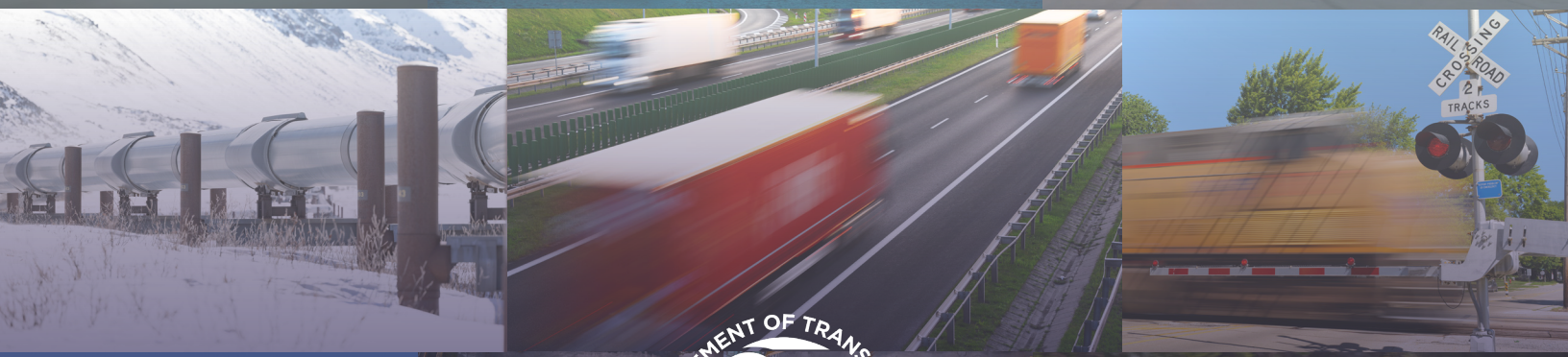
2026

NATIONAL FREIGHT STRATEGIC PLAN



FOREWORD FROM THE SECRETARY

As the United States approaches its 250th birthday, it is fitting to reflect on the systems that have carried our Nation since its founding. From the earliest days of the American Revolution, our independence relied not only on strong leadership, but also on the critical ability to move food, equipment, clothing, and supplies across difficult terrain to support General Washington's army and the citizens of our fledgling Nation. Freight and supply chains were essential to victory then, and they remain essential to our American way of life today.

In the two and a half centuries since that victory, those same transportation networks expanded and evolved, connecting farms to consumers, factories to global markets, and communities to opportunity. They support domestic manufacturing and agriculture, strengthen energy and food security, and enable American businesses to compete from a position of strength.

Today, the Nation's multimodal freight network of highways, railways, ports, inland waterways, pipelines, and airports must function as an integrated, modern system. Safety, security, efficiency, reliability, and innovation are not abstract goals, but instead essential contributors to our economic competitiveness. When the freight system moves efficiently and reliably, costs stay low, shelves stay stocked, and the benefits reach every household and every region of the country.

This updated National Freight Strategic Plan reflects the U.S. Department of Transportation's commitment to strengthening that system. It elevates the need to build resilience into freight infrastructure and operations, improve visibility across supply chains through better data and coordination, and focus investments where they will most effectively support American industry and economic growth. It also addresses the growing threat of cargo theft and the importance of protecting the goods that American workers produce and move every day to keep freight workers safe and consumer costs low.

This Plan also affirms that the government's role is to enable success by strengthening infrastructure, reducing friction, and creating the conditions for private enterprise, workers, and communities to thrive. Through performance-driven, data-informed decision-making and strong partnerships across modes and jurisdictions, we can ensure that the freight system serves those who build, produce, ship, and deliver for America every day.

As we look ahead, the lessons of history are clear. America has always moved forward by building—by connecting people, goods, and ideas at scale. The next chapter of our freight system will be no different. By investing in a safe, efficient, and reliable 21st-century freight network, America will lead in global commerce, reinforce its economic independence, and create opportunity for generations to come.

In our semiquincentennial year, we recommit to the work of building a freight system worthy of the Nation it serves, and equal to the promise of the next 250 years.

SEAN P. DUFFY
20th United States Secretary of Transportation

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EXECUTIVE SUMMARY

The U.S. Department of Transportation (USDOT) works to deliver a safe transportation system that supports economic strength and enhances the quality of life for communities across the Nation. Freight transportation is fundamental to that mission. Every sector of the economy depends on the reliable movement of goods, and the performance of the freight system directly affects safety outcomes, infrastructure condition, supply chain reliability, workforce well-being, and national security.

The National Freight Strategic Plan (NFSP) establishes a coordinated national framework for strengthening the safety, efficiency, resilience, security, innovation, and workforce of the U.S. freight system. It provides a long-term, multimodal strategy to guide Federal freight policy, investment, and partnership, while supporting State, local, Tribal, and private-sector efforts to improve freight movement across the country.

Federal law requires USDOT to periodically update and implement an NFSP. This latest edition of the Plan expands upon the insights of the inaugural 2020 document. It includes greater data-driven insights based solely on publicly available data to define national trends and challenges across the multimodal freight system; provides clearer planning and analysis frameworks for State and local agencies to consider and build upon during their own freight planning processes; and more clearly identifies opportunities for public sector agencies to work in collaboration and with the private sector to improve the performance of the National Multimodal Freight Network. It was developed through a multi-agency effort that includes extensive consultation with freight stakeholders and national experts.

STRATEGIC FRAMEWORK

The Plan defines a set of strategic goals that together define USDOT's approach to freight transportation. These goals reflect the most pressing challenges facing the national freight system and provide a policy framework that guides Federal decision-making, investment, and coordination across modes and jurisdictions. Each strategic goal is supported by targeted strategies that emphasize multimodal connectivity, data-driven planning, risk management, and collaboration with public and private partners.

GOAL	STRATEGIC OBJECTIVES
A Safe Freight System Reduce or eliminate serious injuries and fatalities of the freight system.	1. Focus Federal safety resources on the highest-severity freight risks 2. Accelerate deployment of proven safety technologies in freight operations and infrastructure 3. Strengthen freight-specific hazardous materials safety and emergency preparedness 4. Improve safety outcomes through targeted freight safety data and risk analysis
An Efficient Freight System Improve system reliability and streamline government regulation.	1. Reduce delay and unreliability at nationally significant freight bottlenecks 2. Better utilize existing freight infrastructure through improved supply chain visibility 3. Streamline Federal processes affecting freight project delivery and operations 4. Promote integrated, multimodal freight planning and investment
A Secure Freight System Ensure the integrity of our Nation's supply chains in support of national defense and economic prosperity.	1. Protect and enhance freight assets critical to national defense mobility 2. Reduce cargo theft, fraud, and physical security risks in freight supply chains 3. Strengthen cybersecurity and operational security of freight systems 4. Support secure freight corridors for strategic energy, industrial, and resource supply chains
A Resilient Freight System Reduce risks to the freight system and improve our response approaches.	1. Identify and mitigate single points of failure in the National Multimodal Freight Network 2. Increase redundancy and rerouting capability on critical freight corridors 3. Integrate risk and criticality analysis into freight planning and investment decisions 4. Strengthen freight-focused preparedness, response, and recovery practices
An Innovative Freight System Modernize freight infrastructure and foster game changing technologies.	1. Support safe testing and deployment of advanced freight technologies 2. Promote interoperable digital standards for freight data and operations 3. Direct Federal research and pilots toward high-impact freight use cases 4. Lower adoption barriers of proven innovations across the freight network
A Capable Freight Workforce Build a skilled workforce for the 21st Century and improve quality of life.	1. Strengthen workforce entry pathways into core freight concentrations 2. Support upskilling and reskilling for a technology-enabled freight system 3. Improve freight working conditions to support retention and safety 4. Improve freight workforce data and planning

PLAN IMPLEMENTATION AND THE FEDERAL ROLE IN FREIGHT

The Federal government plays an important role in shaping the performance of the national freight system. The National Freight Strategic Plan (the Plan) aligns Federal freight programs, research, and regulatory activities around a common strategic framework, while supporting collaboration with States, Metropolitan Planning Organizations, Tribal governments, local agencies, and the private sector.

Implementation of the Plan will occur through existing authorities and programs, informed by ongoing performance monitoring and stakeholder engagement. The Plan is designed to be adaptive, allowing Federal freight policy to respond to changing conditions, emerging risks, and new opportunities over time.

This Plan provides a clear, coordinated path forward for strengthening the Nation's freight system. The Department will use this Plan to guide national freight policy, programs, initiatives, and investments; inform guidance to States developing their own freight plans; identify freight data and research needs; inform selection priorities for USDOT's freight-related competitive funding programs; and provide a framework for increased cross-sector, multi-State, and multimodal coordination and partnerships.

INTRODUCTION

PURPOSE

The Nation's freight transportation system is a complex network of nearly seven million miles of highways, railways, navigable waterways, and pipelines. The components of this network are linked through hundreds of ports, airports, and intermodal facilities that connect major American population economic hubs with one another and the globe. This system accommodates the movement of raw materials, intermediate, and finished products from across the entire spectrum of agricultural, manufacturing, natural resources, energy, retail, and other sectors of the United States' economy.

This 2026 National Freight Strategic Plan (NFSP or Plan) builds on the strategies and analysis developed in the first NFSP, published in late 2020. The updated plan meets the requirements of 49 U.S.C. § 70102, which directs the U.S. Department of Transportation (USDOT) to develop and update the NFSP every five years to address the latest freight challenges and opportunities.

USDOT will use this updated Plan to:

- Inform infrastructure planning, coordinate investments, and support future freight efficiencies;
- Provide a framework for increased cross-sector, multijurisdictional, and multimodal coordination and partnerships; and,
- Identify freight data needs to support improved decision-making.

