

Senate Bill 671 – Top 6 Freight Corridors in California

Top 6 Priority Clean Freight Corridors Methodology

To define California's potential priority corridors, Commission staff began the Assessment with a primary focus on freight by forecasting how the type of goods that travel into, out of, and through the state may change through the year 2050. The Assessment employed a four-step approach to identify the candidates for priority freight corridors:

- 1) Estimate goods movement and commodity flows across commodity type, expected trip type, vehicle class, and projected powertrain adoption
- 2) Define priority freight corridors as those corridors greater than 50 miles in length, with the highest concentration of goods movement and related highest average daily traffic and vehicle miles traveled
- 3) Determine the natural cut-off or breakpoint for potential priority corridors by triangulating data from several federal and state-level data sources¹
- 4) Evaluate the potential priority corridors for emissions and near-source pollution exposure effects

1. Estimate Goods Movement

To understand freight movement in the state, staff looked at how goods move based on commodity flow, trip type, vehicle class, and projected powertrain mix. The term “powertrain” refers to the type of energy used in the truck, such as battery electric or hydrogen fuel cell.

The overlap of the highest truck vehicle miles traveled, and the annual median of truck trips per day, gave an initial recommendation for the priority corridors to consider.

The vehicle classes considered were medium-duty vehicles as defined by vehicle classes 4 through 6 and heavy-duty vehicles as defined by classes 7 through 8.² See Exhibit 1 below for more detail.

¹ Staff reviewed and analyzed data from the following sources: federal Freight Analysis Framework (FAF5), United States Army Corp of Engineers, Engineer Research and Development Center (USACE), the California Department of Transportation (Caltrans), and Lawrence Berkeley National Labs.

² The Assessment used vehicle classes as defined by the California Air Resources Board (CARB) and/or the Federal Highway Administration (FHWA).

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Exhibit 1. Truck Vehicle Class Types

FHWA and CARB data and categories are used as a proxy to model MDT and HDT traffic volume



FHWA GVWR category	FHWA GVWR class / weight	FHWA MCFM class / weight	CARB 202x vehicle Class ¹	CEC GVWR class / weight	HPMS Vehicle class	HPMS Classification
Light-Duty (LDT)	Class 1: 0 to 6K lbs	Class 1: 0 to 6K lbs	LDT1/2: < 6K lbs	Class 1: 0 to 6K lbs	Class 1 Motorcycle	Non-commercial: Class 1-3
	Class 2: >6K to 10K lbs	Class 2: >6K to 10K lbs	MDV: 5751 – 8500 lbs LHD1: 8501-10K lbs	Class 2: >6K to 10K lbs	Class 2 Passenger cars	
	Class 3: >10K to 14K lbs	Class 3: >10K to 14K lbs	LHD2: >10K-14K lbs	Class 3: >10K to 14K lbs	Class 3 4 tire, single unit	
Medium-Duty (MDT)	Class 4: >14K to 16K lbs	Class 4: >14K to 16K lbs	Class 4: >14K to 16K lbs	Class 4: >14K to 16K lbs	Class 4 Buses	Single-unit commercial: Class 4-7
	Class 5: >16K to 19.5K lbs	Class 5: >16K to 19.5K lbs	Class 5: >16K to 19.5K lbs	Class 5: >16K to 19.5K lbs	Class 5 2 axle, 6 tire, single unit	Vehicles with power units and chassis permanently attached. SUs are popular for retail delivery, construction, utilities, and services
	Class 6: >19.5K to 26K lbs	Class 6: >19.5K to 26K lbs	Class 6: >19.5K to 26K lbs	Class 6: >19.5K to 26K lbs	Class 6 3 axle, single unit	
	Class 7: >26K to 33K lbs	Class 7: >26K to 33K lbs	Class 7: >26K to 33K lbs	Class 7: >26K to 33K lbs	Class 7 ≥ 4 axle, single unit	
Heavy-Duty (HDT)					Class 8 ≤ 4 axle, single trailer	Combination commercial: Class 8-13
					Class 9 6-Axle tractor semitrailer	Vehicles made up of two or more units, most commonly a tractor and a semitrailer
					Class 10 ≥ 6 axle, single trailer	
					Class 11 ≤ 5 axle, multi trailer	
					Class 12 6 axle, multi trailer	
					Class 13 ≥ 7 axle, multi-trailer	
	Class 8: >33K lbs	Class 8: >33K lbs	Class 8: >33K lbs	Class 8: >33K lbs		

