



Source: FHWA.

Future of Freight

Oak Ridge National Laboratory Smoky Mountains Mobility Conference

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Federal Highway Administration (FHWA)
Office of Operations

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Disclaimers



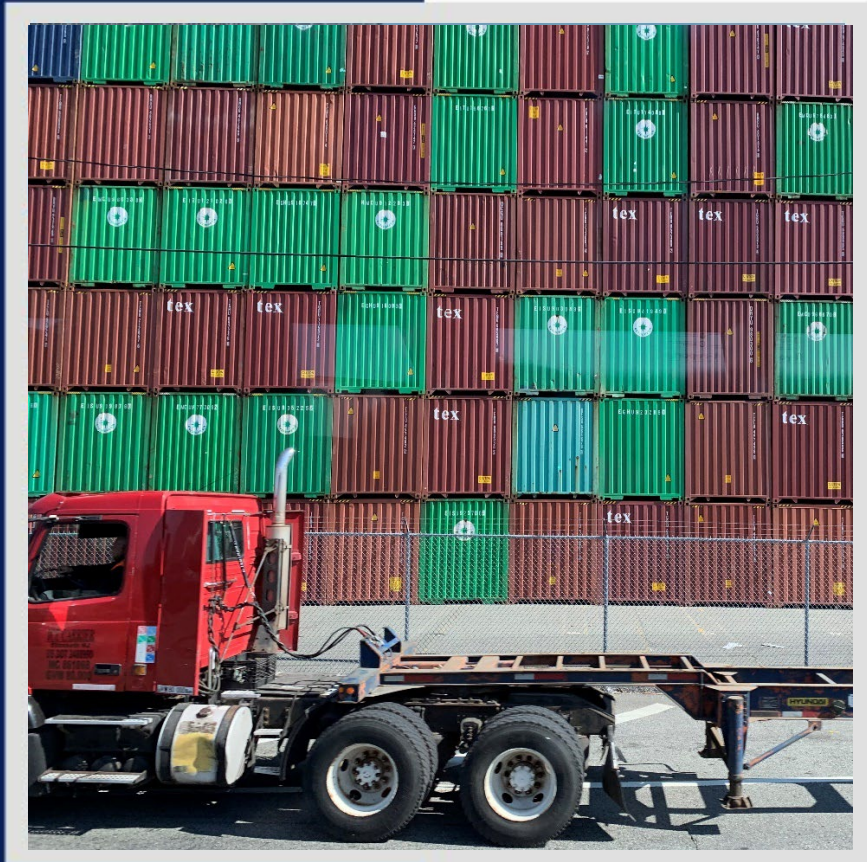
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Source: FHWA.