BACKGROUND

Moving freight safely and efficiently is essential for a strong U.S. economy and supports millions of good-paying jobs. As businesses face growing pressure to deliver goods quickly and affordably, a strong multimodal freight system helps operations run smoothly, lowers inventory costs, and reduces prices for consumers. A strong and efficient freight system also helps American companies stay competitive in the global market and supports a strong national defense.

Freight moves across State and national borders and involves a complex web of both public and private stakeholders. To identify and overcome system barriers and establish a more effective framework to guide the investment of billions of dollars in Federal funding, the Government Accountability Office (GAO) and others have suggested the Federal Government develop a national freight strategy. In 2008, the GAO recommended the Secretary of Transportation release a national freight strategy that defines the government's role in freight transportation and to develop "a national strategy for freight transportation in order to improve freight mobility by more clearly defining the Federal role in the freight transportation network and to begin to align Federal expenditures with economically significant national public benefits."[1] In 2020, USDOT released its first-ever NFSP, which established the public sector's role in the freight system and identified major trends, challenges, and strategic objectives for the Federal Government to maintain and improve the freight network.[2]

As amended by the Infrastructure Investment and Jobs Act (IIJA), 49 U.S.C. §70102, Congress requires the Assistant Secretary for Multimodal Freight to develop an NFSP that assesses the conditions and performance of the National Multimodal Freight Network (NMFN), forecasts freight volumes, and identifies trade gateways, freight corridors, and bottlenecks.

The IIJA requires the NFSP to include the following 17 elements:

1. An assessment of the condition and performance of the NMFN;
2. Forecasts of freight volumes for the succeeding 5-, 10-, and 20-year periods;
3. An identification of major trade gateways and national freight corridors that connect major population centers, trade gateways, and other major freight generators;
4. An identification of bottlenecks on the NMFN that create significant freight congestion;
5. An assessment of statutory, regulatory, technological, institutional, financial, and other barriers to improved freight transportation performance, and a description of opportunities for overcoming the barriers;
6. A process for addressing multistate projects and encouraging jurisdictions to collaborate;
7. Strategies to improve freight intermodal connectivity;
8. An identification of corridors providing access to energy exploration, development, installation, or production areas;
9. An identification of corridors providing access to major areas for manufacturing, agriculture, or natural resources;
10. An identification of best practices for improving the performance of the NMFN;
11. An identification of best practices to mitigate the impacts of freight movement on communities;
12. Best practices for reducing environmental impacts of freight movement;
13. Possible strategies to increase the resilience of the freight system;
14. Strategies to promote United States economic growth and international competitiveness;
15. Consideration of any potential unique impacts of the national freight system on rural and other underserved and historically disadvantaged communities;
16. Strategies for decarbonizing freight movement as appropriate; and
17. Consideration of the impacts of e-commerce on the national multimodal freight system.

USDOT recognizes the importance of engaging with many different types of stakeholders to assist in developing a clear, national vision for freight transportation that is inclusive of public- and private-sector perspectives. These perspectives provide vital inputs to inform freight system operational challenges and opportunities to mitigate these challenges. To develop this NFSP, USDOT consulted with stakeholder groups representing every mode of transportation; various shippers, carriers, and business groups that use and depend on the freight system; other Federal agencies; and the public.

FREIGHT SYSTEM CHANGES SINCE THE 2020 NFSP

Since the publication of the first NFSP in late 2020, the global and domestic freight landscapes have undergone significant changes that affect how goods move across the United States. While some of these changes were already underway before 2020, recent years have seen accelerated trends, introduced new uncertainties, and tested the resilience of the multimodal freight system. These shifts underscore the need for an updated strategic framework to guide freight planning, investment, and multijurisdictional coordination. This updated NFSP addresses these new trends and anticipates emerging ones.

PLAN ORGANIZATION

This Plan is organized into four parts. Earlier sections focus on freight system analysis, while later sections define the national freight strategy:

- Part 1: The U.S. Freight System: Describes the characteristics and challenges of the NMFN and for each sub-NMFN mode: highways, railways, waterways, air, pipeline, intermodal, and trade gateways.
- Part 2: Key Economic Sectors: Describes recent and forecasted freight movement and critical commerce corridors for the agriculture, energy, manufacturing, and natural resource sectors of the U.S. economy.
- Part 3: Freight System Barriers: Provides an assessment of statutory, regulatory, technological, institutional, financial, and other barriers to improved freight performance.
- Part 4: Freight Strategic Framework: Establishes strategies for achieving USDOT's goals set forth in this Plan.

PART 1:

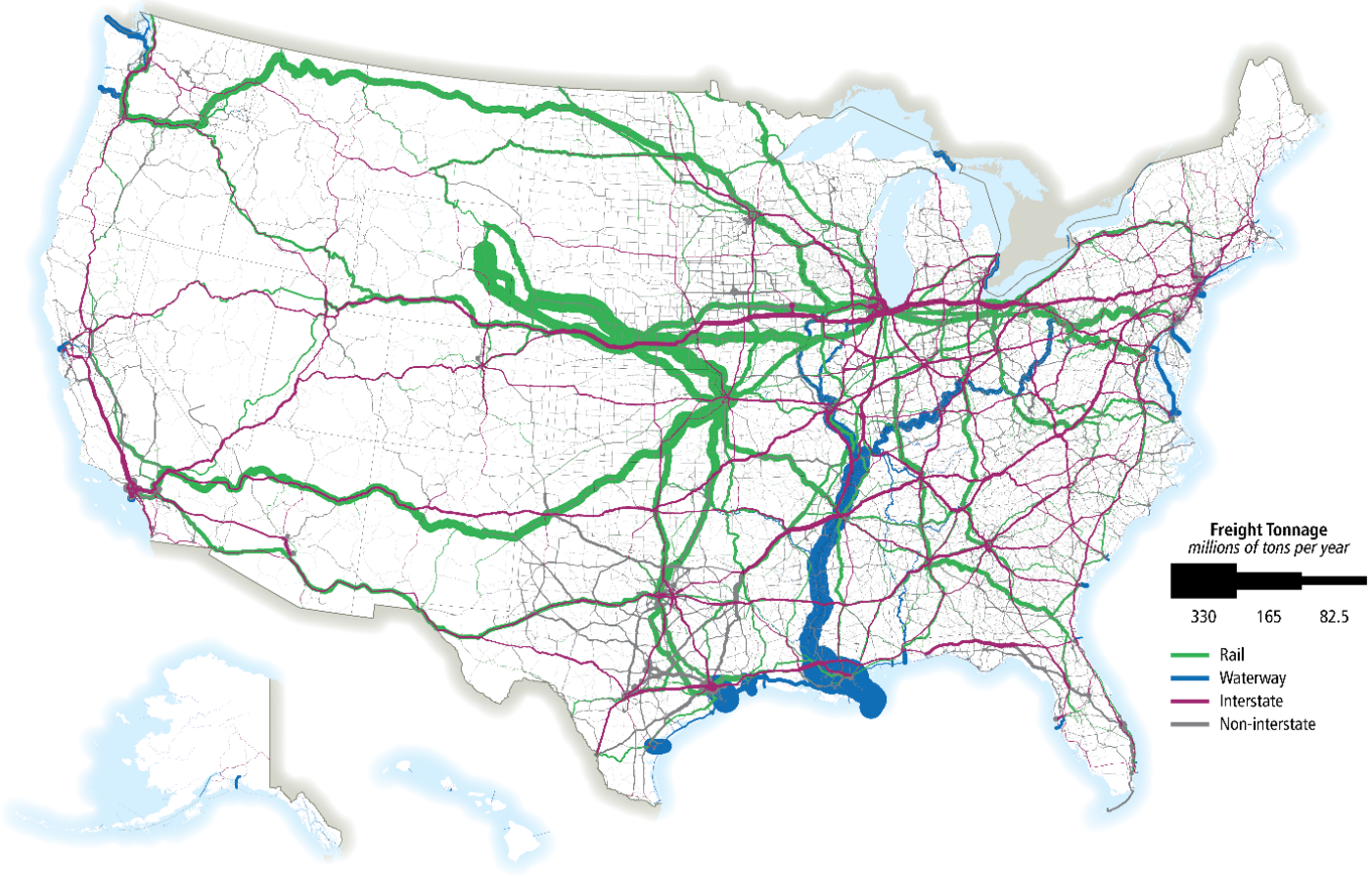
THE U.S. FREIGHT SYSTEM

A NATION SERVED BY FREIGHT

The United States relies on a vast and interconnected freight system linking every mode of transportation that is sustained by both public and private sector investment. The system includes both the physical infrastructure that carries goods, as well as the carriers, shippers, and logistics providers that ensure the efficient flow of commodities. From raw commodities to manufactured parts and recyclables, the freight system delivers essential cargo to support industry, commerce, and everyday Americans.

In 2022, an average of about 54.8 million tons of freight moved across the Nation each day, with an estimated daily value exceeding $52 billion.[3] This extensive transportation system relied on capital assets totaling $9.5 trillion,[4] encompassing more than 4 million centerline miles of roadways, almost 140,000 miles of rail, 25,000 miles of inland and coastal waterways, about 3.3 million miles of pipelines, and more than 500 airports with cargo handling services (Figure 1).[5]

Figure 1. Freight tonnage by mode in the U.S. (2022)[6]



Each transportation mode operates within a distinct set of institutional arrangements, balancing public responsibilities with private sector roles. Freight railroads and pipelines are predominantly privately owned and managed. States and localities own and operate most roadway infrastructure, while private-sector firms provide truck delivery services. The Federal Government oversees the National Airspace System; airports are mostly publicly owned, though private firms primarily deliver air cargo services. Privately owned vessels and barges use publicly maintained waterways and a mix of public and private port facilities.

How and where freight moves will change over time, driven by a variety of economic, business, and population changes. In recent years, supply chain strategies have shifted significantly, which is discussed throughout this Plan. Overall U.S. freight volumes between 2025 and 2045 are projected to be driven primarily by long-term growth in population, economic output, and industrial activity, reinforced by continued domestic consumption, infrastructure investment, and integrated North American supply chains that shape how goods are produced, moved, and consumed across the freight network.