1. EMFAC vehicle classes from Class 4 - 8 also include use-case designations such as Public, Utility, Instate Delivery, Single Dump, etc.

Source: Highway Performance Management Systems, Federal Highway Administration, California Air Resources Board, California Energy Commission

The trip types evaluated were urban, regional, and long-haul.³ The projected power train mixes considered were combustion engine (such as diesel) vehicles, battery electric vehicles, and fuel cell electric vehicles. For more details about the goods movement analysis, see Attachment A of this book item.

The goods movement analysis found that agriculture and consumer goods in California flow to major population centers, while industrial commodities movement is concentrated around various manufacturing, production areas, and harbors throughout the state. Annual urban trips are concentrated along population centers, while regional and long-haul truck traffic is more equally distributed across major interstates. Medium-duty trucks are concentrated on urban roads between large metropolitan areas, while heavy-duty trucks are mostly found on connecting interstates. By 2050, annual battery electric truck trips are projected to be concentrated on all interstates, while fuel cell electric truck trips, coinciding mostly with heavy-

³ Urban trips are defined as trips in and around cities and urban centers usually for delivery. Regional trips are defined as trips in between major cities and neighboring states. Regional also includes short-haul trips such as drayage. Long-haul trips are defined as trips much longer in length whether cross-country or just several states away. In general, medium-duty trucks are more frequently used for urban or delivery trips and heavy-duty trucks are used for drayage, regional, and long-haul trips.

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duty vehicle trips, are projected to be concentrated on the highest vehicle miles traveled corridors between major origin and destination points, such as along I-5.⁴

2. Define Freight Corridors

To determine which corridors have both the heaviest freight volume and near-source exposure to diesel exhaust and other contaminants, the Assessment had to first define freight corridors themselves.

This Assessment defines freight corridors as routes with the highest concentration of goods movement and related daily truck traffic (highest vehicle miles traveled), high daily average and maximum truck volumes, and those corridors longer than 50 miles in length. While the top corridors identified are highways longer than 50 miles in length, Commission staff have included the smaller segments of highways that connect the longer corridors to ports as part of the priority corridor. For example, Interstate (I) 710 is considered part of the I-10 priority corridor because I-710 connects I-10 to the San Pedro Bay ports. See Exhibit 2 below for detail about the links to the proposed top 6 freight corridors.

Exhibit 2. Links to Ports

Top Six Corridors – Key Connecting Routes

AS OF 02/09/2023 ILLUSTRATIVE & DRAFT PRELIMINARY – FOR DISCUSSION



PORT OF OAKLAND

The I-80 corridor includes the short segments of I-580 and I-880 that connect I-80 to the Port of Oakland



SAN PEDRO BAY PORTS

The I-5 corridor includes the I-710 where it connects I-5 to the Ports of Los Angeles and Long Beach, and the segments of I-405 and Highway 1 that connect I-10 and I-710 near the San Pedro Bay Ports. This corridor also includes the local roads that connect the I-5 to the Port of San Diego and to the US/Mexico border

The I-10 corridor includes the short segment of SR-47 that connects I-10 to the Port of Los Angeles, and the segments of I-405 and Highway 1 that connect I-10 and I-710 near the San Pedro Bay Ports



OTAY MESA

The I-5 corridor includes the short segments of SR-905 and SR-11 that connect I-5 to Otay Mesa and the US-Mexico border

Note: These ports are key freight origin and destination points. Thus, they have been included in the freight corridors to reflect the need for infrastructure in and around them



In the Assessment, Commission staff will note the need for zero-emission freight infrastructure at the United States and Mexico border. Zero-emission infrastructure is needed along this border, especially at ports of entry like Otay Mesa East, where a

⁴ Source: Analysis of data from Highway Performance Monitoring System (Federal Highway Administration), Freight Analysis Framework (Bureau of Transportation Statistics).