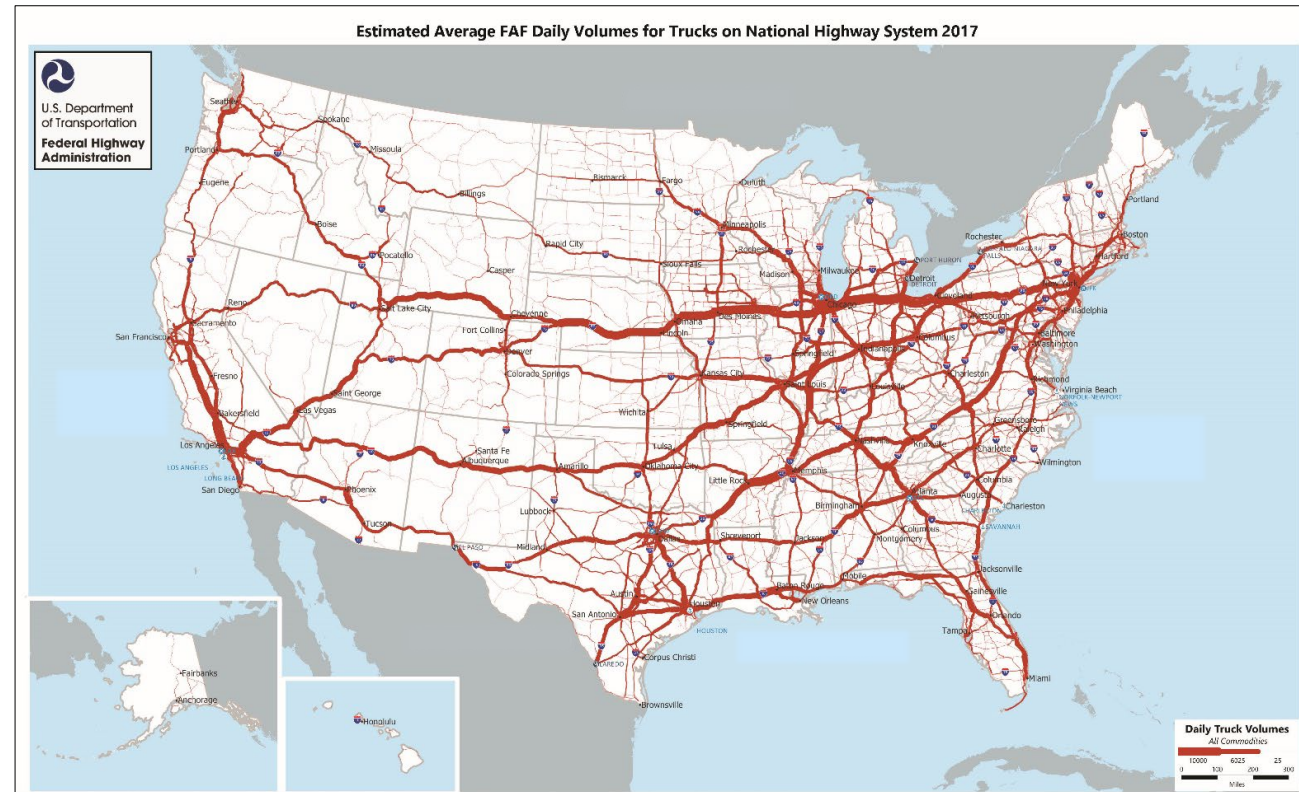
Supply Chain Commodity Flow Data

Background on Freight Trends



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- Freight tonnage by all modes projected to increase 43% from 20.2 billion tons in 2019 to 28.9 billion tons in 2050.
- Goods movement by truck represents 65% of total domestic tonnage.
- Truck travel projected to increase 66% between 2019 and 2050, from 300 billion to 497 billion vehicle miles of travel per year.
- Truck traffic concentrated on routes connecting population centers, ports, border crossings, and major hubs of activity.

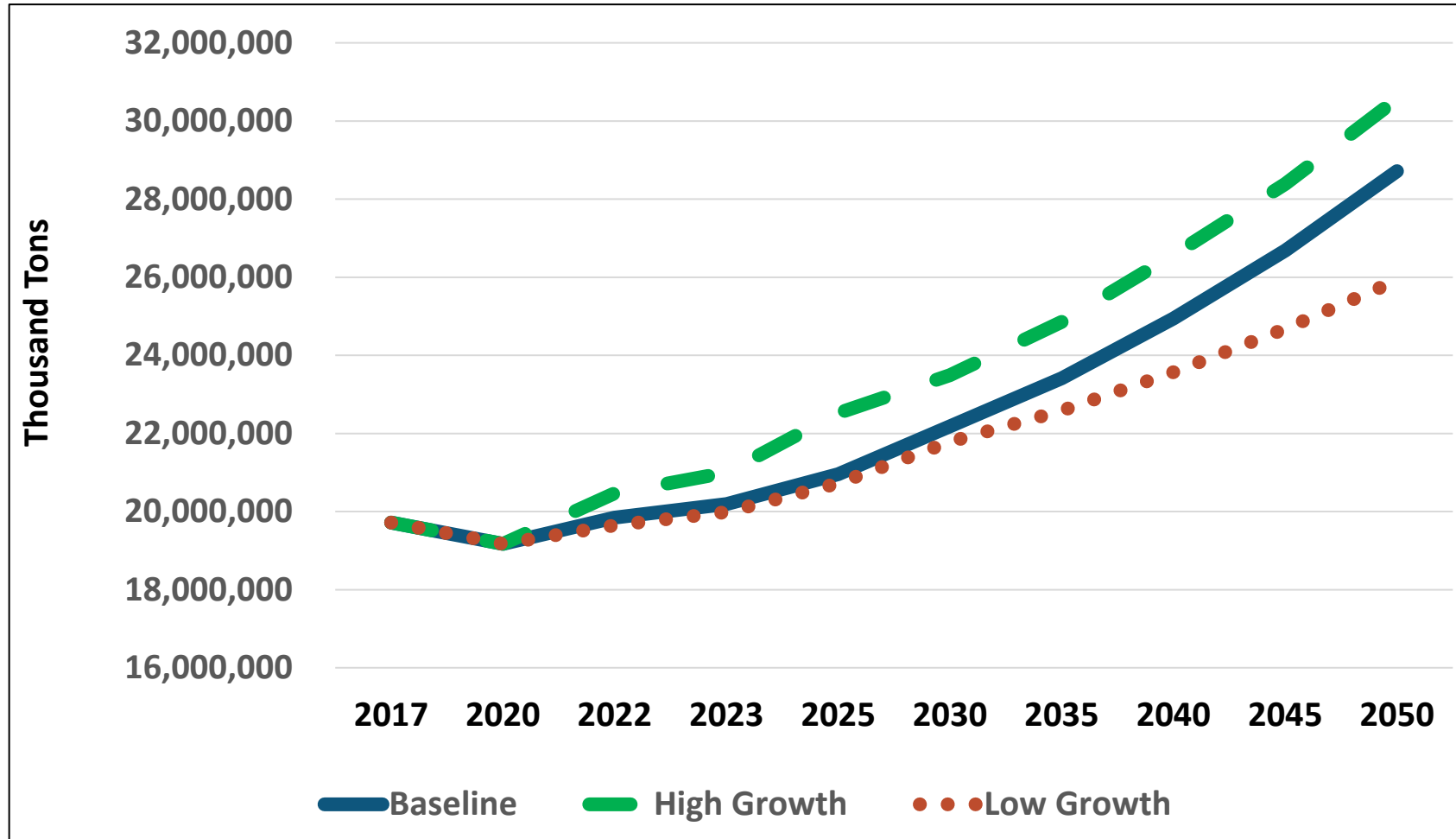


Source: USDOT, BTS, FHWA, Office of Freight Management and Operations, FAF, version 5.2.

