. Single-unit and combination truck shares by vehicle count and annual miles traveled, 2023.

Single-unit trucks represent most trucks over 10,000 pounds, while combination trucks account for most truck miles traveled. This difference helps explain why the scenario analysis compared a single all-truck average with separate single-unit and combination-truck averages.

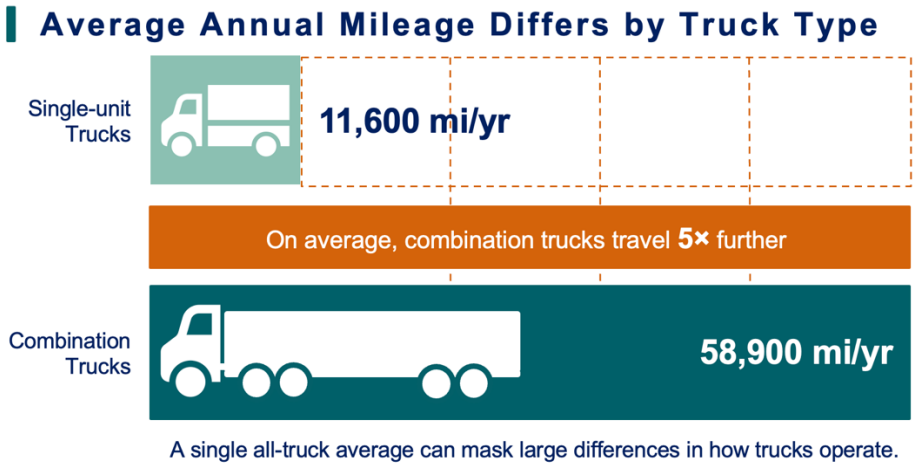


Figure 22. Average annual mileage by truck type.

Average annual mileage also differs widely by truck type. Single-unit trucks average approximately 11,600 miles per year, while combination trucks average approximately 58,900 miles per year, **more than five times as many miles** per year.

Hypothetical Consolidation Scenarios

Using the federal truck-related revenue baseline, the analysis tested two illustrative revenue-neutral structures. **The scenarios were designed to show how different structures affect cost distribution.**

Scenario 1 applied one rate across all trucks over 10,000 pounds. This was the simplest structure tested. The full federal truck-related revenue baseline of approximately $20.1 billion was distributed across all trucks over 10,000 pounds.

Scenario 2 separated single-unit and combination trucks. Federal truck-related revenues were allocated between the two categories using separate assumptions for each revenue source, reflecting differences in mileage, weight, and applicability of current truck-specific charges such as the HVUT. The purpose was to test how revenue-neutral rates would change when the two truck categories are treated separately. A full list of assumptions used for the revenue baseline calculations is provided in Appendix C.

Table 17 summarizes the two illustrative structures tested in the scenario analysis.

Scenario	What it tests	Structure	Main question
Scenario 1	Simplest possible structure.	One rate for all trucks >10,000 lbs.	What happens if all trucks are treated the same?
Scenario 2	Basic segmentation	Separate rates for single-unit and combination trucks	What changes when truck type is recognized?

Table 17. Scenarios overview.

What the Scenarios Show: Averaging and Cost Shifts

The two illustrative scenarios showed how the same revenue baseline can produce different outcomes depending on how the tax or fee is structured. The main difference is how much averaging is used and whether payment remains tied to actual miles traveled.

Revenue-neutral does not mean impact-neutral

Scenario 1 used one average across all trucks over 10,000 pounds. Scenario 2 narrowed the average by separating single-unit and combination trucks. That improves alignment, but it does **not eliminate averaging because individual operations within each group may still differ from the group average.**

The rates shown in the scenarios are not proposed rates and should not be interpreted as recommendations. They were used to test how different structures would affect cost responsibility across truck types and operating profiles.

Table 18 shows how **the same revenue baseline can produce different rates and average annual amounts depending on how trucks are grouped**.

Item	Scenario 1: One all-truck average	Scenario 2: Segmented averages
Revenue baseline	$20.1B	$20.1B
Average used	One average across all trucks	Separate averages by vehicle group
Per-mile rate	$0.0616/mile	Single-unit: $0.0407/mile; Combination: $0.0759/mile
Annual amount at group average	All trucks: $1,364	Single-unit: $472; Combination: $4,468
Main benefit	Simplest structure	Better reflects broad differences between truck types
Main limitation	Treats unlike operations alike	Still averages broadly within each vehicle group

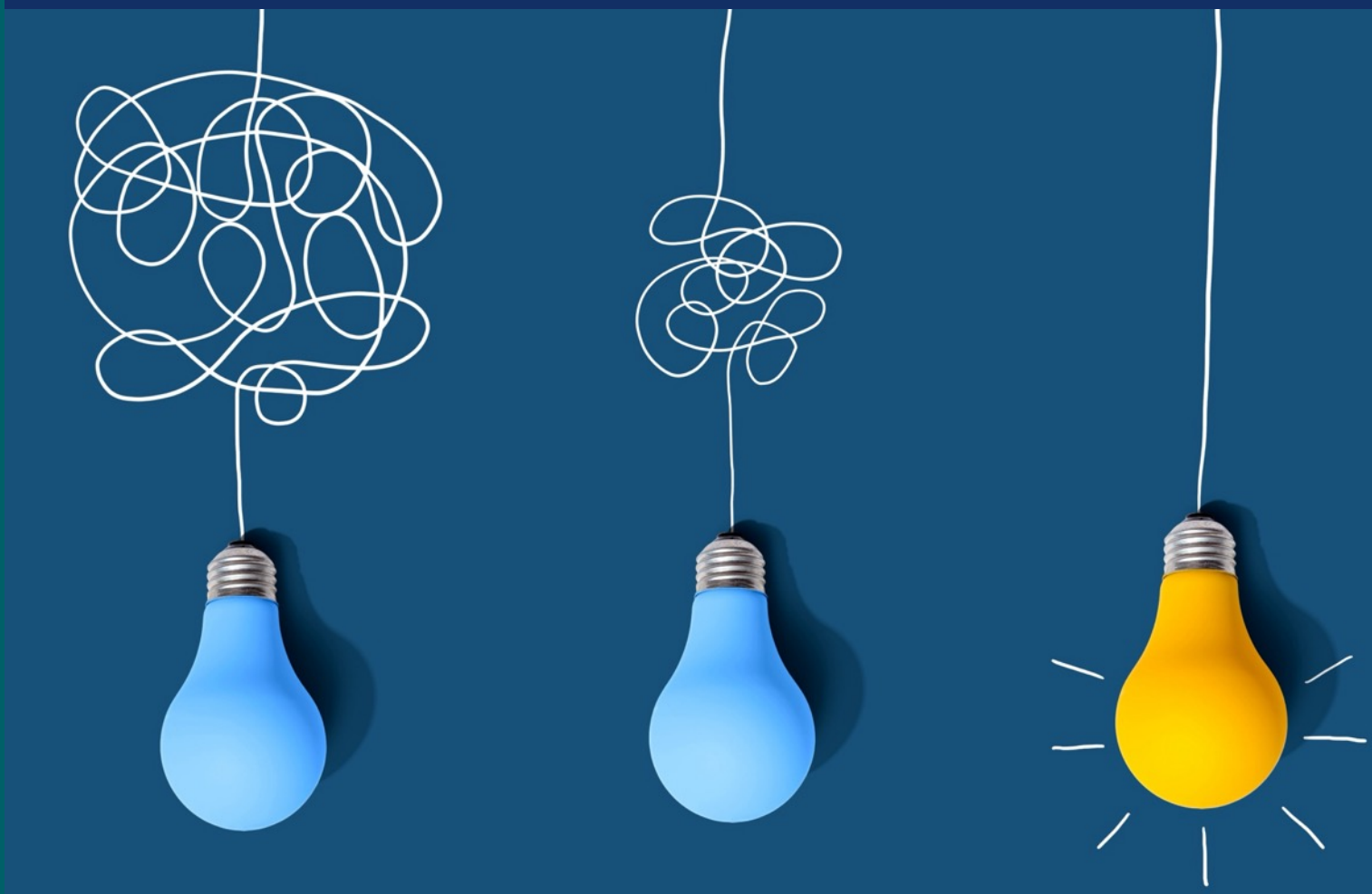
Table 18. Comparing different rate setting scenarios.

Scenario 1 is simpler but treats all operations alike. Scenario 2 better reflects broad differences between truck types but still relies on averages within each group. As shown in table 19 **the level of averaging determines the level of winners and losers, compared to the current system.**

Operation / use case	Scenario 1: All-truck average MBUF rate $0.0616/mile	Scenario 2: Single-unit MBUF rate $0.0407/mile	Scenario 2: Combination vehicles MBUF rate $0.0759/mile
Single-unit truck: 11,593 mi/year	$714	$472	—
Combination truck: 58,890 mi/year	$3,628	—	$4,470

Table 19. Impact of averaging across scenario 1 and 2.

The type and structure of consolidation determine the outcome. Between the scenarios the revenue target stayed the same, but the average used in the calculation changed how cost responsibility was assigned across different operations.



Flat Annual Fees Weaken the User-Pay Principle

The analysis then compared a per-mile structure with a flat annual fee, using combination trucks as an example. The comparison used the Scenario 2 rate of $0.0759 per mile for combination trucks and the equivalent flat annual fee of $4,468. This showed how **the financial impact changes, depending on how far an operation sits from the average mileage used to set the rate**, and **whether the tax or fee is tied to actual mileage or applied as a fixed annual amount.**

Three simplified operating profiles were used:

1. a **long-haul truck scenario**, representing a high-mileage operation;
2. a **regional truck scenario**, representing an operation close to the category average; and
3. a **lower-mileage truck scenario**, such as local or last mile, representing an operation that travels materially less than the average.

Table 20 compares the annual amount under a flat annual fee with the amount that would be paid under the illustrative per-mile rate for each operating profile. Under the flat annual fee scenario, all three operating profiles were assigned the same annual amount, regardless of road use. Under the per-mile approach, payment changed with use.

Operation / Use Case *Combination truck*	Annual miles used	Flat annual fee	MBUF rate ($0.0759/mile)	Difference under flat annual fee
Long-haul truck	120,000	$4,468	$9,108	-$4,640
Regional truck	60,000	$4,468	$4,554	-$86
Local or last mile	40,000	$4,468	$3,036	+$1,432

Table 20. Annual fees vs. per-mile fee. Combination truck use cases.

Table 21 shows the same comparison as an effective per-mile cost. **Under a flat annual fee scenario, all trucks in the same category pay the same amount, regardless of how many miles they travel.** Higher-mileage operations spread the amount over more miles, paying less per mile, while lower-mileage operations face a higher effective cost per mile.

Operating Profile	Annual miles assumed	Flat annual fee	Effective cost per mile under flat annual fee	Relative impact
Long-haul	120,000	$4,468	~$0.037/mile	Pays about 2x more under MBUF structure than under the flat annual fee
Regional	60,000	$4,468	~$0.074/mile	Roughly aligned under both structures
Local or last mile	40,000	$4,468	~$0.112/mile	Pays one-third less under mileage-based structure than under the flat annual fee

Table 21. Effective per-mile cost and relative difference. MBUF vs. flat annual fee.

The **exact rate value used in this scenario is illustrative. The key point is the impact across different operating profiles.** In the illustrative combination-truck scenario, the local or last-mile truck had about three times the effective per-mile cost of the long-haul truck, while the regional truck fell in between at about twice the long-haul cost.

This comparison shows that the structure of the tax or fee determines how costs are distributed.

- Under a mileage-based structure, lower-mileage operations pay less because payment follows actual miles traveled.
- Under a flat annual fee, higher-mileage operations benefit because the same annual amount is spread over more miles.

> *"MCWG members also raised the broader question of how a user-based approach can be maintained if simpler flat-fee structures continue to gain policy attention."*

The total revenue target may stay the same, but cost responsibility shifts between operating profiles.

Simplification and fairness are not the same.
A flat fee is simpler, but it also moves payment away from actual road use.

Revenue Flow, Governance, and Administration

The scenario analysis showed that federal truck-related taxes and fees can be converted into illustrative rates or fees. However, rate calculation is only one part of consolidation. A consolidated structure would also need to address revenue flow, governance, and administration.

The scenario analysis point to three key considerations.

The structure of the tax or fee determines the outcome. The same revenue baseline can produce different results depending on whether the structure uses one broad average, separates truck categories, or converts the amount into a flat annual fee. Segmenting single-unit and combination trucks improves alignment, but it does not remove averaging within each group. The broader the average, the greater the potential mismatch between payment and actual operations.