TABLE 1. FREIGHT VALUE MOVED IN THE U.S. BY MODE OF TRANSPORTATION, 2025 & 2045 (MILLIONS OF U.S. DOLLARS)[7]

MODE CATEGORY	2025 VALUE	2045 VALUE	FORECASTED GROWTH, 2025-2045
Air (incl. truck and air)	609,550	1,046,191	71.6%
Pipeline	1,188,696	1,218,128	2.5%
Rail	574,093	812,358	41.5%
Truck	14,054,885	20,112,925	43.1%
Water	266,429	327,607	23.0%
Multiple Modes & Mail	2,716,718	4,284,617	57.7%
Other multimodal/unknown	28,102	44,867	59.7%
No domestic mode	34,023	45,745	34.5%
Total	19,472,496	27,892,438	43.2%

TABLE 2. FREIGHT TONNAGE MOVED IN THE U.S. BY MODE OF TRANSPORTATION, 2025 & 2045 (THOUSANDS)[8]

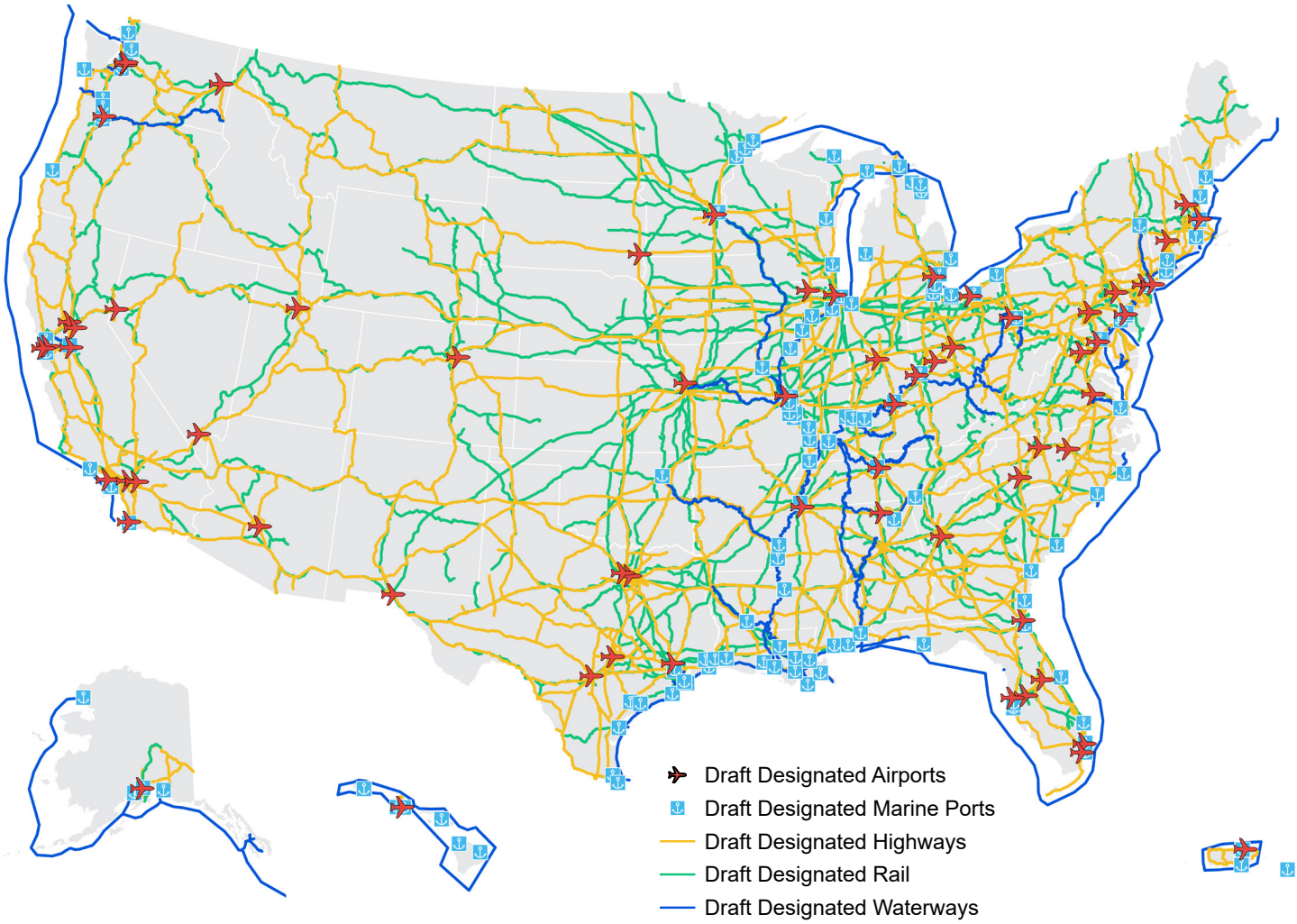
MODE CATEGORY	2025 TONNAGE	2045 TONNAGE	FORECASTED GROWTH, 2025-2045
Air (incl. truck and air)	7,029	10,984	56.3%
Pipeline	4,343,452	4,824,878	11.1%
Rail	1,630,095	2,102,102	29.0%
Truck	13,081,255	16,525,298	26.3%
Water	819,772	969,875	18.3%
Multiple Modes & Mail	655,405	868,208	32.5%
Other multimodal/unknown	86,372	90,830	5.2%
No domestic mode	105,490	133,210	26.3%
Total	20,728,870	25,525,385	23.1%

THE NATIONAL MULTIMODAL FREIGHT NETWORK

USDOT announced a Draft NMFN in January 2025 (Figure 2). At the time of writing this Plan, the network is undergoing public review and revisions under 49 U.S.C. § 70103. Once finalized, the NMFN will help assist States in strategically directing resources, inform freight planning priorities at various geographic scales, and assist in the prioritization of Federal investment to achieve national multimodal freight policy goals. The initial draft network includes about 78,000 miles of roadway miles, 80,000 rail miles, 21,000 miles of waterways and shipping channels, 140 ports, and 65 airports. In the near-term, States will have an opportunity to review and add up to 30 percent more mileage to this draft network for each mode to better reflect local and regional priorities and goods movement patterns.[9, 10]

Freight stakeholders plan to use the NMFN in a variety of ways. Based on comments received by USDOT on a Request for Information notice in early 2025,[11] a plurality of respondents indicated they intend to use the NMFN's designation to prioritize formula and competitive grant investments. Several State and local governments stated they planned to use the NMFN to better integrate freight planning and investment to support their economic, safety, and environmental goals. An association representing private sector operators indicated the NMFN could assist with optimizing shipping routes and mode choice.[12]

Figure 2. Draft National Multimodal Freight Network Designation (January 2025)[13]



HIGHWAYS

KEY INSIGHTS AND MODAL CHALLENGES

- Highway freight bottlenecks, whether congestion- or reliability-driven, introduce inefficiency and economic loss to the freight system.
- Recent public sector highway investments have had positive impacts on freight, but significant ongoing investment is still required.
- Bridge conditions, vertical clearance limits, and work zones constrain truck operations and routing.
- Truck parking shortages have major impacts on freight safety, efficiency, and reliability.
- Oversize and overweight truck movements face routing, permitting, and infrastructure constraints.

Trucks play a role in moving nearly all goods, even when other modes handle part of the trip. Trucks carry nearly 64 percent of all domestic freight by weight and 72 percent by value.[14] Trucks are the primary mode carrying shipments of less than 750 miles.[15] Nearly every intermodal trip includes a highway component. Truck drayage provides the essential first or last leg that links ports, rail terminals, airports, and distribution hubs to the National Highway System (NHS).

More than 14.9 million single unit (2-axle, 6-tire or more) and combination trucks traveled the Nation's roads in 2022.[16] They transported a wide range of goods, from high-value commodities like mixed freight and electronics, to bulk commodities such as gravel, grains, and gasoline. Long-haul freight truck traffic is concentrated on major routes connecting population centers, ports, border crossings, and other major hubs of activity. Commercial trucks represented about 10 percent of all highway vehicle-miles traveled (VMT) in 2023, but they accounted for 17 percent of VMT on interstates and 26 percent of VMT on rural interstates.[17]

Growth in trucking tonnage and ton-miles through 2045 is expected to be driven by continued e-commerce expansion and increasing bulk movements tied to energy and construction markets (Table 3). Sustained population and economic gains in the South and Mountain West[18] will boost truck volume growth on corridors that connect Gulf and Southwest border gateways to interior markets, including east-west routes such as I-10 and north-south trunks such as I-35 and I-75.