Projected Total Flows by Growth Scenario



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Freight Analysis Framework (FAF)



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- What is moving?:
 - Types of commodities
- Where is it moving?:
 - Between metropolitan areas
 - Between States
 - Between the United States (U.S.) and foreign countries
- How much is moving?:
 - Tons, ton miles, and value of goods
- How is it moving?:
 - Truck, rail, air, and water
- How much is expected to move (flow scenarios)?:
 - Base-year estimates
 - 30-year forecasts

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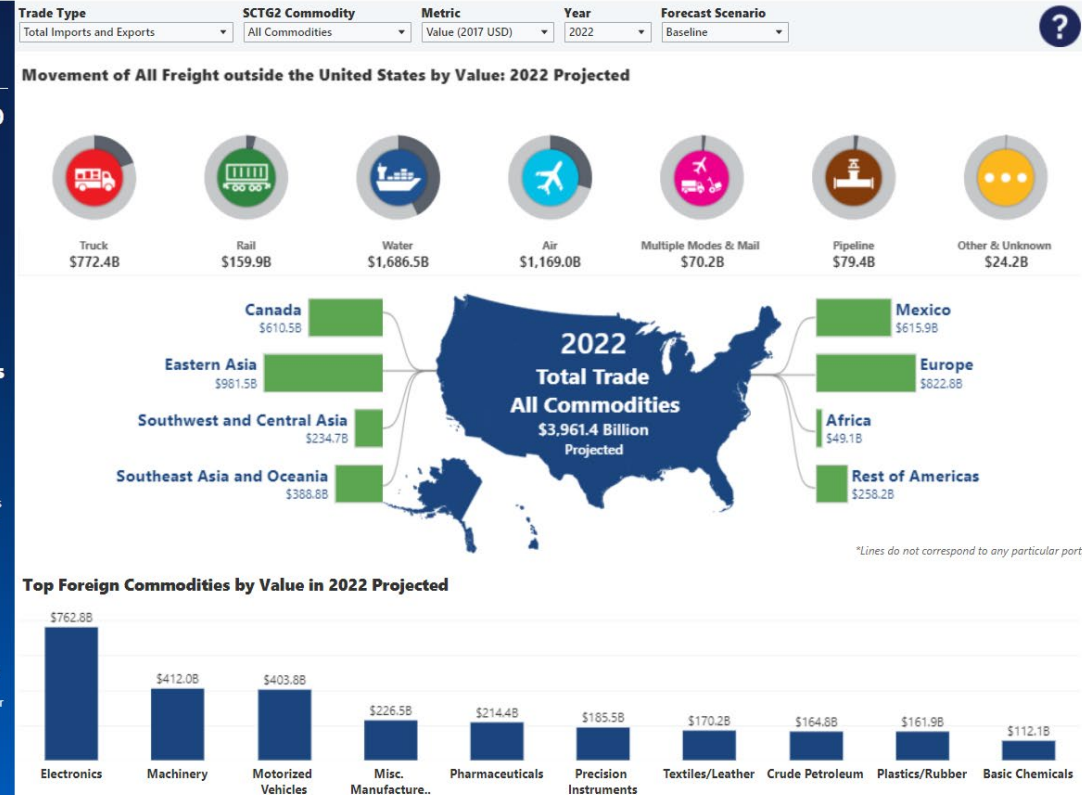
**Freight Analysis Framework (FAF)
Data Visualization Tool:
International Freight Flows**

Navigate to Another View:

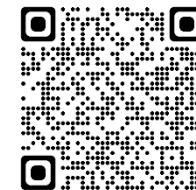
- National Flows
- State and Zone Flows
- Origin-Destination Pairs
- Trend Comparison

Instructions
Use the filters along the top or select the mode icons to change the views. Hover over each data point for more information.

Download the Data
Use the following links to download the data used in the FAF 5.5.1 dashboards or capture selected views. Visit ops.fhwa.dot.gov/freight/freight_analysis/faf/ for more information and downloads.