The administrative value of consolidation depends on what is being consolidated. Some taxes generate significant revenue but create limited direct filing work for motor carriers because they are collected upstream or at the point of sale. Consolidating those taxes and fees may reduce the number of revenue streams on paper, but it may not reduce much day-to-day reporting work for carriers. Taxes or fees that require recurring reporting, filing, payment, recordkeeping, or audit support may offer greater practical value as consolidation candidates, provided the new structure does not simply move the work elsewhere.

Revenue flow and governance also need to be part of the assessment. Consolidation is not only a rate question. It can affect collection, reporting, verification, revenue distribution, audits, refunds, credits, enforcement, and administrative responsibility. Some revenue streams may also be tied to specific purposes, dedicated funds, existing programs, or obligations.

Table 22 lists several governance design questions identified that a consolidated structure would also need to address.

Function	Consolidated structure question
Collection	Who collects the consolidated taxes and fees?
Reporting	What must carriers report?
Verification	Who verifies mileage, vehicle category, exemptions?
Revenue distribution	How are funds allocated to programs/jurisdictions?
Audit	Who audits and under what authority?
Refunds/credits	How are credits or overpayments handled?
Enforcement	Who enforces nonpayment or underreporting?

Table 22. Consolidation implications by functions.

A consolidated structure may reduce visible payment points, but it does not remove the underlying governance and administrative questions. Those questions still need to be resolved.

Taken together, the work shows that any future approach should be evaluated not only for whether it can be calculated, but for how it affects motor carriers, agencies, revenue flows, and the relationship between use and payment.

KEY FINDING 3

Flat Fees May Simplify Payment, but They Weaken the Link Between Road Use and Payment

Consolidation is attractive because motor carriers manage many taxes, fees, filings, records, accounts, and audits. Fewer taxes or fees and fewer payment points may appear to simplify the system, but the practical value of consolidation depends on what is being consolidated and how the new structure is designed.

The Phase 5 work showed that reducing the number of taxes or fees does not automatically reduce administrative burden. Some taxes and fees are already collected upstream, through the fuel supply chain, at the point of sale, or through manufacturers. Combining those taxes and fees may reduce the number of revenue streams on paper, but it may not reduce much day-to-day reporting work for carriers. Taxes and fees that require recurring carrier reporting, payment, recordkeeping, reconciliation, or audit support may offer greater practical value as consolidation candidates, provided the new structure does not simply move the work elsewhere.

Administrative burden is only one part of the consolidation question. The structure of the tax or fees determines how costs are distributed. The scenario analysis showed that revenue-neutral does not mean impact-neutral. The same revenue target can produce different outcomes depending on how trucks are grouped and how the tax or fee is applied. Broad averages can shift cost responsibility between truck types, mileage patterns, and operating profiles.

Flat annual fees make this tradeoff most visible. They are simple to explain and may be easier to administer, but they assign the same amount regardless of actual miles traveled. Higher-mileage operations spread the fee over more miles, while lower-mileage operations face a higher effective cost per mile. In the illustrative scenario, the local or last-mile truck had about three times the effective per-mile cost of the long-haul truck.

The example shows why the structure of consolidation is a critical factor. A flat fee can reduce visible payment complexity, but it also moves payment away from actual road use. A simpler structure is only useful if it reduces practical work and keeps a reasonable connection between what a carrier pays and the vehicle's road use. Consolidation should therefore be judged by both effects: whether it reduces the work carriers and agencies must do, and whether it avoids unintended cost shifts between different types of motor carrier operations.

SECTION

04

THE EASTERN TRANSPORTATION COALITION

CONNECTING FOR SOLUTIONS

Roles & Responsibilities

Phase 5 identified key administrative functions and reviewed existing structures to understand how different allocations of responsibility and governance could affect motor carriers, agencies, and other system participants.

TOPIC

04

Roles

Roles & Responsibilities

Overview

Interstate freight does not stop at state lines. A truck may cross several jurisdictions in a single day, and the administrative requirements tied to that trip could vary by jurisdiction depending on how a future funding framework is structured. Previous Coalition work showed that temporary or independent state solutions can affect the ease of interstate commerce.

For that reason, the roles and responsibilities question is not a secondary implementation detail; it is central to whether a future truck funding approach can work consistently across jurisdictions. A future framework would need enough consistency and interoperability to work across jurisdictions without creating new layers of compliance cost for motor carriers.

Prior truck pilots showed that MBUF transactions can be measured, processed, and reported. However, technical capability alone does not answer the administrative question. Unlike the fuel tax, which is collected upstream through the fuel supply chain, MBUF would move revenue collection closer to the user. That shift raises practical questions about reporting, verification, enforcement, and revenue assignment.

A future truck funding framework would need to define the administrative responsibilities behind taxes and fees and how carriers interact with the funding framework. This becomes more difficult in a multi-state setting if states develop different classifications, reporting rules, billing processes, audit requirements, or support pathways.

MCWG members identified roles and responsibilities as a key topic for continued exploration because the issue has received less attention than the technical feasibility of mileage reporting. They emphasized the need to avoid fragmentation and consider how administrative requirements could scale as more jurisdictions or vehicle types are included.

Phase 5 examined this issue from a practical implementation perspective, focusing on what a future framework could mean for motor carriers, agencies, and other entities involved in operating or supporting the funding structure.

KEY QUESTION

What administrative functions are needed in a multi-state truck funding framework, and what do existing reference structures show about how responsibility, burden, cost, risk, and accountability may shift?

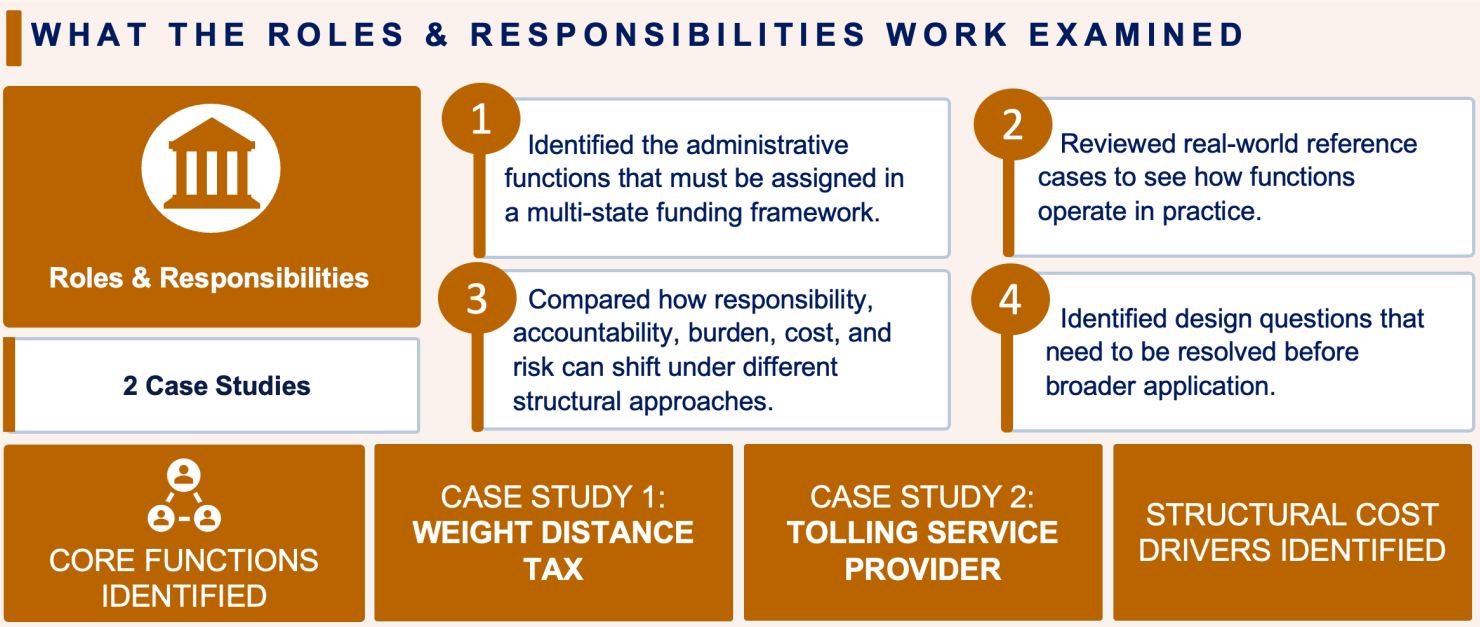


Figure 23. Summary of the Phase 5 roles and responsibilities work.

What We Did

The roles and responsibilities work examined the administrative functions that must be performed, where responsibility could sit, who may remain accountable, and how those choices could affect motor carriers, agencies, and other entities in a multi-state setting. It did not, however, attempt to design a final operating structure for a future truck funding framework.

The work began with a review of prior Coalition truck pilots and administrative framework work, with a focus on the practical questions that would need to be resolved before broader application. The work also looked more closely at the agency side of a future framework, which had not been explored in detail in previous truck pilot work.

The analysis used case studies to help validate and refine the functions identified and to examine how responsibility, accountability, burden, cost, and risk could shift under different structural approaches.

Stakeholder input was incorporated through MCWG discussions, motor carrier engagement, and agency engagement during related Phase 5 activities. This input helped identify motor carrier priorities, agency and institutional priorities, and design questions that would need to be resolved before broader application.

Case Studies Reviewed

Two case studies were selected to understand how administrative responsibilities operate in practice and how burden, cost, risk, and accountability can appear in a future multi-state truck funding framework. One case study examined a state-administered distance-based truck tax, while the other examined a service-provider structure that developed in response to a fragmented payment environment.

Case Study 1: Weight Distance Tax

Kentucky's Weight Distance Tax was reviewed because it provides an existing example of a state-administered distance-based tax for heavy trucks. The review was supported by the Kentucky Transportation Center and focused on the agency side, which had been less explored in previous Coalition truck work.

Case Study 2: Tolling Service Provider

Fleetworthy, formerly Bestpass, was reviewed because it provides an example of how industry responds when payment and account-management environments are fragmented. The case study was used to understand the administrative functions involved in a multi-entity payment environment.

Together, the case studies helped translate real operating examples into practical design questions: which roles and responsibilities must be assigned, where coordination is required, and where unresolved choices could create burden, cost, risk, or accountability gaps.

Results & Learnings

Core Functions

Every transportation funding mechanism requires administration. The difference is where that administrative work sits and how complex it becomes at scale. Fuel tax is collected upstream, and for interstate trucking, is redistributed through existing structures. A flat fee relies mainly on registration and billing. Tolling depends on facility use, account management, billing, and violation processing. Weight-distance taxes and MBUF depend more directly on reported travel activity, which makes clear rules for reporting, payment, verification, and enforcement especially important.

In a multi-state truck MBUF framework, core functions become both more complex and more important because trucks routinely cross jurisdictional boundaries. A carrier may travel through several states in one week, so the framework must define which vehicles are subject to the tax or fee, which miles are taxable, which rate applies, who bills the carrier, who receives the money, who verifies compliance, who audits, and how revenue is assigned to the correct jurisdiction. For agencies, clear roles are also needed to support compliance, reduce evasion risk, and protect revenue integrity.

The work identified three connected layers of responsibility:

Governance and Business Rules

This layer establishes the rules of the funding framework. It defines who has authority over program requirements, eligible vehicles, rate-setting basis and structures, reporting standards, liability, dispute processes, and how changes are handled over time.

Oversight and Control Mechanisms

This layer protects the integrity of the funding framework. It includes audit, enforcement, certification, provider oversight, compliance monitoring, and dispute resolution.

Operational Lifecycle

This layer covers the day-to-day administration of the funding framework. It includes registration, data reporting, validation, rate calculation, billing, payment, reconciliation, customer support, and settlement.

The layers are connected. Operational tasks depend on clear business rules. Oversight depends on knowing what records, data, and processes are required. When one layer is unclear, burden may appear somewhere else in the system.

Rate setting provides one example. Prior Coalition work showed that uniformity does not require identical rate amounts across jurisdictions. Jurisdictions can retain rate-setting authority while operating within a uniform base and structure, supported by common rules for rate application, reporting, and reconciliation.

The challenge is to determine where consistency is needed, where variation can be accommodated, and how responsibility and accountability are assigned across the framework.