TABLE 3. FORECASTED TRUCKING GROWTH BY TONNAGE AND VALUE, 2025-2050[19]

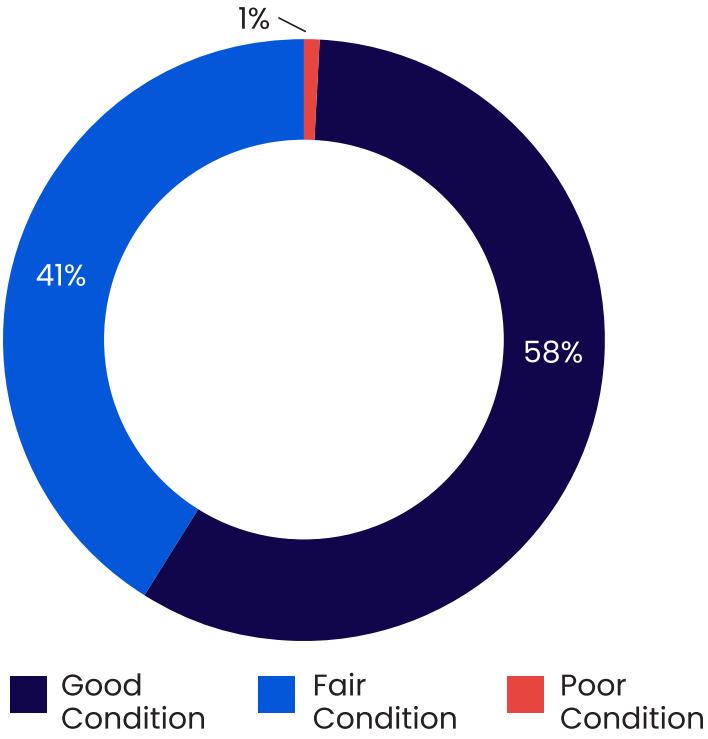
	TONNAGE (THOUSANDS)	CHANGE FROM 2025	DOLLARS (MILLIONS)	CHANGE FROM 2025
2025	13,081,255	-	14,054,885	-
2030	13,967,140	7%	15,382,893	9%
2035	14,712,639	12%	16,689,092	19%
2040	15,559,471	19%	18,264,576	30%
2045	16,525,298	26%	20,112,925	43%
2050	17,586,288	34%	22,135,555	57%

Draft NMFN Highway Conditions

Highway conditions influence truck efficiency. Smooth pavement, adequate lane and shoulder width, and bridges with sufficient weight or height limits support predictable travel times, while deterioration, postings, and recurring work zones add delay and can force detours.

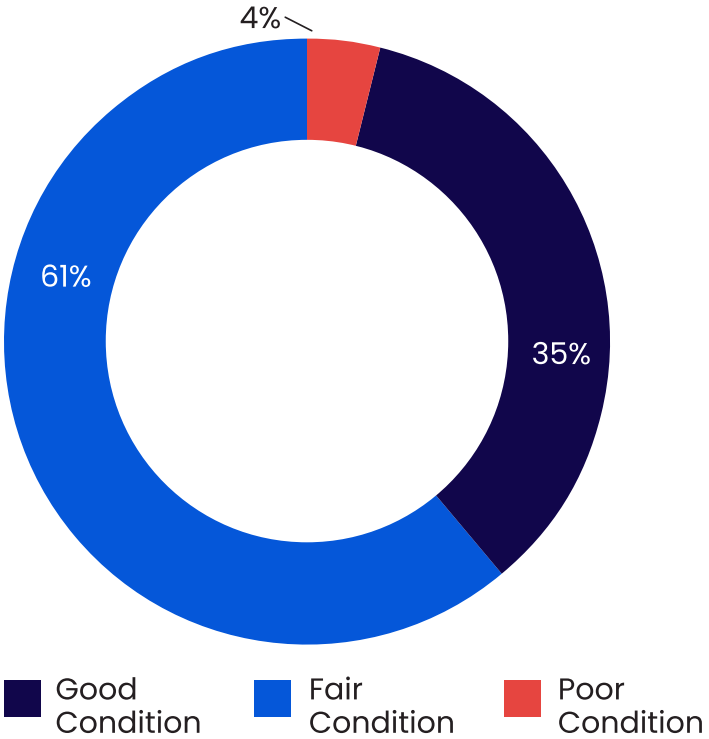
The Federal Highway Administration (FHWA) classifies pavement conditions as good, fair, or poor based on a variety of physical characteristics such as cracking and rutting. In 2022, 98.9 percent of highway segments on the Draft NMFN had pavement in good or fair condition (Figure 3). This is slightly greater than on the broader NHS system, where 96.6 was in good or fair condition.[20]

Figure 3.
Pavement Conditions on Draft NMFN Highways[21]



Note: Draft NMFN designated 78,274 highway miles. Approximately 4,696 miles do not contain condition data in HPMS. Data for years prior to the draft designation in 2025 not available.

Figure 4. Highway Bridge Condition Ratings on Draft NMFN Highways[23]

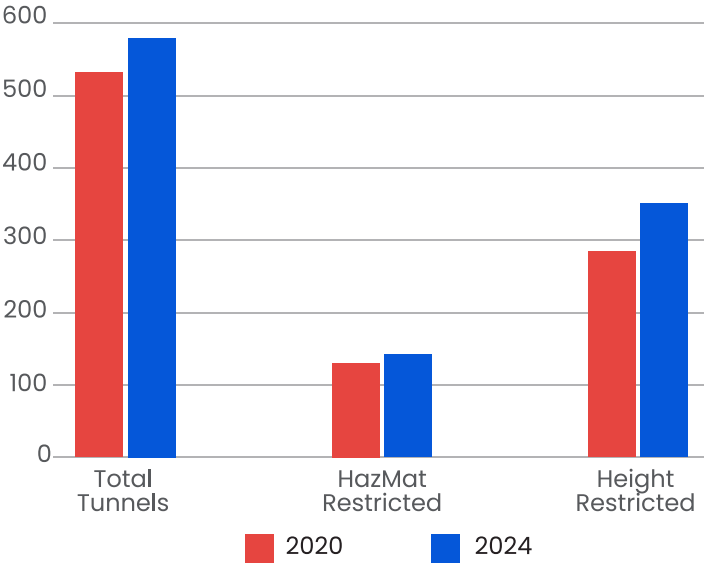


Note: Estimated number of bridges (71,164) based on Draft NMFN network assignment at the time of publication.

Similarly, FHWA defines overall bridge conditions by a variety of superstructure and substructure characteristics. Sixty-one percent of U.S. bridges that are part of the Draft NMFN are in fair condition. A poor condition bridge does not imply an imminent failure but does require attention in the near-term. The Draft NMFN's share of good, fair, and poor condition highway bridges is consistent with those on the broader NHS. In the last decade, States have addressed highway bridge conditions, with the share of poor condition bridges NHS-wide falling from 7 percent in 2012 to 4.2 percent in 2022 (Figure 4).[22]

Across the NHS, as more highway tunnels have been added to the system in the past five years, the number with either hazardous materials (hazmat) or height restrictions has grown (Figure 5). More than half of all tunnels have height limitations for standard trucks (14 feet 6 inches or less), with the greatest number located in California (73). Massachusetts has the highest number of tunnels with restrictions on hazmat (48).

Figure 5. Number of Tunnels with Freight-Limiting Characteristics – Systemwide[24]



Source: National Tunnel Inventory, 2025.

Highway Freight Congestion & Bottlenecks

Highway freight congestion is most concentrated in and around the Nation's major urban areas and on the Interstate corridors that feed them.[25] This congestion slows truck trips, injects uncertainty into supply chains, and increases the costs of delivered goods. Annual operating costs to carriers associated with truck congestion vary between $36 billion[26] to $108.8 billion,[27] and have increased by more than 40 percent since 2019. [28] Nationwide, average speeds in highly congested bottleneck locations improved by about 3.7 percent between 2019 and 2022. However, operating costs of trucks have increased faster due to inflation and wage growth. [29] The southeastern States[30] experience the highest overall congestion-related costs, while costs are rising fastest in Hawaii, Vermont, and Minnesota.[31] At a metropolitan area scale, the New York City metro, Miami metro, and Chicago metro experienced the three highest congestion costs, respectively.[32]

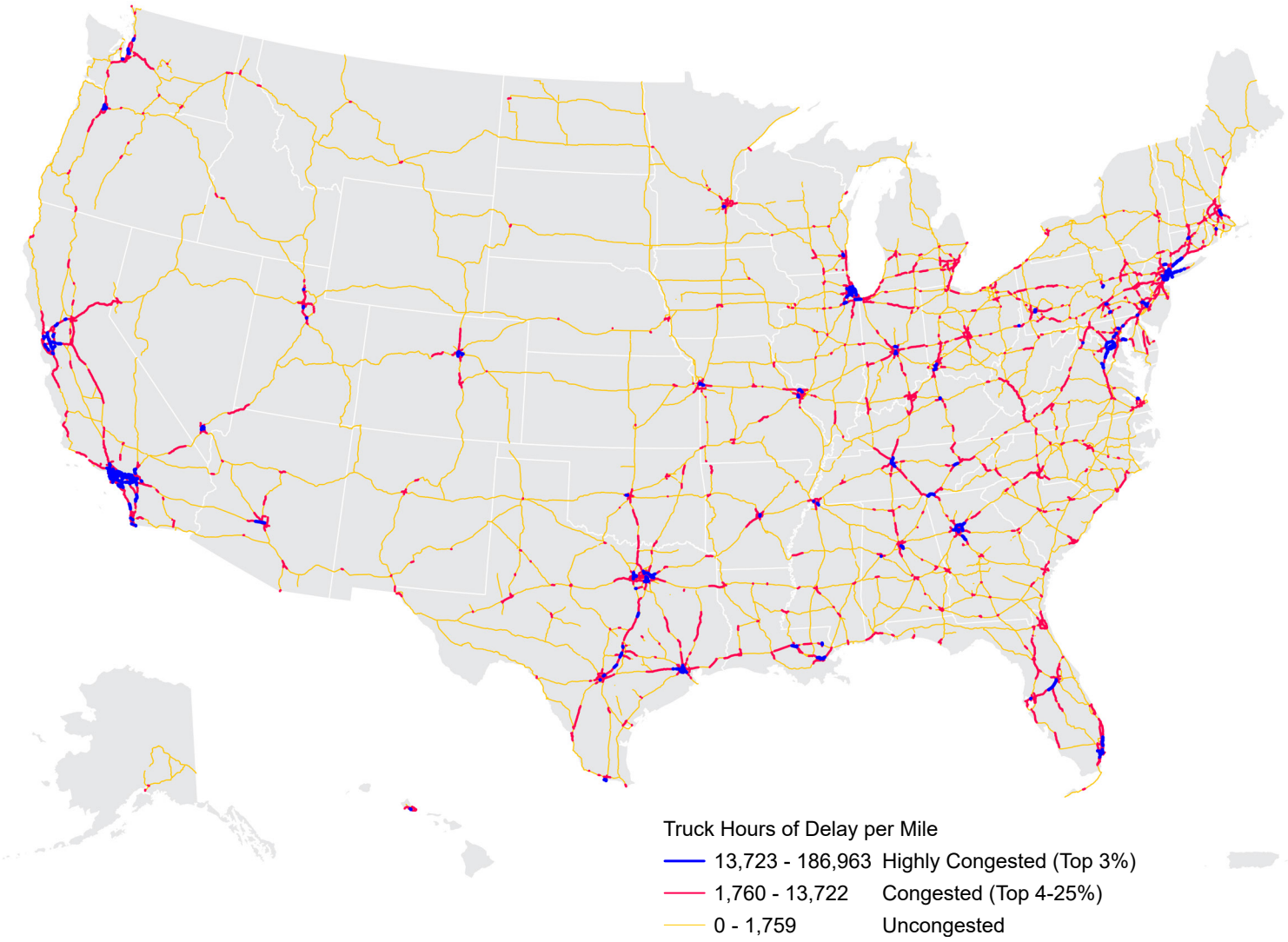
WHAT IS A FREIGHT BOTTLENECK?