FAF version 5 Web page:
https://ops.fhwa.dot.gov/freight/freight_analysis/faf/

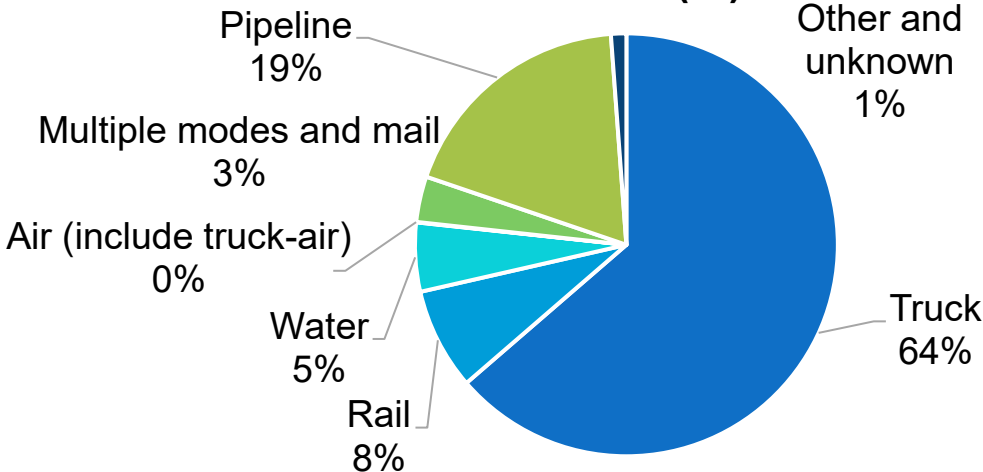


Trucking Leads Freight Growth in Weight and Value

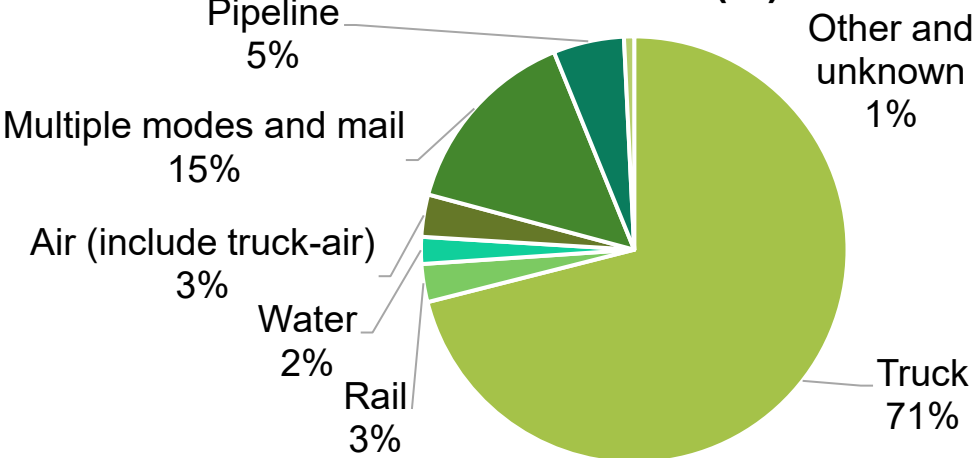


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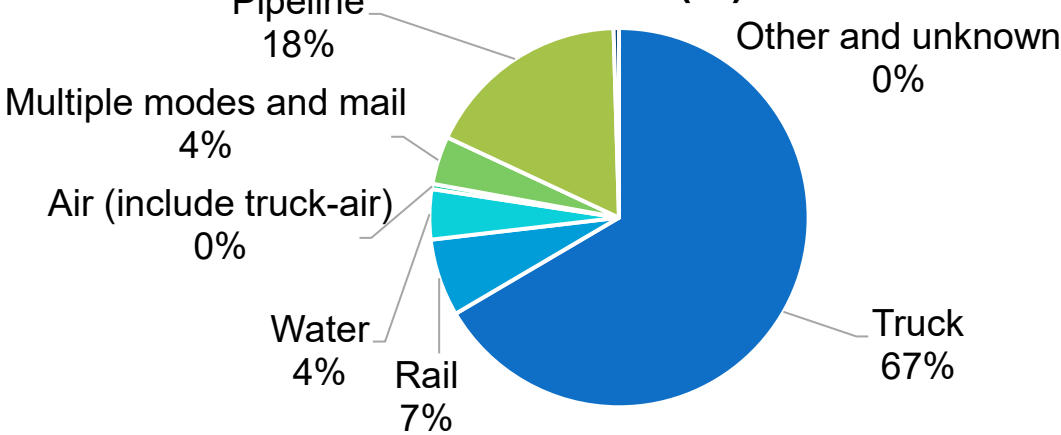
2019 Tons (%)



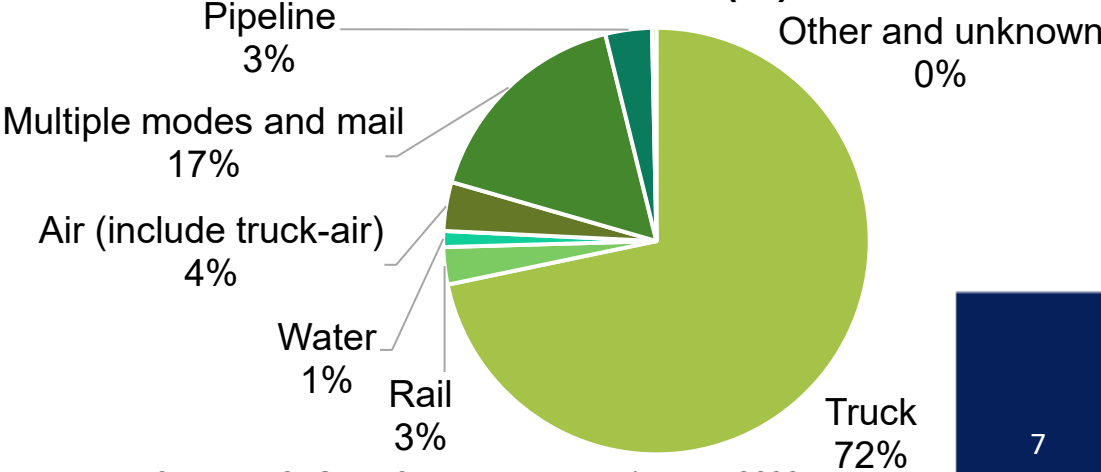
2019 Value (%)