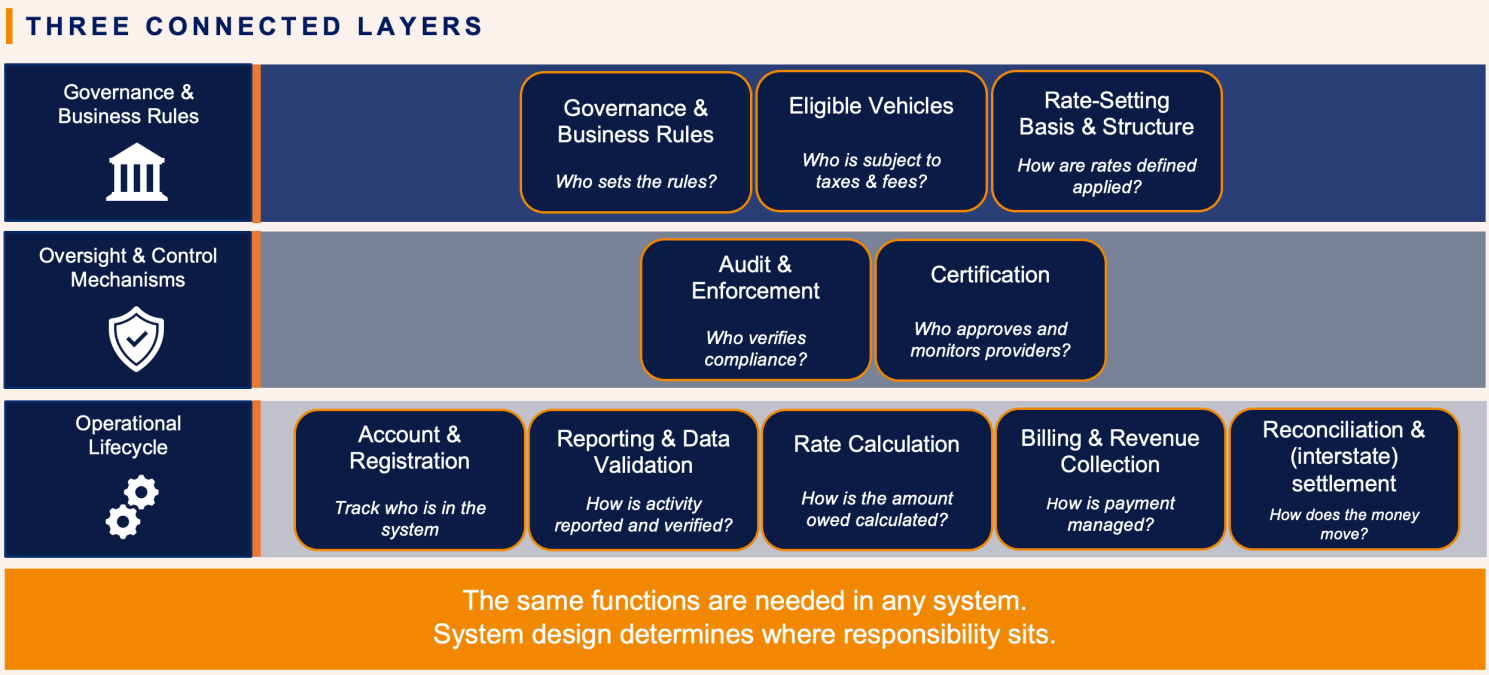


Figure 24. Three connected layers of administrative functions in a multi-state truck MBUF framework.

The roles and responsibilities work identified the core functions that must be assigned in any future multi-state truck MBUF framework. Table 23 summarizes these functions, the core questions they raise, and their purpose. Appendix D provides a more detailed description of each function.

Function	Core question	Purpose
Governance and business rules	Who sets and changes the rules?	Establishes decision-making authority, standards, liability allocation, dispute rules, and long-term system control.
Eligible vehicles	Who is subject to the tax or fee?	Defines which vehicles, operations, or weight categories are included in the framework.
Rate-setting basis and structure	How are rates defined and applied?	Defines the rate-setting basis, structure, classifications, exemptions, and jurisdictional rate-setting authority.
Certification and provider oversight	Who approves and monitors system participants?	Supports consistency where account managers, technology providers, or other intermediaries are involved.
Audit and enforcement	Who verifies compliance?	Defines who can review records, identify errors, enforce payment, apply penalties, and resolve non-compliance.
Account and registration	Who is in the system?	Defines the responsible party, fleet or vehicle structure, and entry point into the program.
Reporting and data validation	How is activity reported and checked?	Establishes the reporting method, data fields, reporting frequency, validation rules, and recordkeeping requirements.
Rate calculation	How is the amount owed calculated?	Applies the adopted rates and rules to reported activity and determines amounts owed by jurisdiction.
Billing and revenue collection	How is payment requested and received?	Determines who issues bills, collects payment, manages credits or refunds, and communicates with carriers.
Reconciliation and settlement	How does the money move?	Assigns revenue to the appropriate jurisdictions and supports correction, netting, and transfer of funds.

Table 23. Core functions in a multi-state transportation funding framework.

These functions are required regardless of the funding or operating structure selected. Each function needs an owner, a clear decision point, and a clear accountability.

When responsibilities are unclear, work can be duplicated or handled inconsistently across jurisdictions, increasing complexity and burden for both motor carriers and agencies.

Governance Structures Can Assign Responsibility in Different Ways

Identifying the core **functions** shows what must happen for a future truck funding framework to operate. Assigning responsibility for those functions is the next step. The question is where those responsibilities sit in practice.

For this discussion, **responsibility** means who must make sure a function is performed and who remains accountable. A **role** describes what each participant does within the framework.

At a minimum, two parties are directly involved: the **motor carrier** and the **jurisdiction**. The motor carrier is the regulated party, while the jurisdiction is the public authority. In a simple structure, the carrier may report and pay directly to the jurisdiction, and the jurisdiction may manage the rules, revenue, compliance, audit, and enforcement functions directly. In other structures, some tasks may be supported by a base jurisdiction, shared mechanism, account manager, technology provider, clearinghouse, or other service entity.

These roles can be combined or separated. A party may support a task without becoming accountable for it. For example, a service provider may help a carrier manage reporting, billing, payment, or customer service, but the carrier may still remain responsible to the jurisdiction for meeting its obligations unless the framework assigns responsibility differently.

The purpose was not to recommend one structure over another, but to understand where coordination is required and how different funding frameworks may shift burden, cost, accountability, and risk among motor carriers, agencies, and service providers

Table 24 provides a simple reference point for the discussion that follows. It shows the main ways responsibility or support can be arranged in a future multi-state truck funding framework.

Arrangement	What it shows	Reference point
State-direct administration	The jurisdiction administers the tax or fee directly, and carriers interact with that jurisdiction directly to meet their obligations.	Kentucky Weight Distance Tax
Base-state / reciprocity structure	The carrier works primarily through one base jurisdiction, while participating jurisdictions rely on common rules, audit recognition, and settlement processes.	IFTA / IRP
Shared coordination layer	Specific coordination functions can be handled through a shared process or tool while jurisdictions retain public authority.	Clearinghouse-style functions
Carrier-facing service provider	A provider can help carriers manage accounts, reporting, billing, payments, corrections, customer service, or disputes.	Fleetworthy / tolling service provider

Table 24. Responsibility and support arrangements.

These arrangements are not mutually exclusive. A future framework could combine state authority, base-jurisdiction responsibilities, shared agency-side mechanisms, and carrier-facing account managers or service providers. **The design question is how those pieces fit together, which responsibilities are assigned to each party, and who remains accountable.**

Case Study 1: Kentucky Weight Distance Tax Shows That Simplicity Depends on Perspective

Kentucky's Weight Distance Tax, commonly referred to as KYU, provides a single-state example of state-direct administration. The tax applies to motor carriers operating vehicles with a registered weight greater than 59,999 pounds on Kentucky roadways. It uses a flat per-mile rate and quarterly, fleet-based reporting. Of the five WDT across the country, the KYU is viewed by the motor carrier industry as the least burdensome.

The Kentucky Transportation Center was the project partner for this work and mapped the full process from motor carrier registration through compliance screening, audit, enforcement, and follow-up when non-compliance is identified. The results were used to understand how a distance-based truck tax operates in practice: who does what, what information is needed, where handoffs occur, and how compliance is monitored. The case study also gave the roles and responsibilities work a real operating structure to test against.

Figure 25 shows the KYU process map developed during the Phase 5 case study work. **The process map illustrates how many steps sit behind a comparatively simple quarterly mileage filing.**

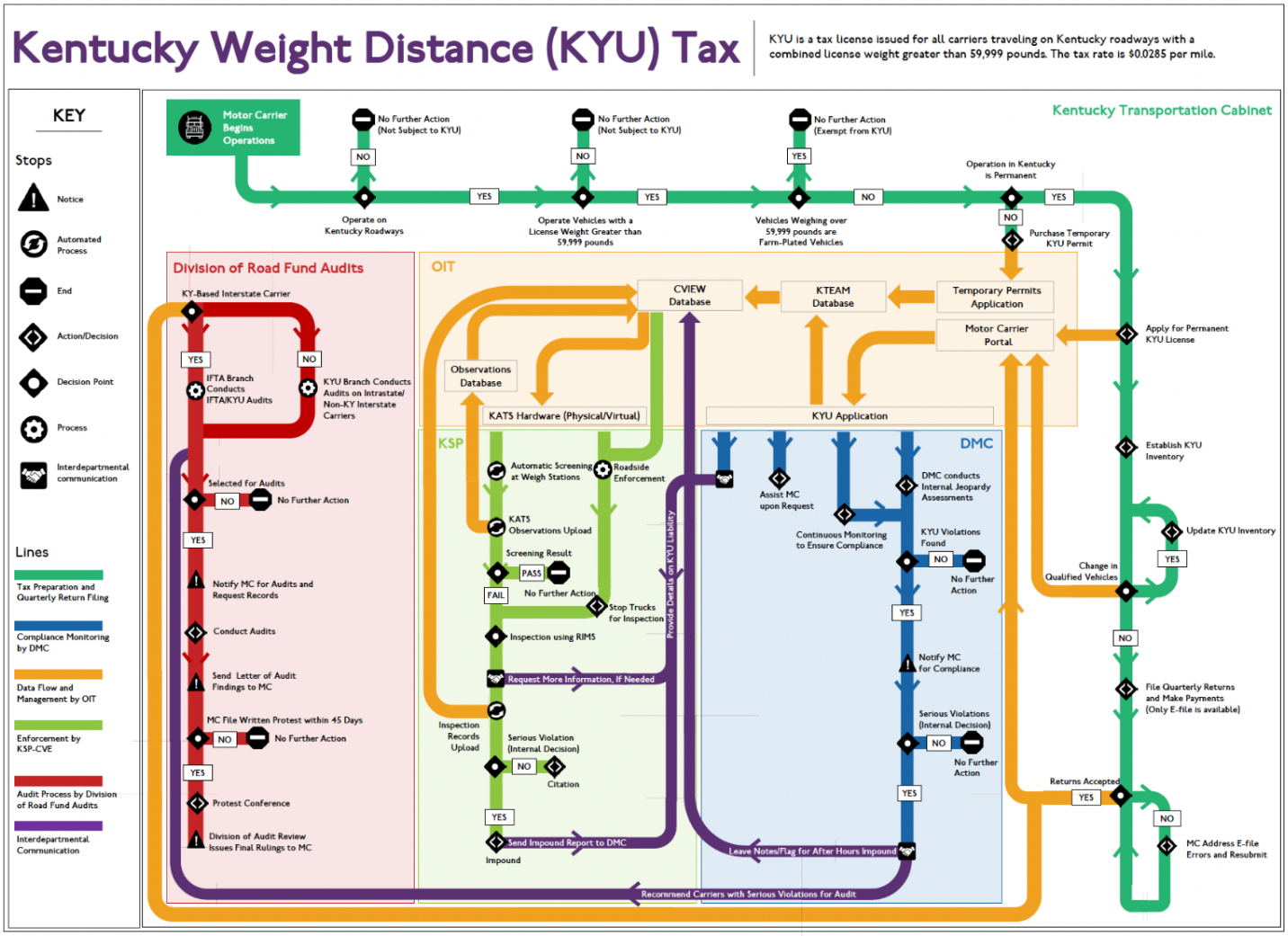


Figure 25. Kentucky Weight Distance Tax process flow.

From the carrier perspective, at first glance Kentucky's WDT can appear straightforward. The rate is flat, filing happens quarterly, and carriers report total Kentucky miles rather than mileage by weight category or changing operating weight. However, the process map shows what sits behind that simple filing requirement. The state still needs current account information, vehicle inventories, permit records, payment systems, screening data, audit triggers, enforcement checks, and follow-up when something does not match. This work happens in the background, so the system can operate, verify compliance, and protect revenue without adding work directly to the carrier's quarterly filing.

A simpler carrier experience depends on strong coordination and clear roles and responsibilities behind the scenes.