While congestion itself is a straightforward measure, there are many ways to define a freight bottleneck. Likewise, there is no single, universally accepted definition of a trucking bottleneck, and different planning and policy goals often produce alternative measures for identifying congestion. This plan identifies bottlenecks on the Draft NMFN using two measures: average hours of truck delay per mile (DPM) due to congestion and the truck reliability index (TRI), which compares truck travel time reliability across the network.[33]

RECURRING CONGESTION BOTTLENECKS

Recurring truck bottlenecks as measured by DPM reflect places where congestion is both frequent and tightly concentrated. DPM measures the average amount of time freight vehicles are delayed per mile traveled on specific roadway segments relative to free-flow conditions and is weighted by the number of trucks passing through a segment of the corridor. High DPM values occur where heavy traffic meets constraints, such as major interchanges, lane drops, closely spaced ramps, and high truck volumes. This metric offers a straightforward way to identify locations where recurring congestion most directly undermines freight mobility (Figure 6, Table 4). These places indicate a need for prioritized investment and resources, including targeted operational improvements or capital investments.

Figure 6. Top 25 Highway Bottlenecks on the Draft NMFN as Measured by Truck Hours of Delay per Mile (2022)[34]



In fast-growing metro areas, adding closely spaced interstate on- and off-ramps can introduce short weaving segments that lower speeds and increase crash risks. National standards generally recommend minimum spacing of one mile between interchanges in urban settings and two miles minimum in rural areas, with context-specific design solutions when closer spacing is unavoidable.[36] Guidance on rural minimum spacing varies by State. Closely spaced interchanges or high-volume interchanges can cause congestion where interchange traffic interacts with through traffic on the expressway. Conflicts between vehicles merging with through traffic can be minimized through use of managed lanes, collector-distributor roads, ramp metering, or other transportation system management and operations (TSMO) strategies that enhance through traffic flow on the mainline lanes. Planning and access-management policies should evaluate interchange proposals at the corridor scale to preserve limited-access performance as regions grow, keeping the specific needs of commercial vehicles in mind where freight volumes are high.

TABLE 4. TOP 25 HIGHEST DELAY PER MILE (NATIONAL HIGHWAY CORRIDORS ON THE DRAFT MULTIMODAL FREIGHT NETWORK (2019-2024)[35]

RANK	CORRIDOR	CORRIDOR LENGTH (MILES)	DPM
1	I-95 from I-95/I-80 to I-95/I-678/I-295 (New York City)	8.0	264,255
2	US-101 from SR-134 to I-5 (Los Angeles)	10.0	112,613
3	I-90/I-94 from I-94N to I-290 (Chicago)	15.0	109,104
4	I-278 from SR-440 to I-95/I-678/I-295 (New York City)	10.6	102,993
5	I-15 from I-515 to I-215 (Las Vegas)	8.0	124,457
6	I-80/I-94 from I-94/SR-394 to I-65 (Chicago)	10.5	86,230
7	I-710 from I-10 to Atlantic Blvd. (Los Angeles)	15.2	85,673
8	I-10 from I-710 to SR-39 (Los Angeles)	30.0	75,853
9	US-59 from Westpark Tollway (tollway) to I-10 (Houston)	14.0	74,589
10	I-495 from Queens Midtown Tunnel to SR-106 (New York)	13.5	73,083
11	I-610 from I-69 to I-45 (Houston)	8.0	71,393
12	I-5 from SR-134 to I-605 (Los Angeles)	11.5	67,507
13	I-678 from Belt Parkway to Cross Island Parkway (New York)	25.0	67,177
14	I-45 from SR249 to I-610 (Houston)	7.5	66,048
15	I-75/I-85 from SR-166 to I-75/I-85 split (Atlanta)	8.5	64,738
16	I-290 from SA-64 to I-294/I-88 (Chicago)	1.5	61,197
17	I-285 from SR-154 to SR-10 (Atlanta)	22.0	59,724
18	I-10 from SR-415 to I-12 (Baton Rouge)	15.0	58,707
19	I-35 from US-290/SR-71 to US-183 (Austin)	7.5	55,841
20	CA-60 from I-5 to I-605 (Los Angeles)	10.5	53,065
21	I-605 from SR-91 to I-10 (Los Angeles)	5.0	49,431
22	I-10 from I-610 to I-69 (Houston)	20.0	49,320
23	I-10 from SR49 to I-619 (New Orleans)	8.0	49,170
24	I-25 from SR-2 to I-70 (Denver)	5.5	47,040
25	CA-91 from I-110 to I-710 (Los Angeles)	8.0	45,451

TRUCK TRAVEL TIME RELIABILITY

While congestion is an important factor in travel times, truck travel reliability drives a large share of freight cost. Unexpected variability and inconsistent travel times cause late arrivals and missed appointments. FHWA's Truck Reliability Index (TRI) measures this phenomenon by dividing the 95th percentile slowest travel times on a stretch of highway by its median (50th percentile) travel time. TRI is an index that quantifies the extent to which travel times in the worst conditions (95th percentile) exceeds typical conditions (50th percentile). In 2022, about 2.32 percent (approximately 1,000 miles) of Draft NMFN road miles experienced highly unreliable travel times (Figure 7, Table 5).

Figure 7. Top 25 Highway Bottlenecks on the Draft NMFN as Measured by Truck Reliability Index (2022)[37]

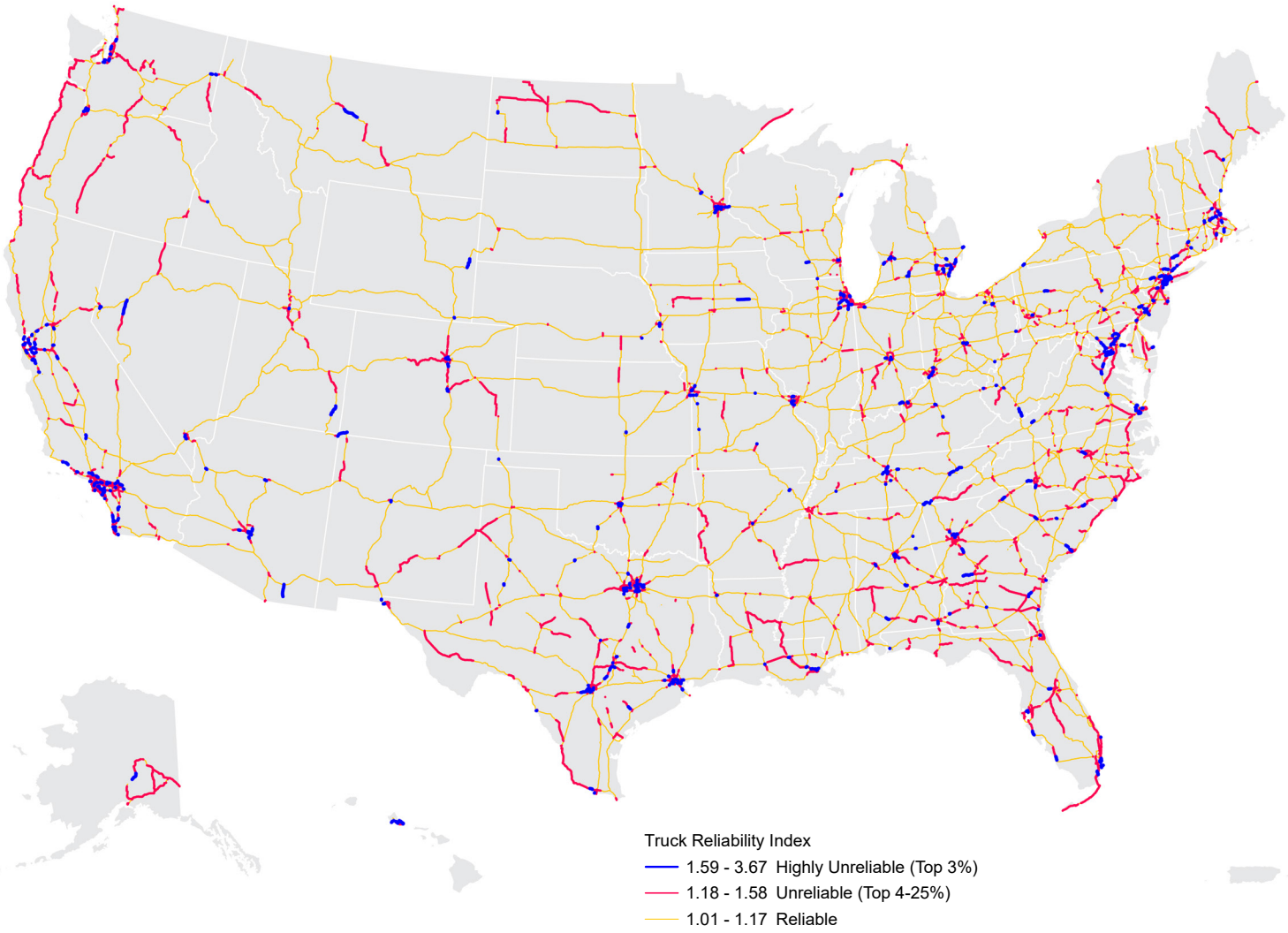


TABLE 5. TOP 25 LEAST RELIABLE NATIONAL HIGHWAY LOCATIONS ON THE DRAFT NMFN (2022)[38]