2050 Tons (%)



2050 Value (%)



Source: USDOT, BTS, FHWA, FAF, version 5.4, 2022



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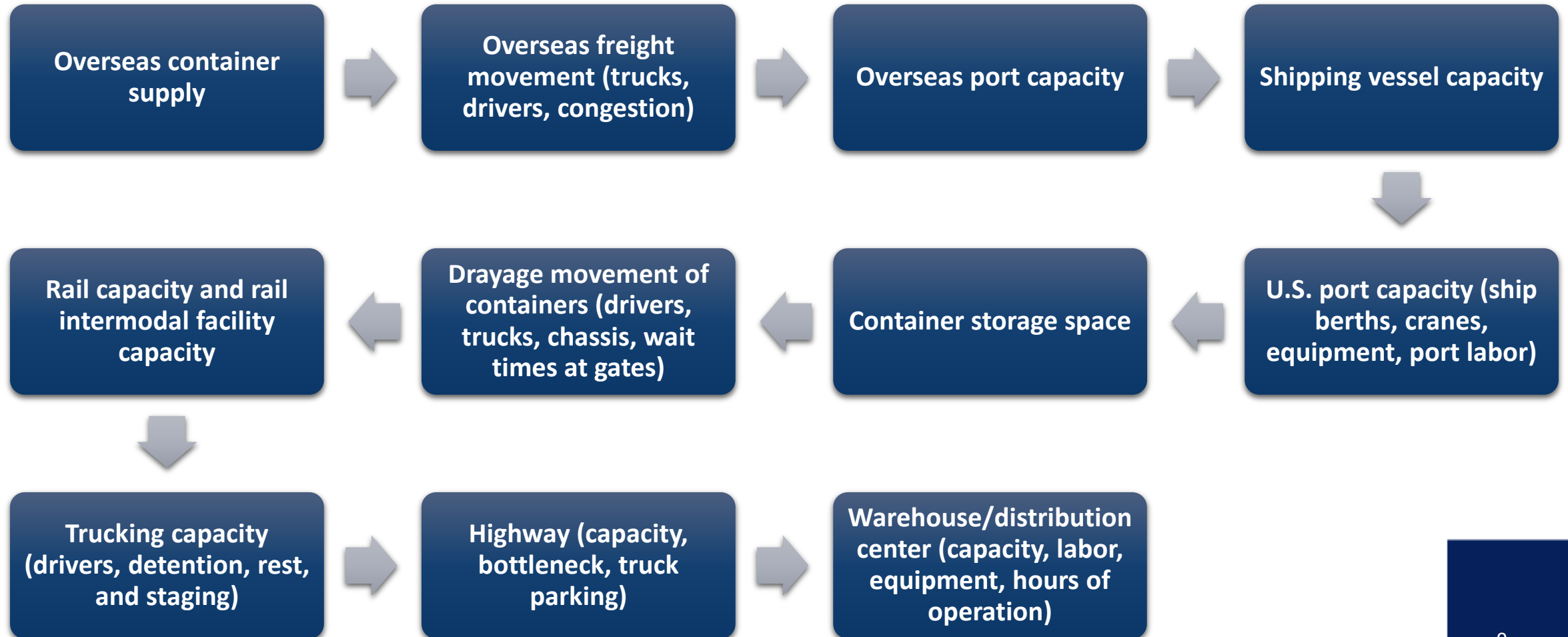
Source: FHWA.

Freight Infrastructure Conditions and Performance Data

Potential Bottlenecks in the Supply Chain



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NHFN Performance

- Most recurring, highly congested conditions on NHFN occurred in major metro areas:
 - High-volume truck portions of NHFN experienced more congested conditions.
- Between 2011 and 2016 for the top 25 domestic freight corridors on the NHFN:
 - Annual average travel speeds generally increased*
 - Truck travel reliability generally decreased**
- Fatal crashes on the NHFN increased from 2014 (3,633) to 2016 (4,447)

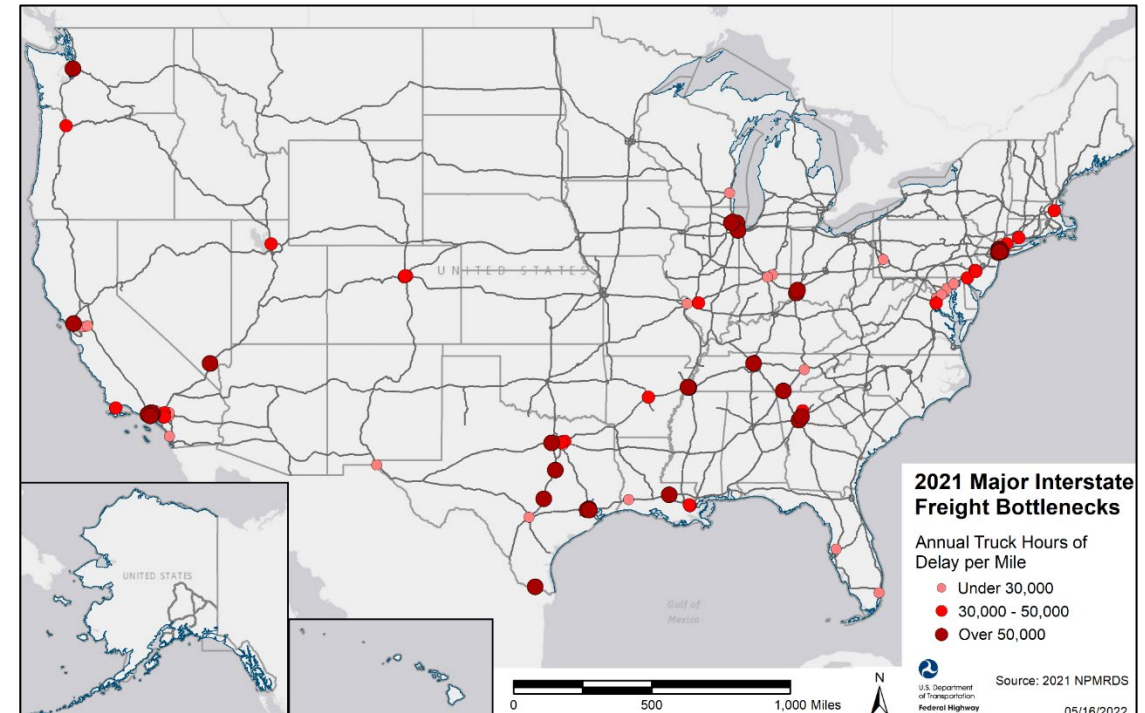
*52 percent of corridors experienced a speed increase over this period