Carriers also have ongoing responsibilities beyond submitting a quarterly mileage number. A permanent KYU license is tied to a vehicle inventory, and carriers must keep that inventory current when vehicles are added or removed. Carriers must file quarterly returns even when no Kentucky miles are traveled during the quarter. They must also keep supporting records for audit purposes.

For interstate carriers, that can include vehicle-level mileage records, route and trip information, bills of lading, and documentation for any off-highway mileage. Intrastate carriers with all mileage taxable have simpler recordkeeping requirements, but carriers claiming off-highway miles still need records to support that claim. Those requirements help keep the account active and give the state a basis for compliance monitoring, but they also show that a simple filing structure still depends on ongoing carrier and agency activity.

Simple reporting does not eliminate recordkeeping.
Even when carriers report total fleet mileage only, supporting records are still needed for audit.

Kentucky also illustrates that even when coordination remains within one jurisdiction, several agency functions are still involved. KYU administration depends on licensing and account management, technology systems, audit, and roadside or weigh-station enforcement. These functions are not separate in practice. They rely on shared data, handoffs, and follow-up when non-compliance is identified.

Figure 26 shows the Kentucky agency functions involved in KYU collection and compliance.

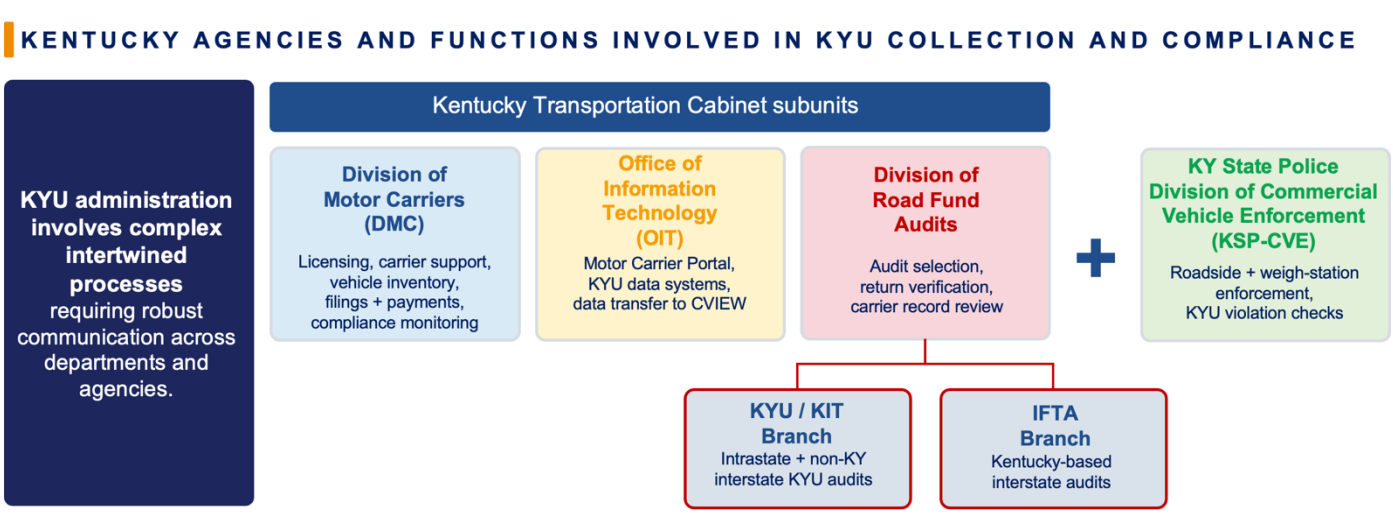


Figure 26. Kentucky agency functions involved in KYU collection and compliance.

KYU administration involves complex, intertwined processes requiring robust communication across departments and agencies.

The way these entities work together is easiest to see in compliance and enforcement. KYU-related transactions are handled through the Motor Carrier Portal, and data flows into Kentucky Transportation Cabinet systems used for compliance screening. At weigh stations, commercial vehicle enforcement officers use screening tools, including license plate, USDOT, and KYU number readers, to help identify potential violations.

A roadside or weigh-station check may begin with a simple question: *Is this carrier compliant?* The answer can depend on information held in another part of the system. Officers can see whether a KYU license is active or revoked, but the screening system does not display every detail, such as the unpaid tax amount. When more information is needed, officers may contact the motor carrier division, which can provide carrier-level information to support the enforcement decision.

The process continues after a roadside action. When a vehicle is held from continuing operation because of a KYU compliance issue, the Division of Motor Carriers (DMC) is notified and records the action. The DMC then monitors whether the carrier has taken corrective action, contacts the carrier if non-compliance continues, and tracks related activity. The DMC may also recommend a carrier for audit when violation reports show repeated or severe issues.

The Division of Road Fund Audits can then use carrier records, quarterly returns, temporary permit records, and enforcement referrals to review whether reported mileage is accurate.

Even within one state, system integrity depends on multiple functions, shared data, and follow-up across agencies.

The audit function reaches beyond Kentucky-based carriers. KYU applies to all eligible carriers operating on Kentucky roadways, so compliance review is not limited to carriers based in Kentucky. Kentucky also reviews compliance for non-Kentucky carriers that operate in the state. For a future multi-state framework, that creates practical questions about who can audit, what records can be requested, how carriers are selected for audit, and how audit results would be recognized or coordinated across jurisdictions.

Temporary permits provide another example of how simplicity can shift work rather than eliminate it. They create a simpler path for carriers that operate only occasionally in Kentucky, but the state still needs processes for issuing permits, accepting payment, managing permit data, monitoring compliance, and supporting enforcement. For a future multi-state framework, this points to a broader design question: when an approach reduces burden for one user group, where does the related administrative work move, and how should that burden be managed across the full system?

Reducing burden in one part of the system can create work elsewhere, so administrative impacts need to be considered across the full system.

Table 25 applies the Kentucky case study to the core functions identified earlier in this section. It shows the administrative chain in a single-state WDT structure and what that structure indicates for a future multi-state framework.

Function	Kentucky WDT	What it shows for a future multi-state framework
Governance and business rules	Program rules, penalties, exemptions, and compliance requirements are defined through Kentucky law, administered through the Kentucky Transportation Cabinet.	If several states operate separately, differences in rules, rate structures, exemptions, and compliance requirements would increase carrier burden.
Eligible vehicles	KYU applies to motor carriers operating vehicles with a registered weight greater than 59,999 lbs. on Kentucky's roadways.	Common definitions and classification rules are needed for weight and vehicle type. Jurisdiction-specific exemptions need to be clearly defined and accommodated within the framework.
Rate-setting basis and structure	Kentucky applies a flat per-mile KYU rate to eligible vehicles.	Uniformity in the rate-setting basis and structure can accommodate jurisdiction-specific rates without adding complexity to reporting.
Certification and provider oversight	Kentucky allows service providers to acquire KYU tax licenses and file returns on behalf of the carrier; however, the responsibility remains solely with the carrier.	Need to decide whether providers or account managers are part of the formal system and if so, how they are approved, monitored, and held accountable.
Audit and enforcement	The Division of Road Fund Audits conducts audits, while KY State Police Division of Commercial Vehicle Enforcement supports roadside and weigh-station enforcement.	Audit authority and enforcement roles would need to be coordinated to avoid duplication, gaps, and uncertainty.
Account and registration	Carriers obtain a KYU license or temporary permit and maintain vehicle inventory records with the Division of Motor Carriers.	Common or reciprocal structure is established, to remove the need for multiple registration points.
Reporting and data validation	Carriers file quarterly returns through the Motor Carrier Portal, maintained by the Office of Information Technology. Vehicle and carrier data are also used in compliance screening.	Fleet-level mileage reporting may simplify filing, but supporting records are still needed for audit. Consistent reporting and validation rules are required.
Rate calculation	The state applies the adopted flat per-mile rate to reported Kentucky mileage.	Clear and uniform rules for applying jurisdictional rates to reported activity are needed.
Billing and revenue collection	Payments are submitted electronically through the state system.	Billing and payment pathways would need to be coordinated to avoid multiple invoices and payment points.
Reconciliation and settlement	Revenue remains within one jurisdiction, so reconciliation is internal and interstate settlement is not required.	Process needed to assign revenue to the jurisdictions where travel occurred.

Table 25. Kentucky KYU functions and considerations for a future multi-state framework.

Kentucky provides a useful baseline for understanding state-direct administration. It shows how a distance-based truck tax works when one state controls the rules, receives the revenue, audits the records, and enforces compliance. It also shows the limits of relying on separate state systems as a broader path. **Where states operate separate weight-distance or highway use tax systems, carriers must comply with and interact with each system separately.** That is already the current reality in five states: Oregon, New Mexico, New York, Connecticut, and Kentucky. **Motor carrier industry representatives have continuously pointed to this state-by-state structure as overly burdensome.**

The agency perspective is just as important. Independent, or stand-alone, state systems also require each agency to maintain or coordinate the same core functions, including registration, data validation, compliance monitoring, audit, enforcement, billing, and revenue assignment. This applies not only to intrastate carriers, but also to out-of-state carriers subject to the tax. In Kentucky, for example, KYU applies to eligible vehicles traveling on Kentucky's roadway.

For a future truck funding framework involving more than one jurisdiction, the Kentucky case study points to issues that would need to be resolved through the broader governance structure: shared rules, reciprocity, interstate settlement, audit allocation, provider oversight, and revenue attribution across jurisdictions.

Case Study 2: Tolling Service Provider Shows That Upstream Clarity Reduces Downstream Burden

Fleetworthy Toll Management, formerly Bestpass, was reviewed to understand how administrative burden appears in a multi-entity payment environment. Tolling is not MBUF, but it provides a practical example of what happens when commercial vehicles operate across multiple agencies, accounts, devices, invoices, payment rules, and dispute processes.

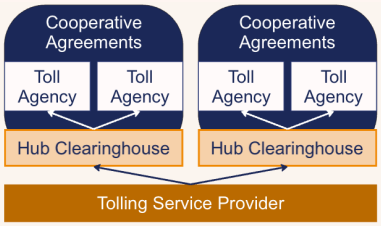
Fleetworthy was selected because of its history and operating experience in helping carriers manage tolling across jurisdictions. Fleetworthy Toll Management began as an initiative of the Trucking Association of New York to help carriers manage tolling more efficiently. The lessons are not company-specific. They reflect the broader account management, payment, reconciliation, customer support, dispute, and agency coordination work that similar providers need to manage in a fragmented tolling environment.

Fleetworthy and similar service providers emerged because **fragmentation in tolling creates complexity for motor carriers.** Carriers operating across tolling agencies must manage multiple accounts, invoices, payment processes, transponders, reconciliation steps, and dispute channels. Tolling service providers sit between carriers and tolling entities to organize those functions into a more manageable account and payment relationship.

Tolling service providers are a market response to an industry pain point.

The model also gives carriers access to volume-based tolling discounts through the tolling service provider relationship. Those discounts are possible because the provider aggregates many carrier accounts and transactions into a larger, more organized relationship with the tolling entity. For the tolling entity, that can reduce the burden of managing many individual carrier accounts, payments, and customer issues directly. Part of that aggregation benefit can then flow through to the motor carrier customer.

Toll agencies also use shared coordination mechanisms



Toll agencies increasingly exchange transactions through regional interoperability hubs rather than relying only on separate agency-to-agency connections. Participation is governed through formal agreements that define technical requirements, data exchange, settlement, dispute handling, and the responsibilities of participating agencies. The four National Interoperability regions (EZ-Pass, Southeast, Central, and Western) use shared business rules and interface standards to route toll transactions and facilitate interagency reconciliation and settlement. The hubs improve connectivity, but participating agencies may still use different technologies, validation rules, posting timelines, payment and reconciliation processes, and other business practices.

For a tolling service provider, hubs can reduce the number of separate system connections, but differences in agency rules and processes still create integration and reconciliation work and may later result in customer-support issues.

The case study is relevant to future truck funding frameworks because it shows what happens when administrative functions become operational responsibilities rather than design concepts.

Its value is in showing the carrier-facing side of fragmentation: where burden appears, how providers help manage it, and what questions would need to be resolved if similar roles were included in a future framework.