RANK	LOCATION	LENGTH (MILES)	TRI VALUE
1	I–4 from SR–482 to SR–429 in Orlando, FL	14.1	6.21
2	I–105 from I–45 to Long Beach Ave. in Los Angeles-Long Beach-Anaheim, CA	9.4	4.47
3	I–205 from I–205/11th St. to Mountain House Parkway in Tracy, CA	1.8	3.78
4	I–10 from SR–415 to I–12 in Baton Rouge, LA	8.1	3.52
5	I–24 from I–65 to SR–266 in Nashville-Davidson, TN	19.6	3.47
6	I–580 from San Ramon Rd. to Dougherty Rd. in Concord, CA	2	3.23
7	I–95/I–495 from I–66 to I–270 Spur; and from I–270 Spur/SR-355 to SR–295; and from I–95/I–395 to US–1 in Washington, DC-VA-MD	30	3.1
8	I–24 from I–124 to I–75 in Chattanooga, TN-GA	6.9	3.05
9	I–35 from SR–6 to Fifth St. and SR–574 to Fifth St. in Waco, TX	7.4	3.00
10	I–95 from I–91 to SR–10 in New Haven, CT	2.1	2.96
11	I–678 from Belt Pkwy to Cross Island Pkwy in New York-Newark, NYNJCT	9.3	2.85
12	I–80/I-294 from I–294 to I–94/SR–394 in Chicago, IL-IN	5.2	2.84
13	I–405 from I–105 to I–710 (SB); and from SR-2 to SR–42 (SB); and from Venice Blvd. to Nordhoff St. in Los Angeles-Long Beach-Anaheim, CA	39.3	2.80
14	I–95 from US–202 to SR–7 and from Academy Rd. to SR–73 in Philadelphia, PANJDEMD	5	2.75
15	I–5 from Exit 162 to NE Northgate Way and from SR–18 to SR–16 in Seattle, WA	21.1	2.73
16	I–5 from Columbia River to Terwilliger Blvd. in Portland, ORWA	10.5	2.71
17	I–90 from I–90/Exit 82 to I–94 in Chicago, IL-IN	2.5	2.68
18	I–10 from SR–303 to N Verrado Way in Avondale-Goodyear, AZ	5.1	2.68
19	I–376 from Birmingham Bridge to Forward Ave. and Birmingham Bridge to Port Fitt Bridge in Pittsburgh, PA	3.6	2.68
20	I–710 from W Shoreline Dr. to SR–42 and Floral Dr. to Florence Ave. in Los Angeles-Long Beach-Anaheim, CA	17.9	2.66
21	I–35E from S Ewing Ave. to SR 183 in Dallas-Fort Worth-Arlington, TX	7.1	2.64
22	I–93 from SR-28 to SR–3 in Boston, MANHRI	13.4	2.61
23	I–10/US–90 from I–35 to Roland Ave. in San Antonio, TX	4.3	2.6
24	I–95 from I–95/I–80 to I–95/I–678/I–295 in New York-Newark, NYNJCT	10.6	2.59
25	I–65 from I–40 to I–24 in Nashville-Davidson, TN	2.3	2.58

Each additional hour traveled at the 95th-percentile delay time creates a proportional cost on every shipment moving through that corridor. For example, the implied costs on a corridor where 1 in 20 trips at the same time of day run two hours late is roughly $320 per shipment in reliability costs when averaged across all moves, even though most trips arrive on time.[39] Carriers and shippers combat unreliable travel times by padding schedules to hedge against those peaks, which lowers freight utilization and raises operating costs systemwide.

Temporary disruptions cause about half of all congestion. The top three causes include disabled vehicles and crashes (25 percent of all congestion), work zones (10 percent), and weather (15 percent).[40] Other causes of non-recurrent congestion include special events and emergency closures. Because they arrive without much warning and often occur on already busy corridors or terminal approaches, these incidents create sharp, uneven delays that hurt reliability. Even when congestion is manageable on a typical day, a single non-recurrent event at a critical point on a highway such as an Interstate interchange, a posted bridge, or a connector near a gate can disrupt schedules across an entire region.

Nearby traffic generators can also impact reliability. For instance, port or rail intermodal facilities near a major highway route may generate new freight demand at irregular times as ships dock throughout the week and cargo is unloaded.

States and regions invest in TSMO-focused solutions to reduce the frequency and duration of these operational disruptions. Examples include quick-clear laws and service patrols, work-zone mobility planning like off-peak staging and lane closure policies, road-weather management, and truck appointment systems, among others. These are eligible investments across a variety of Federal-aid Highway programs and USDOT competitive grant programs. Additionally, FHWA provides a range of technical assistance and training to States and MPOs seeking to increase their deployment of operations-focused congestion solutions.

CONGESTION IMPACTS ON THE ECONOMY AND ENVIRONMENT

Rising truck hours loss to congestion, worsening TRI, and persistent non-recurring bottlenecks on the Draft NMFN act like a recurring surcharge on the cost of moving goods. Longer delays and unreliable trip times raise carriers' operating costs, force shippers to pad schedules, and manufacturers to pay premiums or hold more inventory.[41] Those costs flow through to producer prices and usually to consumers, dampening productivity and competitiveness even when freight demand is healthy.[42] Shippers value transit time between $25 and $200 per hour, depending on the cargo being moved, which can increase as much as 50 and 250 percent during unexpected delays—and up to 80 percent of those additional[43] costs can be passed to the consumer.[44] Targeted investments that restore predictable speeds at critical links and nodes therefore serve not only mobility and safety goals, but also reduce inflationary pressure in goods supply chains by lowering delivered input costs and improving network reliability.

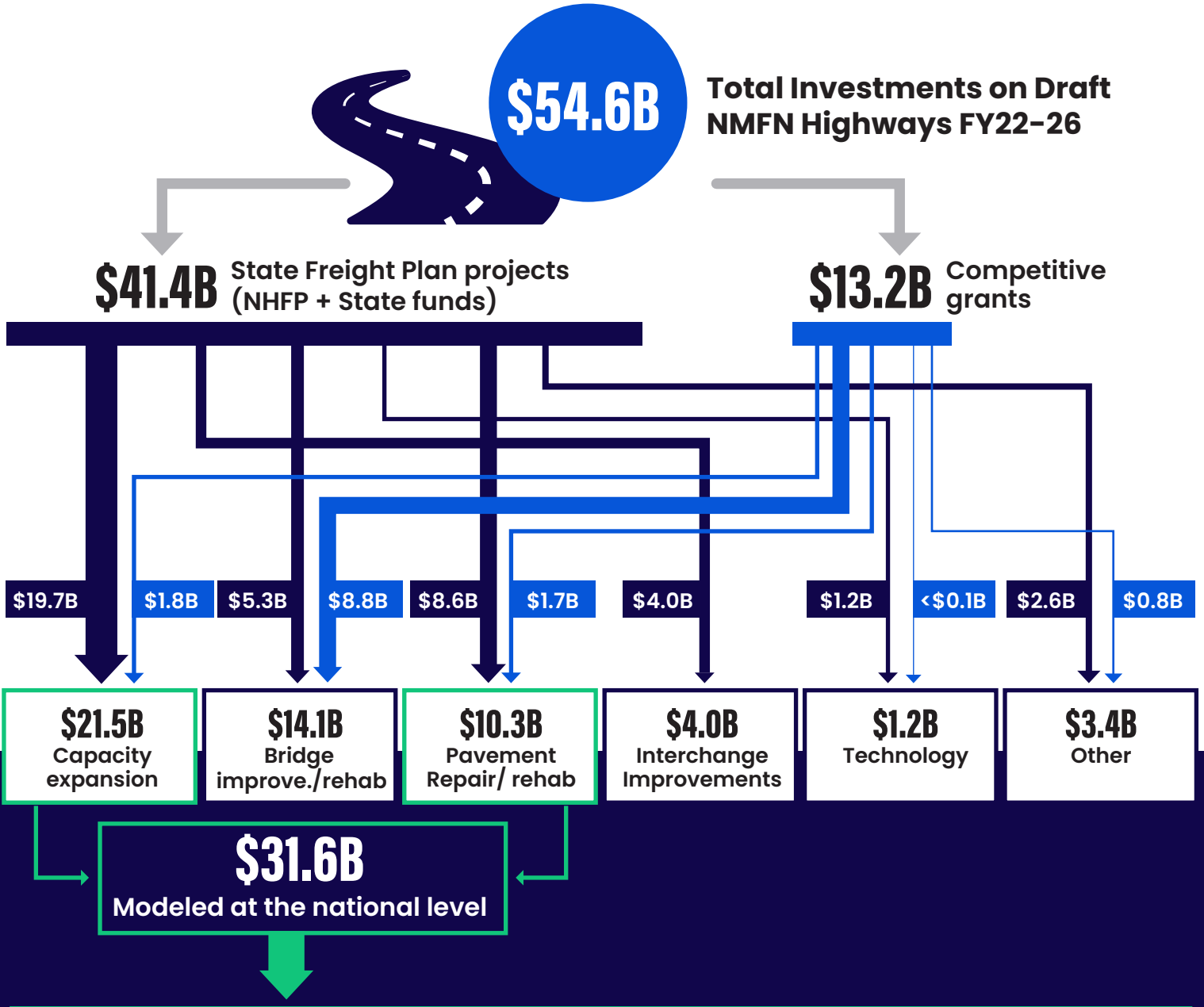
Congestion also causes excess pollution, especially in metropolitan areas. Systemwide, about 6.4 billion gallons of additional diesel fuel was wasted in 2022 due to congestion, resulting in an excess fuel cost of $32.1 billion for the trucking industry.[45] Medium- and heavy-duty trucks are the second largest sources of pollution in the transportation sector, and congestion increases emissions. A class 8 truck operating in stop-and-go traffic has an average fuel economy of between 2.64 and 4.83 miles per gallon – about half of the expected 7 miles per gallon in free-flow traffic on flat roads.[46]