** 72 percent of corridors experienced a decrease in truck travel reliability



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2021 Major Interstate Freight Bottlenecks



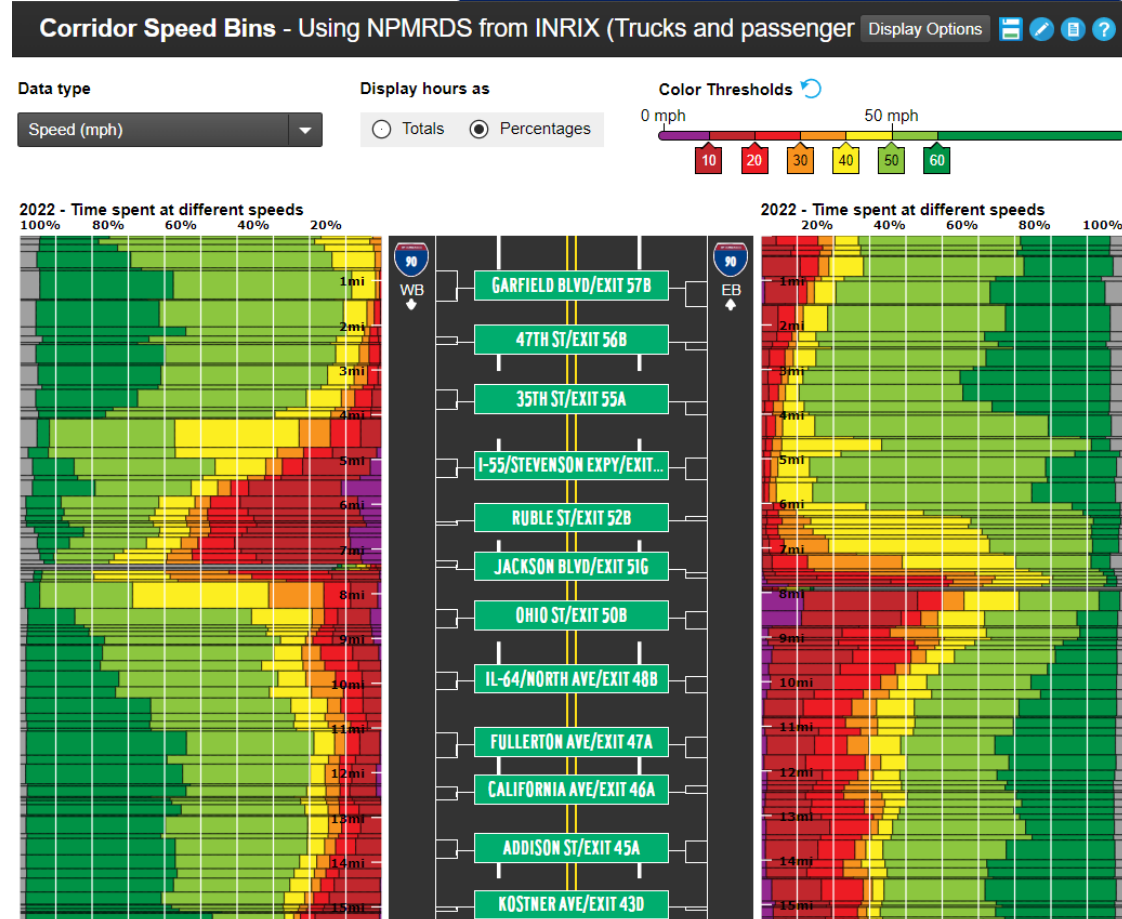
Source: FHWA, Office of Freight Management and Operations

Freight Performance Measurement Data



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- National goals and performance management measures for freight movement under 23 U.S.C. 150:
 - Truck Travel Time Reliability (TTTR)
 - Freight highway bottlenecks
- National Performance Management Research Data Set (NPMRDS) vehicle probe-based travel time data:
 - Speeds and travel times for passenger vehicles and trucks
 - NPMRDS analytics such as congestion scans and performance charts
- Methods to improve freight reliability and bottlenecks:
 - Freight-related Transportation Systems Management and Operations (TSMO)
 - Congestion at bottlenecks
 - Performance-based planning process