The tolling example shows that consolidation and coordination can reduce visible burden, but they do not eliminate the work. Account setup, data matching, billing logic, payment timing, reconciliation, dispute handling, agency coordination, and customer support still must happen somewhere. **The key question is who performs that work, under what rules, and with what accountability.**

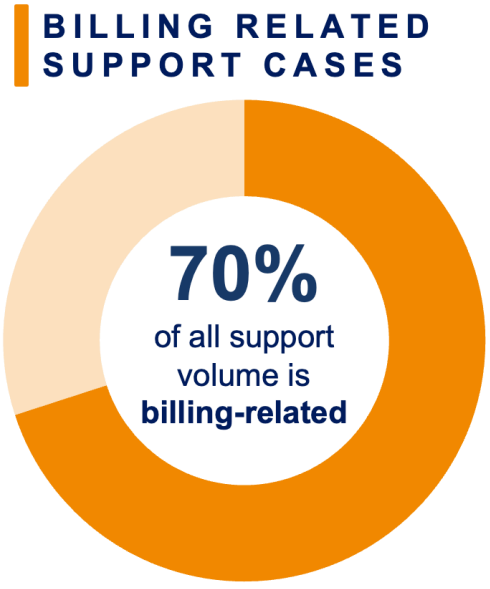
The case study also shows where **cost can be prevented**. When terminology, account relationships, billing rules, validation steps, correction processes, and dispute pathways are clear before transactions reach the carrier, fewer issues need to be resolved later through customer support. **When those elements are unclear or inconsistent, the burden moves downstream** to invoice review, dispute handling, reconciliation, and payment correction.

To better understand administrative cost drivers, Fleetworthy analyzed approximately 100,000 customer support cases to identify where complexity most often appears. Approximately 70 % of the tolling service provider support cases reviewed were billing-related, including duplicate toll charges, data mismatches, timing differences, and other invoice questions.

Administrative burden often appears after the transaction.

The support data showed that much of the work occurs after the transaction, when records must be matched, invoices explained, duplicates corrected, disputes handled, and payments reconciled.

These downstream issues often reflect decisions made earlier in the process, including how vehicles and accounts are identified, how billing rules are applied, when validation occurs, and how corrections are routed. When those upstream decisions are not clear or aligned, issues surface downstream through customer support and dispute resolution, increasing effort and cost for the parties involved.



The same issue does not create the same burden for every carrier.

The data also showed that administrative burden does not fall evenly. The same billing or reconciliation issue may be manageable for a larger fleet but create a more significant burden for an owner-operator or small fleet.

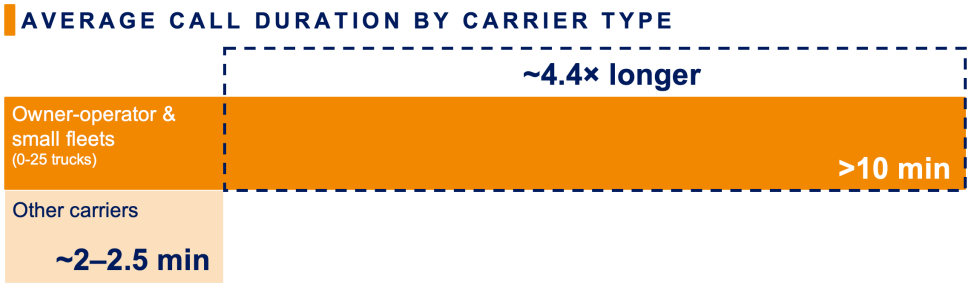


Figure 27. Average call duration by carrier type.

Owner-operator and small fleet support calls were materially longer than calls involving larger carriers, with calls often exceeding 10 minutes compared with roughly 2 to 2.5 minutes for larger carrier accounts.

The support patterns showed that smaller carriers often accumulate multiple issues and raise them together, often after receiving an invoice. Larger fleets are more likely to have specialized staff and more defined internal processes for handling billing, reconciliation, and account questions.

That has a direct lesson for future truck funding approaches. Administrative burden and cost should not be measured only by the number of accounts, transactions, or filings. The same billing question could be a routine back-office task for a larger fleet and a significant burden for an owner-operator. **A system that looks simple in design can still create high support demand** if the carrier-facing experience is unclear or if corrections happen only after the invoice is issued.

The case study showed that **some of the most expensive issues** are not created at the point of transaction or payment. They often **reflect earlier uncertainty in the system**, including decisions about definitions, data standards, agency interfaces, billing rules, validation timing, and dispute processes. By the time the issue reaches customer support, the cost has already moved downstream.

Table 26 translates the tolling service provider case study into the roles and responsibilities framework.

Function	Tolling service provider case study	What it shows for a future multi-state framework
Governance and business rules	Toll agencies retain their own rules and business practices. Service providers help carriers manage complexity across them.	Stronger alignment to reduce fragmentation rather than manage it after the fact.
Eligible vehicles	Any vehicle using a toll road, unless exempted.	Clear and uniform definitions on weight, vehicle type and incorporate exemptions needed.
Rate-setting basis and structure	Toll rates are set by tolling agencies under their own authority and business rules.	Define rate-setting authority, classifications, and where uniformity is needed while allowing jurisdictions to set their own rates.
Certification and provider oversight	Service providers may be accepted or contracted through agency arrangements, but there is no single formal certification framework across the tolling environment.	If account managers are used, provider certification, performance standards, audit, liability rules and customer protection requirements would need to be defined.
Audit and enforcement	Toll agencies retain enforcement authority. Service providers support account management, billing, and dispute handling.	Distinguish carrier-facing operational support from public enforcement authority.
Account and registration	Carriers may have accounts across multiple toll agencies, with the service provider offering a consolidated account management layer.	Define whether carriers interact directly with jurisdictions, through a base jurisdiction, through an account manager, or through some combination.
Reporting and data validation	Toll transactions and account records must be matched across agencies, devices, plates, accounts, and billing systems.	Common terminology, validation rules, and exception handling would be needed to avoid mismatches.
Rate calculation	Toll rates are applied through agency systems. Service providers help organize the resulting toll charges for carriers.	Clear and uniform rules for applying adopted rates, classifications, and jurisdiction-specific requirements to reported activity.
Billing and revenue collection	Service providers can consolidate billing and support payment management for carriers across multiple tolling entities.	Consolidated billing can reduce carrier burden, but the framework would need to define payment risk, fees, timing, correction processes, and dispute pathways.
Reconciliation and settlement	Tolls must be reconciled among agency records, service provider systems, and carrier accounts.	Structured reconciliation and traceability would be needed before errors reach carriers as billing disputes.

Table 26. Tolling service provider functions and considerations for future a multi-state framework.

The tolling service provider example shows that provider support can reduce carrier-facing burden, but it is not a substitute for clear system design.

Stakeholder Perspectives: What a Workable Framework Needs to Do

The preceding sections show that **the same administrative functions can be assigned in different ways**. A state may administer functions directly, jurisdictions may rely on shared mechanisms, and providers may support the carrier-facing side of the system. These **choices shape how the framework impacts motor carriers, what agencies need to verify to protect revenue, and what third parties may be asked to support.**

To understand those perspectives, Phase 5 gathered input through MCWG discussions, motor carrier engagement, agency input, and related project activities. The input helped clarify what a workable funding framework would need to do for motor carriers, agencies, and the support roles needed to make the framework operational.

Stakeholder input reinforced a clear theme: **a fragmented, state-by-state MBUF framework would likely be unacceptable to industry, but a simplified carrier interface cannot come at the expense of public accountability.**

For motor carriers, the priority is uniformity and operational simplicity. Carriers emphasized that any future MBUF framework should avoid adding another layer of complexity to an already complex compliance environment and reflect trucking realities. Main priorities included fewer filing points, predictable billing, clear and limited audit rules, consistent reporting requirements, privacy protection, system accuracy, uniform and equitable enforcement, and clear support pathways when issues arise. Automation was generally seen as useful for reducing error and evasion risk, but only if the system is easy to use, verifiable, and does not create new disputes over data accuracy. Stakeholders also noted the importance of retaining a user-pays principle.

These points reflect the practical experience of operating across multiple jurisdictions. **A system that is technically feasible may still be burdensome if carriers face multiple accounts, unclear filing requirements, or uncertainty about who can audit which records.** This aligns with the lessons in the case studies that complexity often becomes visible downstream through billing questions, corrections, disputes, customer support, and audit.

For agencies, the priority is verifiability and control. States and public agencies need clear authority, reliable data, traceable revenue flows, enforceable compliance mechanisms, auditability, and confidence that revenue is allocated correctly. In a multi-state framework, this also requires settlement and reconciliation processes that can assign revenue to the appropriate jurisdiction, correct errors, resolve disputes, and support enforcement when needed.

These priorities reflect the public accountability side of the system. **A framework that is simple for carriers still needs to preserve the ability of jurisdictions to verify compliance, protect revenue integrity, and enforce program requirements.** In a multi-state framework, that requires reliable data, clear business rules, common terminology, and a process for correcting errors or resolving disputes.

Third parties may help fulfill those needs. Account managers, technology providers, clearinghouse functions, tolling service providers, or other intermediaries can reduce burden by supporting reporting, billing, payment, validation, reconciliation, customer service, or data exchange. But their role only helps if the funding framework is clear about what they can do, what they are responsible for, and what remains with the carrier or jurisdiction. The business case also needs to be workable for the third party, including clear service expectations, revenue or fee structures, operational risk, liability, data access, and the scale needed to support the role.

These perspectives are not in conflict, but they require careful design. Carriers want simplicity at the front end. Agencies need control, auditability, enforceability, and confidence that revenue is protected at the back end. Third parties may support both sides, but their role also needs clear expectations, defined accountability, and a workable business case.

The challenge is to simplify the carrier experience without weakening public accountability.

Service Provider Roles Must Be Decided, Not Assumed

For a future truck funding framework, the question is not whether private-sector companies can support administrative tasks. The Fleetworthy case study showed that they can. **The question is whether those roles are formally included in the framework, what responsibilities they carry, and how they are overseen.**

Service providers or other intermediaries may support account setup, data reporting, billing, payment processing, customer service, validation, reconciliation, corrections, or dispute handling. Their role should be decided deliberately rather than assumed. However, authorizing language must be carefully constructed to refrain from naming or locking in specific providers, because doing so would likely reduce competition, limit flexibility, or increase costs over time.

If service provider roles are formally included in the funding framework, then requirements for approval, certification, oversight, liability, audit access, data standards, payment risk, customer support, and performance monitoring are needed. If they remain outside the formal framework, carriers may still use them, but agencies may have less visibility into functions that affect reporting accuracy, billing, dispute resolution, compliance, and revenue assurance. In that case, the provider may help with the carrier-facing process, while compliance responsibility remains largely with the carrier.

Table 27 summarizes the service provider role questions that would need to be resolved before implementation. These are governance decisions, not technical details, because they affect accountability, auditability, carrier protection, and state reliance from the beginning.

Service provider role	Questions to resolve
Certification authority	Who approves providers or reporting methods?
Certification scope	What functions require certification?
Performance standards	What service, data, security, and reporting requirements must be met?
Monitoring	Who reviews ongoing provider performance?
Corrective action	What happens if a provider fails to meet standards?
Carrier protection	How are carriers protected if a certified provider makes an error?
State reliance	What level of reliance can jurisdictions place on certified data or provider processes?

Table 27. Provider and account manager role questions.

Certification can support system integrity by setting minimum expectations for providers, systems, data quality, security, and performance. **It does not replace audit or enforcement**. A certified service provider or system still needs oversight, audit access, correction processes, and clear accountability if errors occur.

Certification is a front-end control. Audit and enforcement are back-end controls.

This issue becomes more important if the framework allows delegated execution. The more functions intermediaries perform, the more important certification, oversight, auditability, and accountability become.

Service provider roles address one part of the coordination challenge: how carrier-facing and operational support functions could be performed. A separate issue is how jurisdictions coordinate shared administrative functions, such as data exchange, reconciliation, settlement, and revenue assignment.

A Clearinghouse Can Support Administration, But Does Not Replace Governance

Previous Coalition work provides useful context for how shared administrative functions could support a multi-state truck funding framework. In Phase 4, the Coalition tested whether existing (IFTA/IRP) and a purpose-built (ClearRoad) clearinghouse could be adapted to handle MBUF transactions. That work showed that clearinghouse entities can validate incoming data from a third party, calculate amounts to be distributed to jurisdictions, and support netting without requiring separate reporting by motor carriers or jurisdictions. It also showed that roles and responsibilities must be clearly defined before a clearinghouse function can be used in practice. Additional information can be found in the Phase 4 final project report.[5]

The subsequent Coalition clearinghouse workshop explored what a future MBUF clearinghouse could do. Workshop participants identified two core functions: a data repository and a funds transfer process. A data repository can support validation and storage of MBUF-related data, including account status, included vehicles, and reporting history. A funds transfer process can support direct transfers or netting among participating jurisdictions.

Workshop participants also identified possible supplemental functions that can reduce state workload if they were standardized and delegated. These included education and training, communication, vendor certification, and audit or compliance support. Other possible functions included developing MBUF-related standards and exploring whether fee collection could occur at the clearinghouse level.

A clearinghouse is a tool, not a governance framework.