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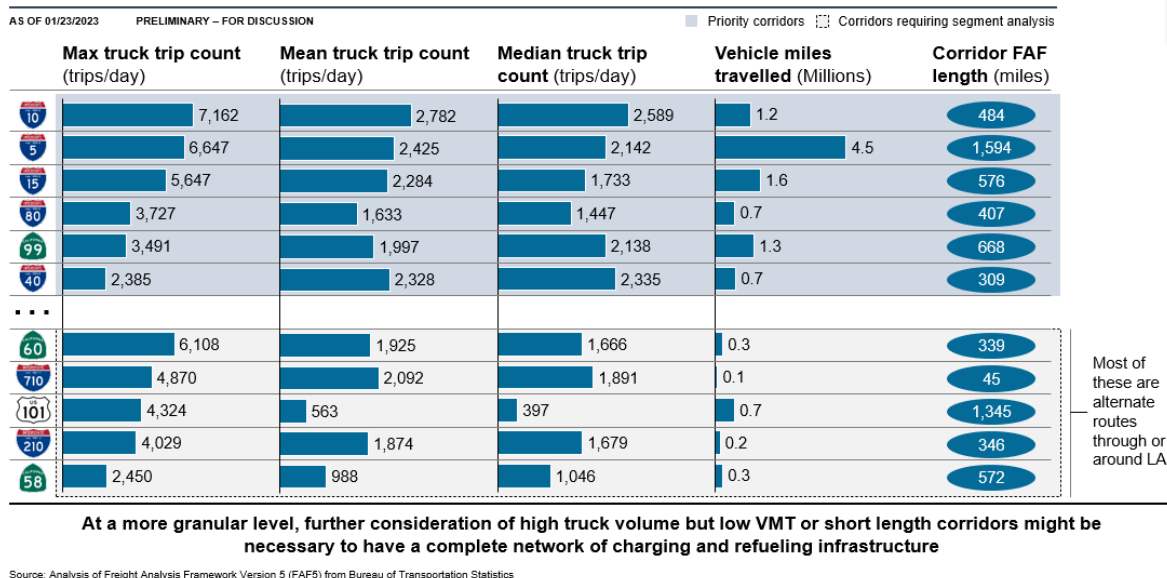
large number of trucks cross the border. This need is not driven by a priority corridor, but by a key port of entry.

3. Rank Corridors by Truck Traffic Metrics and Assess Natural Break Point

To prioritize the top corridors, staff completed a comparative analysis of federal and state-level data sources including Freight Analysis Framework (FAF) 5 data, California Department of Transportation (Caltrans) truck counts, United States Army Corps of Engineers, Engineer Research and Development Center (USACE-ERDC) work, and truck Global Positioning System (GPS) data. This data was used to determine the natural break points of freight corridors. The comparative analysis included key truck traffic metrics such as vehicle miles traveled, corridor length, daily average truck trips, and maximum truck volumes. The six proposed priority corridors ranked highly in terms of commodity flows, as well as highest daily truck vehicle miles traveled and high in all other truck traffic metrics assessed. An example of this analysis is included as Exhibit 3 below.

Exhibit 3. Truck Traffic Assessment of California Corridors

There are six priority corridors as measured by maximum, average, and median daily truck traffic and VMT



Although Commission staff prioritized the corridors, shorter highway segments have been flagged for further consideration when building out statewide infrastructure. Some of these highways will need infrastructure along or near them to create a complete and viable charging and fueling network throughout the whole state.