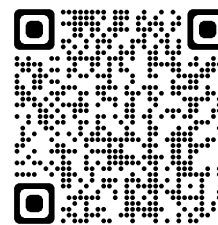
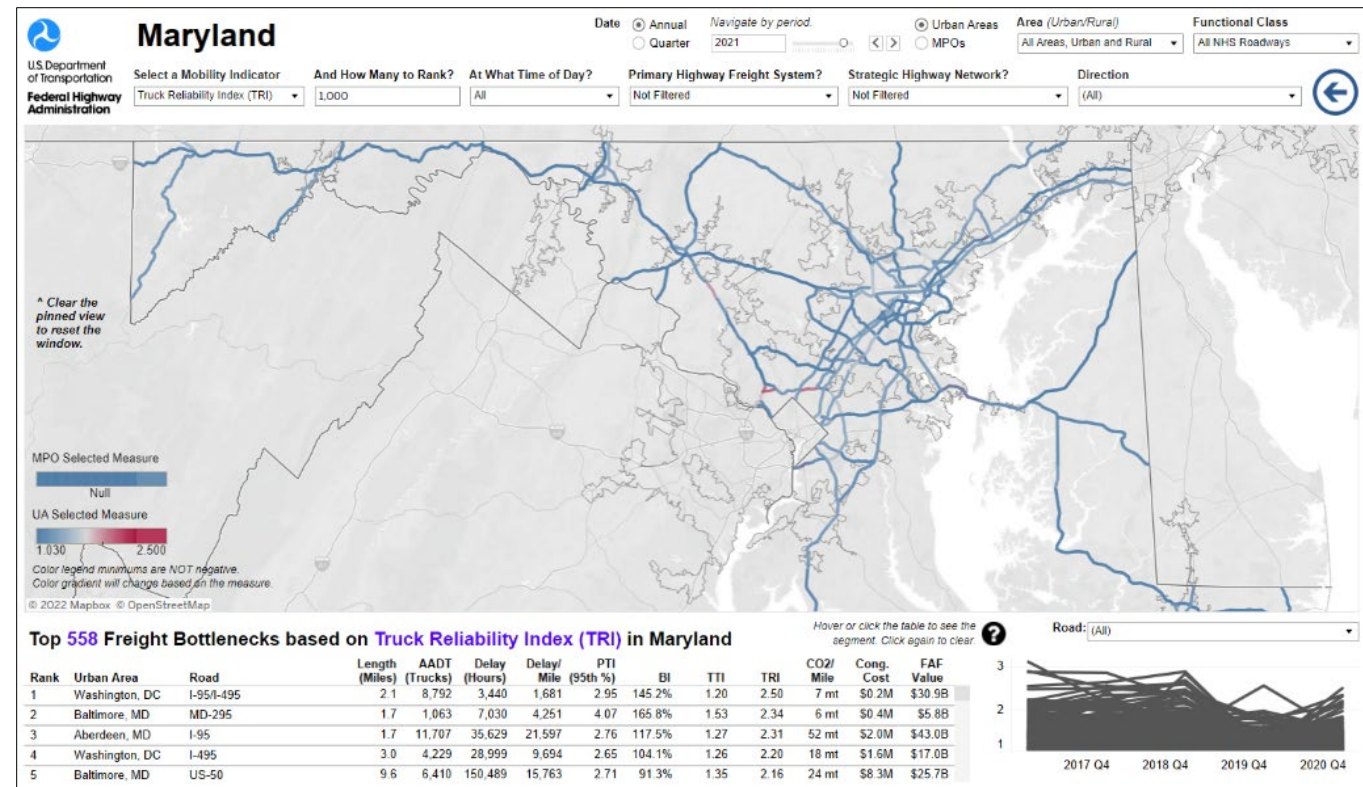
Source: NPMRDS.

Freight Mobility Trends



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- Freight mobility at National, State, regional, or corridor level
- Freight mobility around major ports, intermodal facilities, cargo airports, and border crossings
- Freight mobility performance indexes
- Delay and cost of freight bottlenecks
- Truck carbon dioxide (CO2) emissions



Freight Mobility Trends:
https://ops.fhwa.dot.gov/freight/freight_analysis/mobility_trends

Source: FHWA.

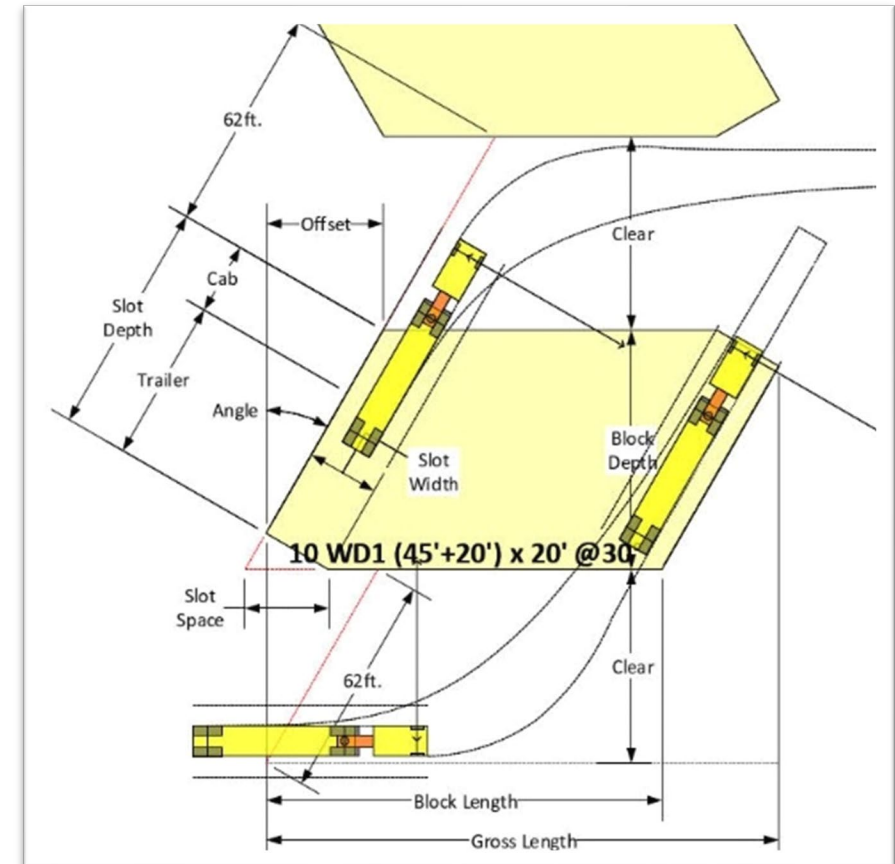
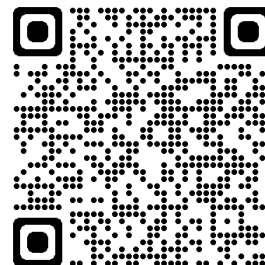
Truck Parking Development Handbook