Recent Public Sector Investments in Highway Freight

FHWA's National Highway Freight Program (NHFP), a Federal-aid Highway program focused on freight, and various USDOT competitive grant programs have focused recent investments on the Draft NMFN. States use both formula and competitive funding for highway resurfacing, highway capacity expansion, bridge construction and maintenance, and other projects, and program these funds in their State Freight Plans (SFPs).[47]

Between 2022 and 2026, States planned about 1,787 investments totaling approximately $54.6 billion on the Draft NMFN highway segments (Figure 8), which represented about 65 percent of all freight funds analyzed (35 percent spent outside the Draft NMFN). About 24 percent ($13.2 billion) came from competitive grant sources. The largest spending category was capacity expansion projects (e.g., highway widenings, new segment construction), which comprised 39 percent of total spending ($21.5 billion) across approximately 31 percent of the total number of projects. Much of this investment occurred in Texas, California, the Midwest, and East Coast, all of which are major freight hubs that expect continued growth. See Appendix A for a full discussion of the methodologies used in this analysis.

Figure 8. Highway Investments on the Draft NMFN: National Highway Freight Program, Competitive Grant Programs, and Select State Funds (FY2022–2026)[48]



ESTIMATED RETURN ON INVESTMENT: $45.3B IN TOTAL BENEFITS

$1.42
RETURNED
For every dollar spent

85,000
HOURS
Saved by Large Trucks Annually

$2.9
MILLION
Annual Emissions Benefits

Of the investments that can be modeled at a national scale (primarily capacity expansion, pavement and bridge rehabilitation, and safety improvements), recent highway investments are expected to return benefits of $1.42 for every dollar spent. Additional benefits include $2.9 million in annual emissions-related cost savings and a reduction in truck travel delays by 1.74 minutes per 1,000 miles traveled, which would save large trucks approximately 85,000 hours annually. Programmed resurfacing work is also estimated to increase the share of trips on good-quality pavement by 0.6 percentage points.

OPTIMIZING PUBLIC SECTOR FREIGHT PROJECT DECISION-MAKING

In addition to new construction and expansion, State investment priorities today include improving specific locations, such as widening stretches of highway to meet increasing demand, or making better use of existing assets through operational enhancements. Public agencies must weigh how to spend finite funding to optimize freight movement in harmony with passenger vehicle traffic needs.

However, methods to compare the costs and benefits of freight project alternatives across modes are underdeveloped. For instance, one highway congestion mitigation strategy could be to build additional multimodal links to expand options for shipping via water, rail, or other options to bypass congested highways. Another strategy may be to dedicate right-of-way on key freight routes for truck-only lanes during specific travel times. Currently, no public tool or standard methodology exists to help transportation planners evaluate alternatives to optimize multimodal freight investments across the whole network. In the coming years, USDOT will prioritize development of tools and research to help State, Metropolitan Planning Organizations (MPOs), and local governments consider a wider range of freight projects, helping to ensure the most efficient use of public dollars.

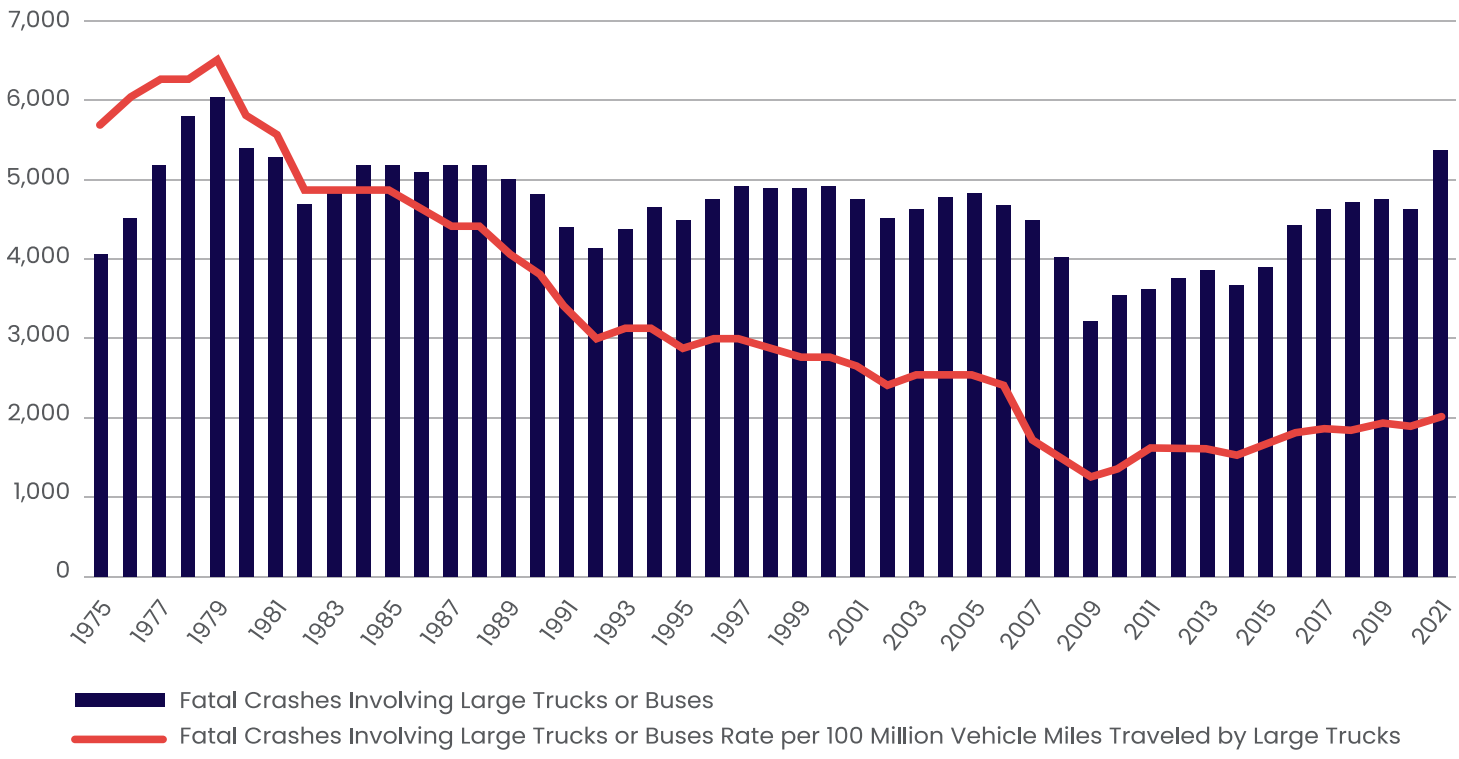
Safe Roadways

While transportation safety has improved significantly since the mid-20th century, substantial challenges remain. Trucks comprised only about 10 percent of national Vehicle Miles Traveled (VMT) in 2023 yet were involved in 13.3 percent of all highway fatalities.[49] Similarly, while they move approximately 44 percent of all freight by ton-mile, trucks account for 86.5 percent of all freight-related fatalities. Large truck-involved fatal crashes occur most frequently on rural highways and interstates, typically involving truck tractors pulling a single semi-trailer.[50]

TRUCK-INVOLVED CRASHES

After falling consistently for three decades, large truck-involved fatal crashes have trended upward since 2009 (Figure 9), even as non-fatal truck crashes have fluctuated.[51] Fatalities occur in about one percent of all truck crashes, with 5,472 people killed in crashes involving large trucks in 2023 – an eight percent decrease from the previous year. However, the rate of large truck-involved fatal crashes is up 25 percent since 2016 and 50 percent since 2010.[52] Large truck crashes that result in non-fatal injuries decreased four percent from 2022 to 2023 after a seven year trend of increasing injuries year over year.[53]

Figure 9. Large Truck-Involved Fatal Crashes (1990-2022)[54]



Note: NHTSA revised its methodology for classifying trucks in 2016; comparisons across periods before and after 2016 should be performed with caution.