The workshop findings reinforce that point. A clearinghouse can perform assigned functions, but it does not decide which functions should be assigned to it. It does not, by itself, decide who has authority, who sets business rules, who owns or controls data, who carries payment risk, who oversees providers, who has audit access, how disputes are resolved, or who remains legally accountable. Those are governance decisions.

The lesson for Phase 5 is not to copy any existing clearinghouse or interoperability structure directly. The lesson is that **shared administration can be useful, but only when the governance framework is clear.** Participating jurisdictions would need to decide what the shared mechanism is responsible for, what remains with each jurisdiction, how carriers interact with the system, how revenue is assigned, and how errors, disputes, audits, and enforcement are handled.

[5] Final report for STSFA Phase 4 truck work: https://tetcoalitionmbuf.org/wp-content/uploads/2023/09/TETC_Phase-IV_Final-Report_91123_FINAL.pdf

Taken together, the provider and clearinghouse discussions show that **support structures can reduce burden, but they do not eliminate administrative work.** The work moves depending on how responsibilities are assigned, how rules are aligned, and how errors are corrected.

Structural Cost Drivers and Administrative Burden

Much of the administrative burden sits in what happens around the tax or fee, not only in how it is calculated. **The case studies showed that many cost drivers are created upstream through system design choices but become visible downstream in daily operations**.

A carrier may experience the burden as an invoice question, a duplicative charge, an unclear support path, or an audit issue. The source of the burden is often defined earlier in the framework through decisions about rules, data, responsibilities, billing logic, correction processes, and oversight.

Administrative burden is largely a design outcome,
not a byproduct of mileage measurement or collecting activity data.

The core functions identified above carry different administrative cost drivers. Table 28 summarizes those cost drivers and shows where complexity can appear if responsibilities, rules, and processes are not clearly defined.

Function	Main cost drivers
Governance and business rules	Rule changes, liability allocation, dispute authority, and consistency across participating jurisdictions.
Eligible vehicles	Non-uniform vehicle definitions. Including vehicles that are not currently part of an existing reporting framework could increase administrative burden for motor carriers and agencies e.g. intrastate or under 26,000 lbs. vehicle.
Rate-setting basis and structure	Non-uniform rate-setting bases, classifications, or definitions. Weight-based rate structures that require operational weight information would add reporting and verification burden.
Certification and provider oversight	Different provider standards, unclear certification authority, and lack of ongoing performance monitoring.
Audit and enforcement	Duplicative audit, unclear authority, inconsistent recordkeeping standards, and lack of enforcement coordination.
Account and registration	Multiple registration points, different vehicle definitions, inconsistent fleet or vehicle-level requirements.
Reporting and data validation	Different data fields, reporting formats, validation rules, and recordkeeping requirements.
Rate calculation	Unclear or inconsistent rules for applying classifications, jurisdiction-specific rates, and exemptions.
Billing and revenue collection	Unclear or incorrect invoices, refunds, credits, payment risk, and customer support cases.
Reconciliation and settlement	Interstate allocation, timing differences, corrections, and issues with traceability of revenue flows.

Table 28. Structural cost drivers and administrative burden

The table shows why administrative cost depends on more than the tax or fee approach. A framework can measure miles accurately and still create burden if billing is unclear, audit rules are duplicated, provider roles are undefined, or revenue flows cannot be traced. The cost of those issues often appears after implementation, but the source is usually in the design of the framework.

Administrative cost grows when responsibility is unclear, coordination is duplicated, and errors are hard to correct.

Governance Structure Determines How Complexity Scales

The Phase 5 work showed that the same core functions can be organized in different ways. They may be handled directly by each state, coordinated through shared mechanisms, supported by account managers or other providers, or split across multiple parties. The functions do not disappear. How responsibility is divided determines where administrative burden appears, how risk is allocated, and how complexity scales as more jurisdictions and carriers are added.

No structure eliminates complexity completely. Each structure places it somewhere.

With a small number of participating states, several approaches may appear workable. As more states participate, non-uniform eligibility definitions, rate-setting bases and structures, reporting rules, billing logic, correction processes, certification standards, settlement procedures, and audit authority become more important.

Scale increases the importance of structure.

A state-direct approach may be easier to establish at the beginning because each state controls its own rules, accounts, billing, audit, enforcement, and revenue. The challenge is that each additional state can add another set of rules, filings, payment processes, audit requirements, and support pathways for carriers.

Account managers or other provider roles can reduce some carrier-facing burden, but the coordination work does not disappear. It shifts to the service provider layer. That reinforces the need to decide whether the role of providers is formally included in the framework and how they are certified, overseen, audited, and held accountable.

A base-jurisdiction approach can reduce direct carrier interaction with multiple states, but it increases the importance of interstate coordination. Settlement, audit recognition, timing, corrections, and dispute resolution need to be structured clearly.

A shared coordination function can reduce duplicated state-to-state relationships by creating one common pathway for specific functions, such as data exchange, reconciliation, settlement, or validation. However, this concentrates reliance in the shared function and requires clear governance, performance standards, liability rules, and contingency planning.

Table 29 is illustrative, showing how **administrative complexity can shift depending on the structure selected.** The table also includes a state-direct structure with an account manager as a variation, because service provider support can change where administrative burden appears without changing the underlying governance structure.

Model	Initial Setup	Marginal Administrative Complexity per Additional State
State-Direct	Low	High
State-Direct + Account Manager	Low–Moderate	Moderate
Base-State Reciprocity	Moderate	High (interstate coordination grows)
Base-State + Shared Coordination Layer	Higher	Low

Table 29. Structural scaling behavior across governance models.

A multi-state system scales in two ways. Transaction volume grows as more carriers, vehicles, miles, invoices, payments, disputes, and corrections move through the system. Governance complexity grows as more states, providers, and processes need to align.

The number of participating jurisdictions matters, but the alignment of responsibilities has a greater effect on whether the framework remains manageable.

A framework with clear responsibilities, common data expectations, and defined settlement and correction processes can scale more predictably. A framework with unclear or inconsistent responsibilities is more likely to become burdensome as more states, providers, and carriers participate.

The question is not whether complexity can be eliminated. It cannot. The question is whether complexity is kept in check through a clear governance structure or allowed to multiply through separate state requirements, unclear provider roles, inconsistent data rules, and unresolved settlement processes.

Risk follows responsibility. How roles and responsibilities are divided allocates operational, financial, and compliance risk.

Taken together, the case studies point to the same conclusion: **a workable framework depends less on the number of entities involved than on whether each function has a clear owner, clear authority, and a clear accountability structure.** A future multi-state truck funding framework could include agencies, carriers, account managers, technology providers, clearinghouse entities, or other participants, but the system would need to define how those participants interact before implementation. **Without that clarity, simplicity for one participant can create new work, risk, or uncertainty elsewhere in the system.**

Design Decisions That Need to Be Made Before Implementation

The scaling discussion shows that complexity does not disappear as a framework grows. It shifts depending on how responsibilities are assigned, how many jurisdictions participate, and how much coordination is built into the structure. The practical next question is what needs to be decided before implementation, so those responsibilities, interfaces, authority, and accountability are clear from the beginning.

A future multi-state truck MBUF framework should define the required functions, responsibilities, authority, data needs, audit access, and coordination rules in a technology-agnostic way.

Technology options, service providers, and reporting methods can help support those functions, but they need to fit within a framework that clearly defines responsibility, authority, and accountability.

Governance decisions should come before technology choices.

If stakeholders coordinate around the framework design, participating jurisdictions can define common rules, reporting expectations, audit access, settlement processes, and provider requirements. **If that coordination is not built into the framework, the carrier becomes responsible for making the system work** across different rules, filings, bills, accounts, and support processes. In that sense, the carrier becomes the system.

Rate setting is one example. A framework must decide what the rate is based on, whether different vehicle or weight categories are used, and who sets the rate. Jurisdictions can still set their own rate amounts, but using a uniform basis and structure would allow carriers to report activity in the same way across jurisdictions and reduce jurisdiction-specific calculation and reporting requirements. This reflects the STSFA Phase 4 finding that uniformity does not require identical rates across jurisdictions, but rather a consistent framework that reduces administrative burden.

The case studies and reference frameworks point to several connected design decisions that would need to be addressed before implementation, as shown in Table 30.

Topic	What needs to be decided for a future multi-state framework
Core function allocation	Which entity (or entities) performs registration, reporting, validation, rate calculation, billing, collection, reconciliation, audit, enforcement, and provider oversight.
Eligible vehicles	Which vehicles, operations, or weight categories are included, and how jurisdiction-specific exemptions are handled.
Rate-setting basis and structure	What the rate is based on, whether and how vehicle or weight categories are used, how rates are structured, who has rate-setting authority, and where uniformity is needed across jurisdictions.
State-side coordination	How states align eligibility rules, reporting formats, audit recognition, settlement timing, corrections, and dispute resolution.
Legal accountability	Which responsibilities remain with public agencies even if operational tasks are delegated.
Provider and account-manager role	Whether the provider role is formally included in the framework, who approves the providers, what standards apply, and how certification connects to audit and enforcement.
Shared coordination function	Whether a clearinghouse-style function, shared settlement process, common data exchange process, validation function, or exception routing process is used and what level of authority is delegated.
Billing and correction	How invoices are generated, how taxes/fees can be traced, how errors are corrected, and who provides customer support. This is where upstream alignment reduces downstream burden.
Revenue assurance	How data quality, payment risk, non-payment, bonding, corrections, and enforcement are handled.
Data, identifiers, and validation	What identifiers, data fields, reporting formats, and validation rules are required across jurisdictions.
Small carrier and intrastate carrier impact	Whether reporting, billing, support, and audit processes are manageable for owner-operators, smaller fleets, and intrastate fleets that may not be subject to current multi-state reporting requirements.
Scalability	Whether the structure remains manageable as additional states join, including how rules, billing, audit, settlement, provider oversight, and data standards scale.

Table 30. Design decisions for a multi-state MBUF framework.

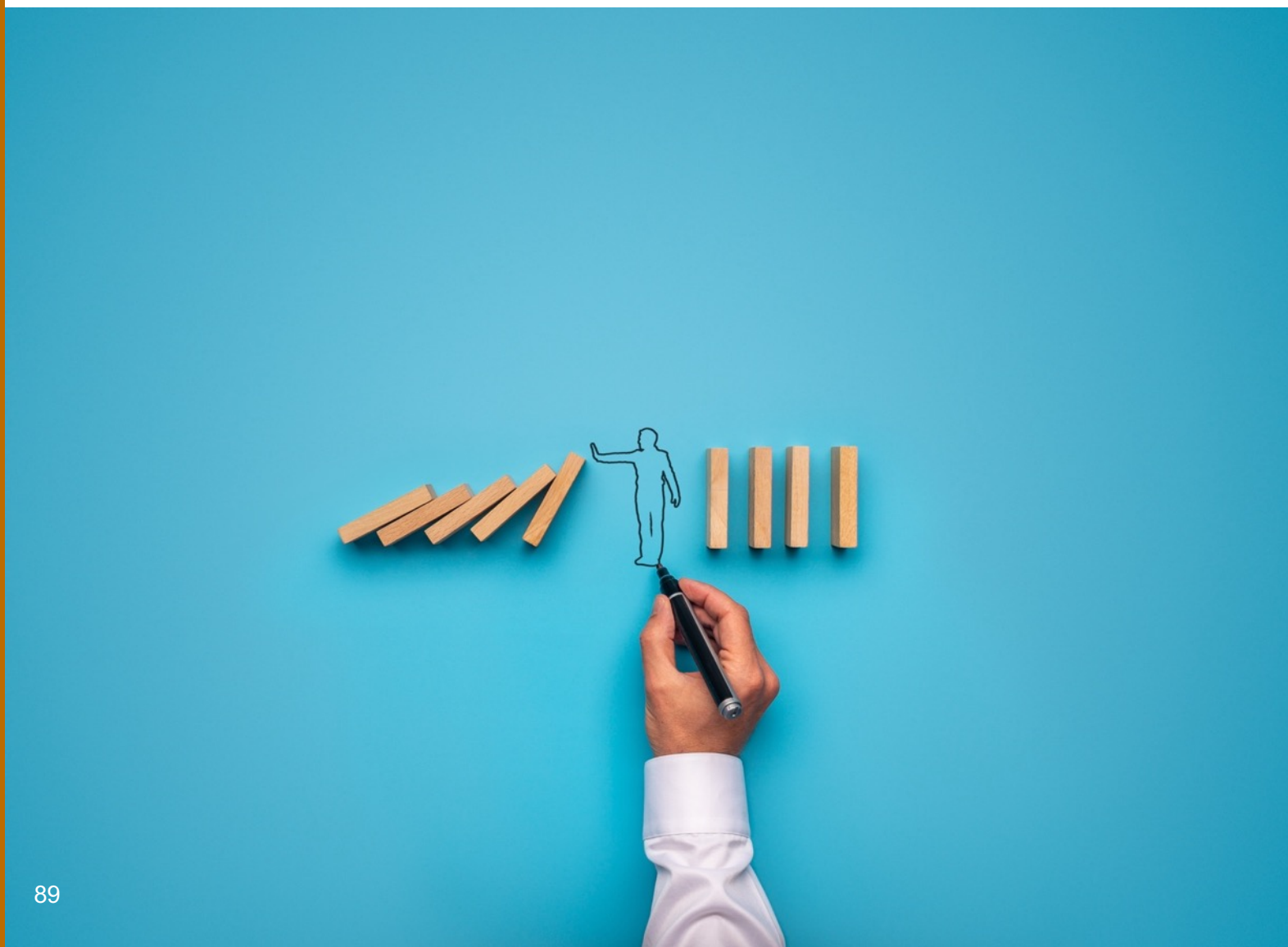
A single filing point or single bill only reduces carrier-facing burden if settlement, validation, audit, provider oversight, billing, correction, and support processes are aligned behind the scenes.