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- Presents tools and strategies for local planners and officials to integrate truck parking with freight land uses
- Provides tools for estimating truck parking generation and needs
- Identifies public benefits of truck parking and benefit cost and economic impact analyses
- Discusses factors for identifying sites and designing truck parking
- Examines attributes that ensure truck parking areas are safe
- Provides case studies of successful truck parking developments

Truck Parking Webpage:
https://ops.fhwa.dot.gov/freight/infrastructure/truck_parking



Source: FHWA.

Freight Automation



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- Automated long-haul freight movement
- Automated local freight distribution
- Automated package delivery
- In-terminal, drayage, and transfer operations
- Integration with other modes (rail/marine)



Source: FHWA.

Benefits of automation:

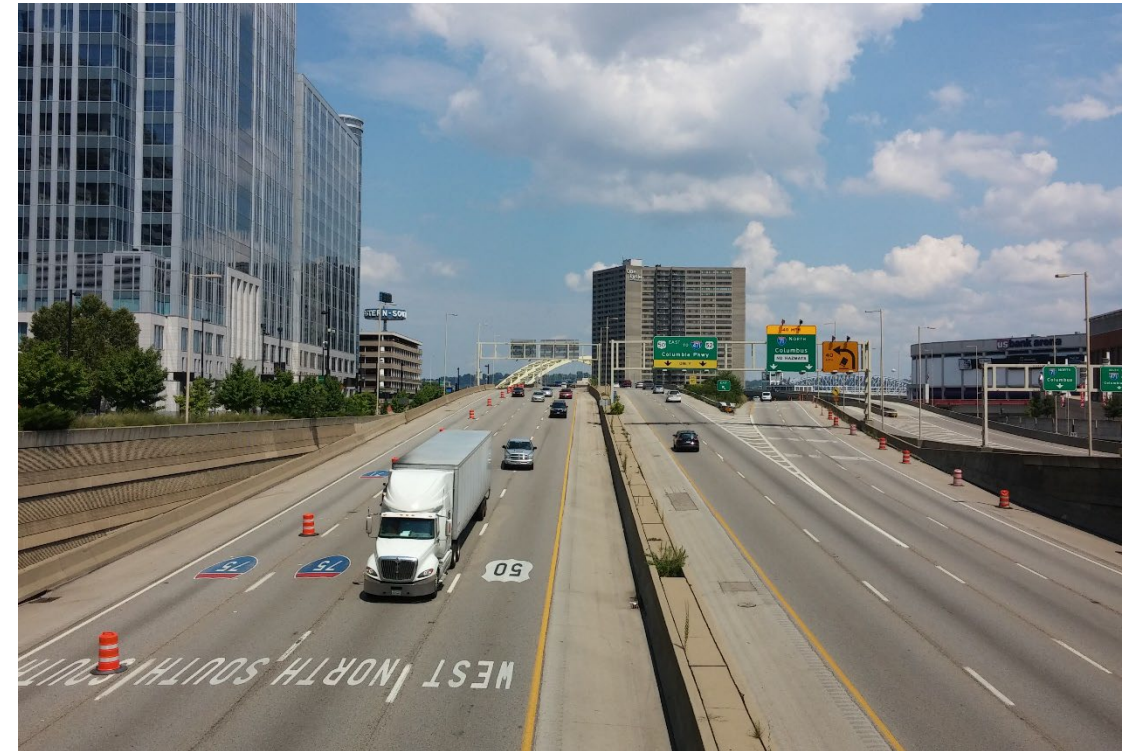
- Improved safety
- Decreased congestion
- Reduced energy use
- Improved mobility
- Reduced crashes and costs
- Better productivity, efficiency, and flexibility
- Integration with 24/7 operations at automated warehouses
- Reduce inventory cost savings from more reliable deliveries
- Address driver shortage



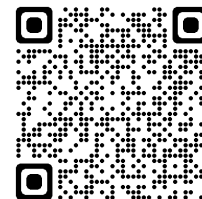
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For more information:

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