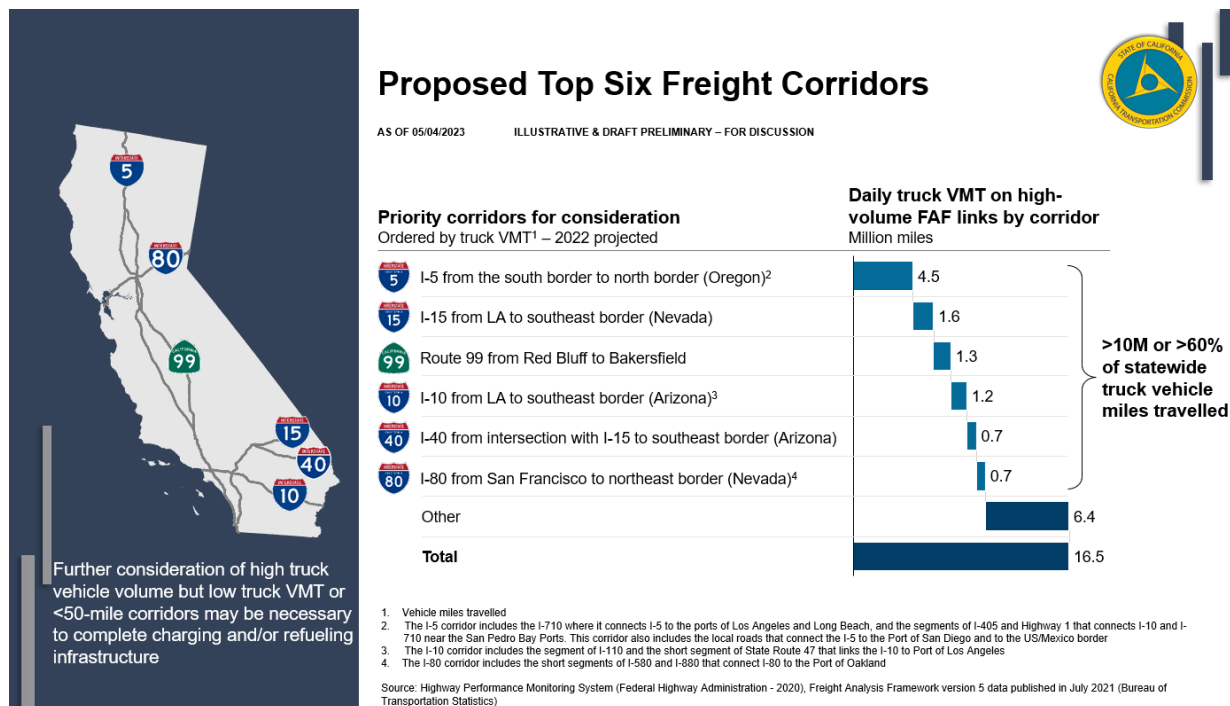
Proposed Six Priority Freight Corridors

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Based on the methodology outlined above, Commission staff identified six proposed priority freight corridors:

- I-5 from Mexico to Oregon⁵
- I-15 from Los Angeles to southeast border (Nevada)
- Route 99 from Stockton to Bakersfield
- I-10 from Los Angeles to southeast border (Arizona)⁶
- I-40 from intersection with I-15 to southeast border (Arizona)
- I-80 from San Francisco to northeast border (Nevada)⁷

These six priority freight corridors represent over 60% of the daily truck vehicle miles traveled across the state of California.⁸



⁵ The Interstate (I)-5 corridor includes the I-710 where it connects I-5 to the ports of Los Angeles and Long Beach, and the segments of I-405, Highway 1, and State Route 47 that connects I-5 and the I-710 to the San Pedro Bay Ports. This corridor also includes the local roads that connect the I-5 to the Port of San Diego and to the United States/Mexico border.

⁶ The I-10 corridor includes the segment of I-110 and the short segment of State Route 47 that connects I-10 to the San Pedro Bay Ports.

⁷ The I-80 corridor includes the short segments of I-580 and I-880 that connect I-80 to the Port of Oakland

⁸ Based on 2022 projected vehicle miles travelled for California interstates, numbered highways, and state routes, as defined in federal Freight Analysis Framework data.