These decisions become more important as more jurisdictions participate. **At small scale, several structures may appear workable. At larger scale, unclear roles, inconsistent rules, and unresolved settlement processes can quickly increase administrative burden.** A system that is hard to understand, verify, or correct is more likely to be viewed as burdensome, even if the charging method itself is technically feasible.

> *For 40 years,*
> *I preached this message to my staff…*
>
> *A great tax policy contains 3 E's:*
>
> *Equitable, Efficient, Enforceable*
>
> -- MCWG member

Upstream clarity prevents downstream burden.

When rules, data, billing logic, correction processes, and accountability are defined early, downstream operations are simpler and more predictable. When issues surface later, burden increases across the system.



KEY FINDING 4

System Design Determines Administrative Cost, Burden, and Acceptance

A future truck funding framework will not be judged only by whether miles can be measured or transactions can be processed. It will be judged by whether the system is understandable, predictable, auditable, enforceable, and manageable for motor carriers and agencies.

The roles and responsibilities work showed that administrative cost and burden are shaped by system design. Required functions need to be performed, with clear responsibility for how they are coordinated, supported, audited, and enforced. The design question is where those functions sit, who is responsible for them, and who remains accountable. Administrative costs grow when responsibility is unclear, coordination is duplicated, and errors are hard to correct.

The case studies showed that coordination is required in any multi-state environment. Kentucky's Weight Distance Tax highlights that simplicity depends on perspective: a comparatively simple carrier-facing filing process still requires coordination behind the scenes to support account management, compliance screening, audit, enforcement, and revenue protection. Existing interstate frameworks, like IFTA and IRP, show how common rules, base-jurisdiction administration, audit recognition, and settlement can reduce fragmentation while preserving state authority. The tolling service provider case study shows that upstream clarity reduces downstream burden. When rules, definitions, billing logic, and correction processes are not aligned, burden appears downstream through billing questions, reconciliation, disputes, and customer support. It also showed that burden does not fall evenly across carriers.

Tools such as clearinghouses, account managers, technology providers, and service providers can reduce burden in different places, but their roles need to be defined rather than assumed. A provider may support the carrier-facing process without becoming responsible to the jurisdiction. A shared mechanism may support agency-side coordination without replacing governance. A future framework must decide whether these entities are formally included, what functions they perform, what standards apply, and who remains accountable. The design challenge is to simplify the carrier experience without weakening public accountability.

Early coordination on governance is critical. Technology can help measure miles, move data, process payments, and support customer service, but a workable, interoperable framework needs states, motor carriers, and other participants to be aligned before implementation on who performs the work, who has authority, who carries risk, and who remains accountable. In short, governance decisions should come before technology choices.

For motor carriers, the system needs to be understandable, predictable, and manageable. For agencies, it needs to be auditable, enforceable, and able to protect revenue integrity. A future framework must do both: simplify the carrier experience while preserving public accountability and balancing risk across participants. Certification is a front-end control, while audit and enforcement are back-end controls. Ultimately, a system will succeed or fail based on whether responsibilities are clearly assigned and coordination is structured in a way that is workable for carriers and defensible for agencies. In summary, upstream clarity prevents downstream burden.

Future Work

The Phase 5 work advanced several questions identified in prior Coalition truck pilots. It also showed where additional detail, practical testing, and stakeholder input are still needed to inform any future implementation path. Across the work, the same issue came up in different ways: MBUF may be measurable in a pilot setting, but it still needs to work in day-to-day operations for motor carriers, agencies, and any supporting entities. Therefore, future work should provide additional insights into the following:

Governance Design and Coordination

The 2025/26 work showed that the main challenge is not whether transactions can be processed. The larger issue is how a future multi-state funding framework should be organized in practice. System design will also shape cost. Administrative burden sits well beyond mileage measurement and is affected by how rules, responsibilities, reporting, billing, correction, support, audit, and enforcement are assigned.

Bring the affected stakeholders together and use practical examples to work through governance options, coordination needs, and key design choices. This should include how account managers, technology providers, or other system providers may be included in the framework, what functions they may perform, what standards should apply, and who remains accountable.

The design questions identified in Phase 5 can form the basis for the next stage of discussion. Future work should use them to assess where key functions should sit, how responsibilities should be assigned, where costs may shift, and which structures would be manageable at a larger scale.

Compliance and Enforcement

The 2025/26 work reinforced that compliance and enforcement cannot be treated as secondary issues. Audit, certification, data sharing, roadside enforcement, and agency roles need to fit together in a way that is workable in a multi-state environment.

Future work should examine what existing audit, compliance, enforcement, and data-sharing practices can be built on. It should also identify where new protocols or procedures would be needed for a future truck funding framework. These questions should be worked through using realistic operating scenarios, so that audit, correction, and enforcement are tested as part of system design rather than added later.

Intrastate and Smaller Commercial Vehicles

Future work should also focus on vehicles and operations that are not currently fully covered by existing interstate reporting structures. This includes intrastate commercial vehicles and trucks below 26,001 pounds.

This issue was identified in previous Coalition work and was reinforced again in Phase 5, particularly in the weight analysis. Additional work should assess what data is available for these vehicles, if and how registered weight is documented across a range of states, what reporting structures exist today, and what new burden could be created across a range of motor carriers.

The next phase should help move the discussion from practical operating concepts to defined operating choices. Future work should use realistic scenarios to test where complexity can be reduced, where burden may shift, and what tools, processes, or guidance would be needed to inform implementation paths.

Project Team and Partners

We thank all the project partners for their valuable input and dedication.

Project Lead
The Eastern Transportation Coalition

Project Management and Report Development
NEWROAD Consulting

Technical and Research Support
Kentucky Transportation Center
Kentucky Transportation Cabinet

Technology / Account Manager Partner
ClearRoad
Fleetworthy

Motor Carrier Participants
Participating motor carriers are not named to preserve confidentiality.

Advisory and Review Groups
TETC MBUF Steering Committee
TETC Motor Carrier Working Group

Appendices

Appendix A | MCWG Meeting Summaries

The MCWG met three times over the course of the Phase 5 work. The meetings provided input on the pilot design, recruitment, data collection, system design considerations, and draft findings. The discussions helped the Coalition test whether the work reflected motor carrier realities and where additional clarification or refinement was needed.

November 2024

The November 2024 meeting provided an overview of MBUF developments around the country and introduced the Phase 5 commercial vehicle work. The discussion focused on the four Phase 5 topics: roles and responsibilities, consolidation of taxes and fees, kWh-based fee compared with MBUF and the fuel tax, and complexity of weight.

Members discussed concerns around kWh-based fee, including data availability, charging losses, utility involvement, home and depot charging, and the cost of collection. The group also emphasized the importance of keeping future systems simple, fair, and coordinated across states.

The meeting included a deeper discussion of roles and responsibilities. The group reviewed potential future scenarios and discussed registration, rate setting, reporting, filing, system certification, audit, and compliance. Members expressed support for fleet-based registration, state responsibility for rate setting within a coordinated framework, and the need for system certification, while views were more mixed on issues such as exemptions, audit requirements, and roadside compliance. Across the discussion, members emphasized the importance of avoiding unnecessary reporting and audit burden for motor carriers. The discussion reinforced that system design will strongly influence cost, burden, and compliance.

April 2025

The April 2025 meeting provided updates on national and state-level MBUF activity, recent think tank positions on MBUF, and progress on Phase 5. Members expressed concern that some public policy discussions do not fully reflect motor carrier operations, current truck-related taxes and fees, or the practical requirements of a future funding framework. The group noted the continued need for education and outreach.

The Coalition team provided updates on the roles and responsibilities work, including the Kentucky Weight Distance Tax case study, the Bestpass account manager perspective, and motor carrier input gathered through workshops. Preliminary observations from the Kentucky case study showed that administration and enforcement involve multiple agencies and systems, reinforcing the value of process mapping and interagency coordination.

The meeting also included updates on pilot recruitment and data collection. For the kWh-based fee analysis, six electric trucks had been enrolled, and early data collection showed challenges with data availability, charging event information, and telematics consistency. For the weight work, members discussed the difficulty of recruiting participants willing or able to share operational weight data. Because the pilot work was still underway, the discussion focused on early observations, recruitment challenges, and additional data needs rather than final conclusions. The group reaffirmed the importance of real-world data, data standardization, and industry collaboration in evaluating future truck funding approaches.

March 2026

The March 2026 meeting focused on sharing Phase 5 learnings, reviewing draft key findings, and gathering feedback before the findings were finalized. The Coalition team presented an overview of the work and provided deeper discussion on roles and responsibilities and kWh-based fee compared with MBUF.

The discussion showed general support of the findings, while also identifying areas where wording and emphasis needed refinement. Members repeatedly pointed to coordination, responsibility allocation, and system design as major drivers of administrative burden and cost. Lack of coordination across states, multiple filing points, billing and reconciliation, audit exposure, and inconsistent reporting requirements were identified as practical burden drivers in a future multi-state system.

The group also discussed consolidation and flat-fee structures. Members emphasized the importance of fairness and maintaining a connection between road use and payment. While simpler structures may appear attractive, participants noted that flat fees can create winners and losers across different operating profiles and can weaken the connection between use and payment.

The finding that a kWh-based fee was not practical was generally supported as a current-condition finding, with members noting the complexity of using electricity consumption as a funding basis today while also cautioning against wording that would appear to rule out future technology changes. The actual-weight finding was broadly accepted, with members supporting registered weight as the more practical basis for rate setting under current conditions.

Live polling during the meeting confirmed that roles and responsibilities, coordination, and administrative burden were the areas of strongest interest and greatest need for refinement. The input from the meeting was used to refine the final project findings and how to summarize supporting materials in the final report.

Appendix B | Account Manager & Data Collection

ClearRoad served as the account manager for the Phase 5 kWh pilot. In this role, ClearRoad supported pilot participant onboarding, device distribution where needed, monthly pilot reporting, data validation, and clarification or correction of reported data.

ClearRoad also provided the pseudonymized vehicle-level datasets used for the project analysis. Data was accessed through ClearRoad's integration with the pilot participant's telematics provider, using an open API arrangement. For vehicles that already had telematics devices installed, the pilot participant granted ClearRoad access to the data for the enrolled vehicles. Where a device was not already installed, ClearRoad provided the device and installation instructions.

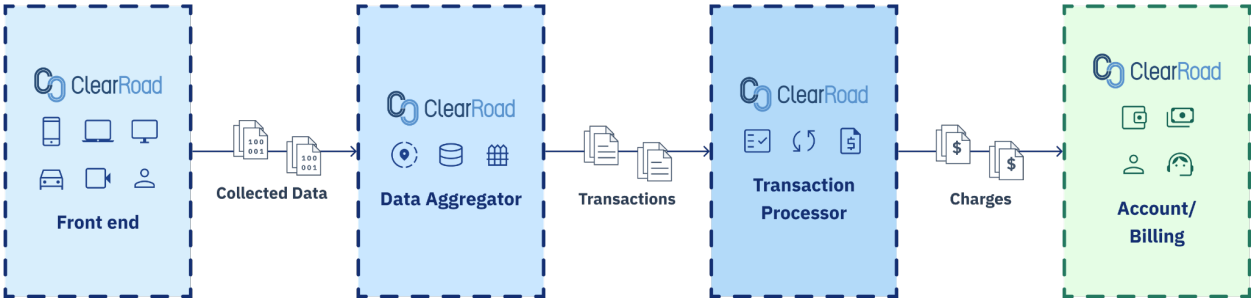
ClearRoad provided monthly reports and summaries to the project team. These reports included information on pilot vehicles, reporting days, charging events, device or vehicle issues, issue logs, communication logs, charging logs, miles traveled, and estimated mileage-based user fees by month and jurisdiction.

System Architecture

ClearRoad's system architecture for the pilot included four main components: front-end data collection, data aggregation and processing, transaction processing, and account or billing functions.

The front-end data collection process included pilot onboarding forms, vehicle enrollment information, and integration with the telematics provider. Data from the enrolled vehicles was transmitted to ClearRoad's data processing module through the telematics provider's API.

The data aggregator processed and prepared the data for analysis. Trip information was matched with vehicle information, including registered weight class, and GPS data was used to assign miles traveled to the appropriate jurisdiction. The resulting mileage information was then prepared as transaction data.



The transaction processor applied the relevant pilot rate table and business rules to calculate mock mileage-based fees. Charging data was used to support the kWh analysis. Because the pilot fleet did not include internal combustion engine vehicles, fuel tax comparisons were not distributed to the participating carrier.

The account and billing function generated mock pilot statements and summary reporting. No actual payment or financial transaction occurred as part of the pilot.

Privacy Considerations

The pilot agreement between ClearRoad and the pilot participant clarified the roles and responsibilities of the parties, the data to be collected, and the reports to be shared for research purposes.

Pilot data was shared with the project team in pseudonymized vehicle-level datasets and reported externally only in anonymized or aggregated form. The project materials do not identify the participating carrier or individual vehicles by name.

At the end of the pilot, participants that had granted ClearRoad access to their telematics devices were asked to remove ClearRoad's access from their telematics account. For devices provided for the pilot, subscriptions were deactivated after the pilot ended to stop further data collection.

Appendix C | Consolidation of Taxes and Fees

Federal Taxes & Fees | Overview

The table shows that most federal truck-related taxes create relatively little direct reporting burden for motor carriers, with HVUT and UCR as notable exceptions. From an agency perspective, this structure also keeps administrative costs relatively low.

WHAT	WHO	HOW MUCH	USED FOR	TERMS	WHERE PAID	PAID BY	HOW OFTEN
Federal Tax on Diesel	IRS	$0.244	HTF (Construction and Maintenance)	All undyed diesel fuel sales for fuel used on public roads.	IRS Form 720 (Quarterly Excise Tax Return)	Collected at the terminal or rack by fuel distributors. Embedded in retail price at pump.	Continuous
Heavy Truck/Trailer (FET)	IRS	12% of first retail sales price	General Fed Revenue supporting infrastructure projects	Chassis >33,000lbs; trailers >26,000 lbs., tractors > 19,500 combined weight	IRS Form 720 (Quarterly Excise Tax Return)	Manufacturer or dealer at point of sale	One time per sale. Reported quarterly
Heavy Vehicle Use Tax (HVUT)	IRS	$100 base + $22 per 1,000 over 55,000 lbs. Max $550	HTF (Construction and Maintenance)	Trucks, tractor-trailers, buses on public highway > 55,000 lbs.	Form 2290 by Vehicle Owner or lessee claiming usage	Owner or lessee claiming usage	Annually, prorated for mid-year vehicle first use.
Truck Tire Excise Tax	IRS	Various ($0.04725-$0.0945) per tire	Federal Highway programs, (HTF and related infrastructure)	New tires bias-ply or super single tires	IRS Form 720 (Quarterly Excise Tax Return) Manufacturer or importer at point of sale	Manufacturer or importer at point of sale	Per sale/import. Reported quarterly
Unified Carrier Reg (UCR)	FMCSA	Various $46 - >$44,836 (2025 rates)	Enforcement of safety regulations, highway safety programs across states	Based on number of vehicles in the fleet	Registrant's base state UCR system.	Carrier or entity (broker, forwarder)	Annually by Jan 1

State Taxes & Fees | Overview

The table shows state-level fees generally create higher reporting burden for motor carriers and may also require more administrative effort from agencies.

WHAT	WHO	HOW MUCH	USED FOR	TERMS	WHERE PAID	PAID BY	HOW OFTEN
State Excise Tax Diesel	Various: State DMV/Dept of Transportation/Dept of Revenue	Various ($0.19 - $0.9710) OK has the lowest, CA highest	Highway Construction and Maintenance	All undyed diesel fuel sales for fuel used on public roads.	Various: State DMV/Dept of Transportation/Dept of Revenue	Fuel Suppliers or Distributors licensed in each state.	Monthly
Weight Distance Tax	CT, KY, NM, NY, OR	Various	Road maintenance/damage in respective state collecting fee	CMVs over a weight threshold operating intra/interstate	State Motor Vehicle taxing authority.	Carrier/vehicle owner/operator	various (mostly quarterly)
Registration Fees (IRP)	Various: State DMV/Dept of Transportation/Dept of Revenue	Varies by vehicle weight, type, jurisdictions traveled in, base fees plus weight/mile apportionment.	Vehicle licensing, administration and state road funding	Applies to CMVs (over 26,000 lbs.) operating interstate	Base Jurisdictions DMV/IRP Registration offices.	Vehicle owner or fleet operator	Annually (Some states have staggered registration periods)
Local Taxes/Fees	Local Governments or municipalities	Various by state	Local transportation infrastructure, congestion management, public transit	Trucks entering designated zones or meeting certain requirements	Various	Truck or fleet operator (registered owner)	Various
Fuel Tax (IFTA)	Various: State DMV/Dept of Transportation/Dept of Revenue	Amount based on fuel use + miles traveled in each jurisdiction. Tax paid at the pump is redistributed depending on where purchased and consumed.	State/province road maintenance and infrastructure	Interstate commercial vehicles with two or more axles > 26,000 lbs. or 3 or more axles regardless of weight.	IFTA return submitted to state agency	Carrier or operator	Quarterly
Oversize/Overweight Permits	State DOTs and transport agencies	Various (From $10's to $100's per move)	Permit administration, road inspection, escort services, infrastructure protection.	Vehicles or loads exceeding legal dimensions or weight	State permitting agency	Carrier or vehicle owner	Per trip or permit period (single use-multi use)
Toll Roads	Tolling Authorities	Varies by road, distance, size/class of vehicle	Toll maintenance, debt service, congestion relief, transit funding	Commercial vehicles using tolled segments	Tolling Authority or Account Manager.	Vehicle owner or fleet operator	Per use or per trip

Assumptions made for revenue baseline calculations

Fuel Tax attribution

For purposes of the illustrative revenue baseline, diesel fuel tax is attributed to trucks and gasoline fuel tax is attributed to light-duty vehicles and motorcycles. This is a simplifying assumption used for scenario modeling. In practice, some trucks over 10,000 pounds use gasoline, and some diesel vehicles may fall below the 10,000-pound threshold. FHWA does not publish federal fuel tax receipts by vehicle weight class and fuel type in a way that allows a precise split for this analysis.

Scenario 1

1. All registered motor vehicles in these categories are commercial and would be subject to MBUF; no exemptions.
2. Registered vehicles and miles traveled are assumed to be accurately reflected in the source reports.
3. Cents-per-mile estimates are strictly for the federal portion of the fees collected and do not include state revenues.
4. With the consolidation of the 5 fees in this chart, the estimated cents per mile to break even is approximately 7.91 cents.

Scenario 2

Single-Unit Trucks

1. Lightweight vehicles have higher MPG and some in this class run on gasoline. Therefore, the annual revenue for diesel from this class is the difference between the total FHWA reported revenue, less that from the combination vehicles.
2. Average Miles Traveled by single-unit trucks (11,593 miles) are approximately 20% of the annual average miles traveled by combination trucks (58,890 miles).
3. Vehicles under 55,000 pounds are not subject to HVUT fees.
4. Vehicles under 55,000 pounds are not subject to FET or will not replace vehicles as frequently. Used 20% of total collected as basis for CPM costs.
5. Fines/Penalties and Other Revenue: Used 20% as the basis.
6. UCR Fees are based on fleet size. Vehicles under 55,000 lbs. are likely smaller fleets. Took the estimated UCR revenue from Chart 3 and subtracted it from the total UCR collections to determine the average paid by vehicles in this class.
7. Many of the vehicles (10,000-26,000 lbs.) are for personal use and therefore skew the diesel tax collections. No adjustment made as actual numbers are not known and adjustments were not made for varying operating weights from 10,000 - 55,000 pounds.

Combination Trucks

1. Majority of vehicles in this category are registered at 80,000 pounds and use diesel fuel. Therefore, the average diesel gallons by combination vehicles was multiplied by .244 to get the total tax paid by these trucks.
2. Average Miles Traveled by combination trucks (58,890 miles) are approximately 80% of the average miles travelled by single-unit trucks (11,593 miles).
3. Vehicles in this class are subject to HVUT.
4. Vehicles in this class more subject to FET. Used 80% of total collected as basis for CPM costs.
5. Fines/Penalties and Other Revenue will also be significantly more for these vehicles. Used 80% basis.
6. UCR Fees are based on fleet size. Took the average minimum fee per vehicle (0-1,001) from each class and divided by 6 to get the average minimum per vehicle. (3,324,112 x $14).

Appendix D | Roles and Responsibilities

Definitions of Core Functions

This appendix provides working definitions for the core functions used throughout the memo. These functions are not tied to one governance model. They would need to be addressed whether a future truck MBUF framework is state-direct, base-state, supported by a shared coordination function, or carried out in part by account managers or other service providers.

Governance and Business Rules

Every framework needs an authority structure for setting and changing the rules. This includes program requirements, rate structures, eligibility rules, exemptions, liability, dispute processes, reporting standards, and changes to the framework over time.

For a multi-state truck MBUF framework, this function would need to define which decisions remain with individual jurisdictions, which decisions are made through a common agreement, and how changes are handled across participating states.

Certification and Provider Oversight

If technology providers, account managers, or other service providers are allowed to perform system functions, the framework would need a process for approving and monitoring them. This could include technical standards, data quality requirements, security requirements, reporting formats, customer support expectations, auditability, and corrective action.

Certification can support consistency and reduce the risk of weak or incompatible data entering the system. It does not replace audit or enforcement. It is a front-end control that helps establish whether providers, devices, systems, or reporting methods meet agreed requirements.

Audit and Enforcement

A workable system must define who verifies accuracy, who has authority to review records, and how non-compliance is addressed. This includes audit jurisdiction, documentation standards, audit thresholds, selection criteria, enforcement actions, penalties, and dispute pathways.

In a single-state system, these responsibilities can remain within one jurisdiction. In a multi-state system, audit and enforcement require coordination. Without clear allocation, carriers could face duplicative review or uncertainty over which entity has authority.

Account and Registration

Every system must determine who is in the system, under what structure, and through which jurisdiction or administrative entry point participation occurs. This includes defining eligibility, establishing account structures, maintaining records, and identifying the responsible or base jurisdiction where relevant.

In a truck context, this also requires clarity on the reporting entity. The framework would need to define whether reporting occurs at the carrier, fleet, vehicle, account, or base-jurisdiction level, and how vehicle classes or weight thresholds are treated.

Reporting and Data Validation

A multi-state MBUF framework must define how activity is recorded, how it is reported, and how reported information is checked before taxes/fees are applied. This includes reporting methods, reporting frequency, required data fields, transmission standards, validation rules, exception handling, and record retention requirements.

This function is broader than mileage capture. It also includes the standards and processes needed to determine whether data is complete, consistent, and usable for revenue attribution, billing, settlement, audit, and compliance review.

Rate Application

Once reportable activity has been established, the system must determine how taxes/fees are calculated. This includes applying rate logic, vehicle classifications, exemptions, adjustments, and jurisdiction-specific rules.

This is separate from the policy question of what the rate should be. Even under a simple rate structure, the system still needs a reliable process for applying the correct rules and showing how taxes/fees were calculated.

Billing and Revenue Collection

Billing and revenue collection determine how payment is requested, received, corrected, and communicated. This includes invoice generation, payment processing, adjustments, credits, refunds, revenue recovery, payment risk, and customer communication.

For truck MBUF, this function would be especially important because revenue collection would move closer to the user than the fuel tax model. Decisions about who controls billing also affect dispute pathways, payment risk, customer support, and the visibility of the tax/fee to the carrier.

Reconciliation and Settlement

In a multi-state system, reported activity and collected revenue must be attributed to the jurisdictions where travel occurred. Reconciliation and settlement include calculating jurisdictional balances, correcting errors, supporting revenue apportionment, netting payments where applicable, and transferring funds among participating jurisdictions.

This function is central to multi-state operability. It is the process that allows revenue to move across jurisdictional boundaries in a way that can be traced, corrected, and trusted.

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