In crashes where the truck was identified as the primary cause, driver-related factors accounted for 87 percent of the critical reasons. These were predominantly characterized by recognition errors (such as inattention) and decision errors (such as driving too fast for conditions).[55] While speeding is the most frequent driver-related factor cited for truck-involved fatal crashes, the initiating event is rarely the truck leaving its path. In 2022, the critical pre-crash event for 63 percent of large trucks involved in fatal crashes was another vehicle, person, or object encroaching into the truck's travel lane.[56] In 2022, 6 percent of truck drivers involved in fatal crashes tested positive for at least one drug, a rate that is nearly three times lower than for all vehicle drivers.[57] In fact, crashes involving passenger vehicle drivers are much more likely to include drug and alcohol use, fatigue, and driver illness.[58] Seat belt use remains a key determinant of survivability, with unbelted truck drivers facing significantly higher fatality rates.[59]

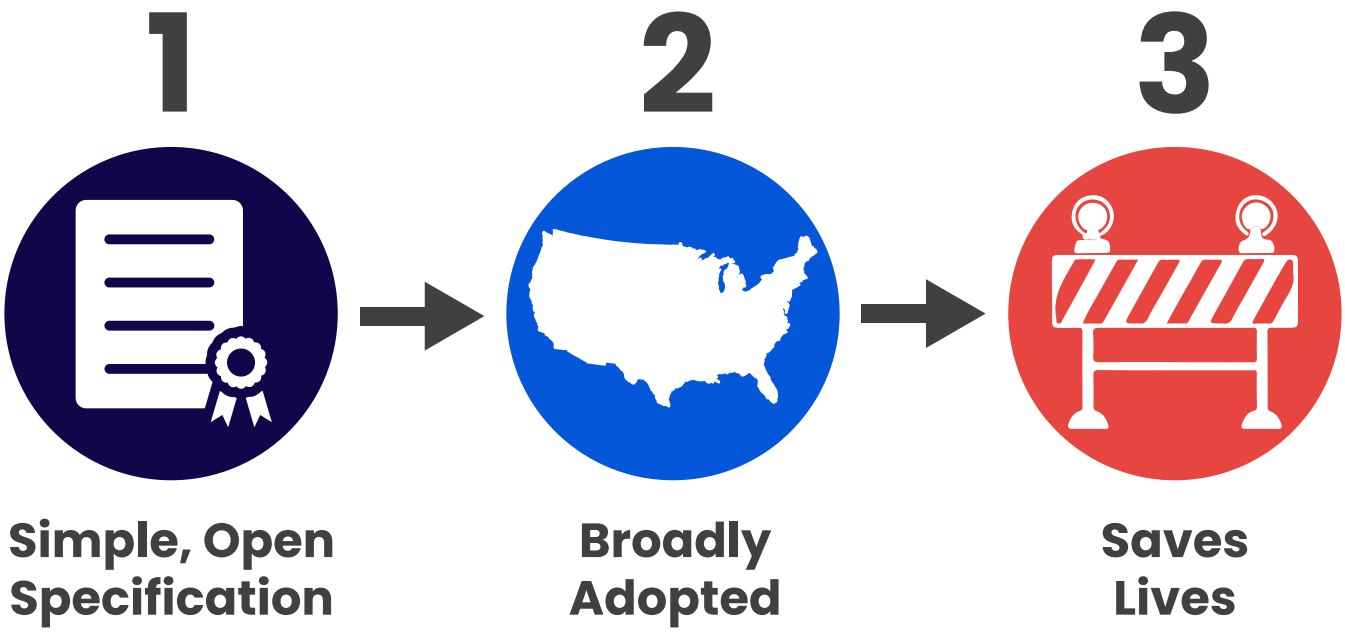
Work Zone Safety and Design

Highway work zones present challenges for truck drivers. Narrower lanes, sudden stops, traffic pattern shifts, and uneven road surfaces can lead to significant crashes. On average, large trucks are overrepresented in work zone crashes. In 2022, over 30 percent of fatal crashes in work zones involved a commercial motor vehicle – a 16 percent decrease compared to just the previous year.[60]

THE WORK ZONE DATA EXCHANGE: DATA SPECIFICATIONS AND ACCESS PROTOCOLS

FHWA's Work Zone Data Exchange (WZDx) gives public agencies a common, plain-language way to publish where, when, and how work zones affect travel. Instead of every State and city sharing work-zone details differently, WZDx sets a consistent format so information on lane closures, detours, and timing can be shared and compared across jurisdictions. For freight planners, that means easier visibility into recurring construction impacts on key freight corridors, more comparable before/after analyses, and better coordination with carriers and MPOs.

Agencies post their WZDx feeds openly on the web, and the data are free to use. Planning teams, regional partners, and map providers can pull the same up-to-date feed into dashboards, performance monitoring, or project scoping without one-off data wrangling. A related specification, the Road Restriction feed, helps capture truck-relevant limits (like height, weight, or seasonal restrictions), supporting routing for oversize/overweight movements and detour planning. This standardized data also powers private-sector navigation and trucking apps, enabling them to deliver real-time alerts and routing to drivers. Together, these open, discoverable feeds help planners quantify freight reliability impacts, target mitigation (e.g., off-peak lane closures, signed detours), and communicate expected conditions to industry.



TRUCK PARKING

A lack of adequate truck parking is a persistent national safety challenge. Drivers who cannot find safe legal spaces are more likely to park on highway shoulders, ramps, or other unsuitable areas, increasing crash risks for both trucks and passenger vehicles. Truck parking shortages remain a major problem in most States.[61] Chronic truck parking shortages directly contribute to driver fatigue and stress, as truckers spend valuable time searching for parking instead of resting. Lack of predictable and available parking also causes inefficiency in the system, as drivers can spend an hour or more searching for available parking during their hours of service instead of making progress on their journey.

Demand for truck parking is increasing faster than it is being built. Rising freight volumes, increasing congestion in major urban areas, Federal hours-of-service rules, and growth in e-commerce delivery have all added pressure on rest facilities. States are beginning to respond with expanded rest area capacity, public-private partnerships with truck stops, and real-time information systems that show available truck parking spaces. Phone applications for truck drivers are also on the rise as more developers create apps that identify rest areas or available parking options for trucks. However, national evaluations have found that, while truck parking information systems can reduce search time and are generally valued by drivers, oftentimes nearby spots are full, and these tools simply confirm the lack of appropriate capacity. Without additional spaces, measured safety gains remain modest.[62]

USDOT prioritizes a multi-faceted approach to address truck parking needs, focusing on innovative capacity expansion, data-driven strategies to optimize utilization, and creative financing for facility operations. To support these physical improvements, the Department actively promotes coordination across State, regional, and local governments to ensure truck parking is seamlessly integrated with freight land-use planning. Eliminating freight bottlenecks and reducing truck travel times in urban areas, as highlighted earlier in this chapter, will also help to reduce the need for truck parking in dense urban areas.

BRIDGE AND TUNNEL STRIKES

Each year, an average of 14,500 bridge strikes occur nationwide and are one of the most frequent causes of bridge failures.[63] An estimated 220 deaths and 4,700 injuries occur annually from bridge and tunnel strikes (Figure 10).[64] Oversized trucks or the inadvertently raised portions of cargo such as crane booms are a specific strike risk, and can cause significant damage to infrastructure, injuries and fatalities, traffic delays, and rerouting of traffic to remove the truck and repair damage.

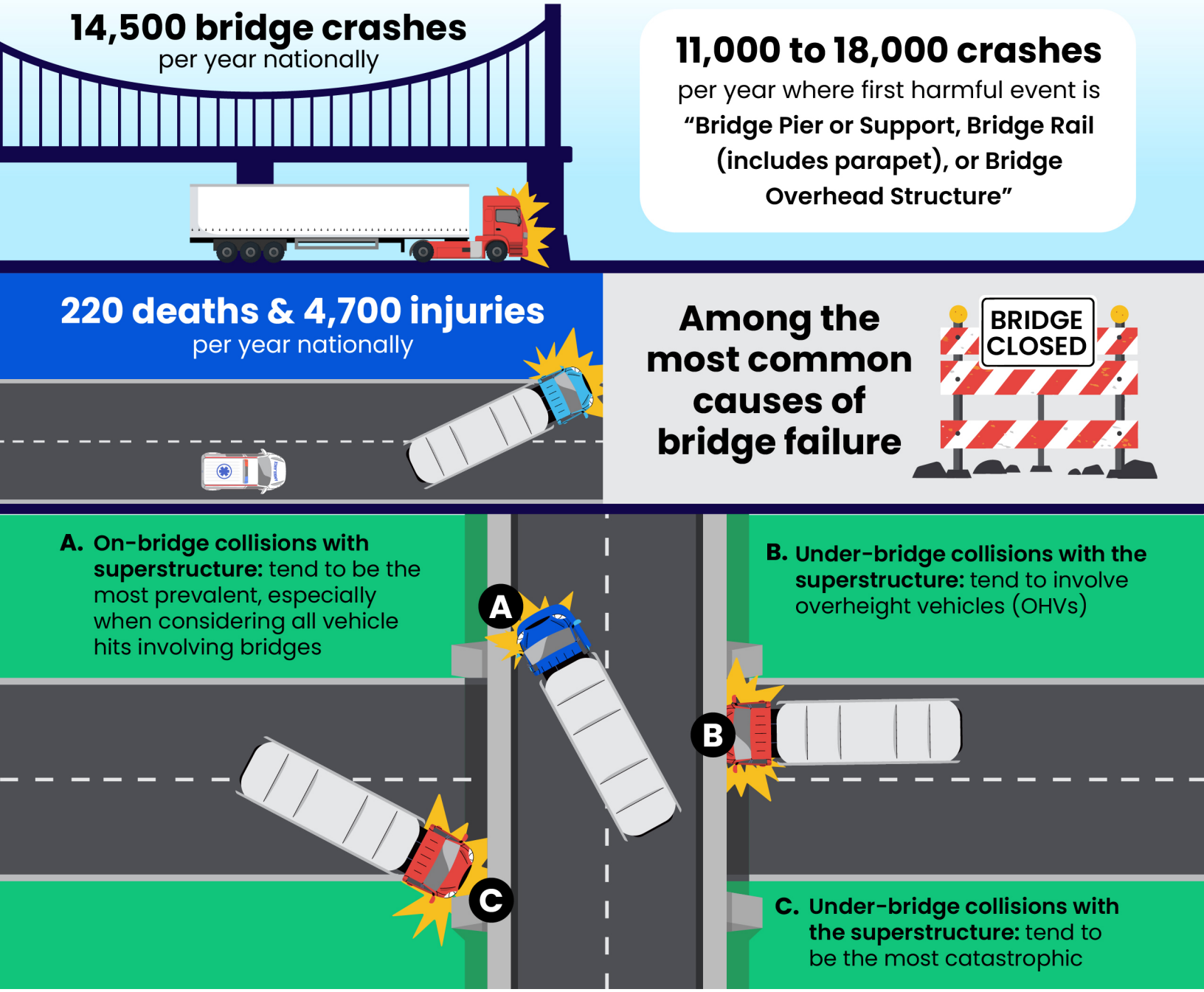
The Draft NMFN's highway components contain an estimated 108 bridges with a vertical clearance of less than 14 feet to accommodate standard trucks, and 366 bridges with less than the 16 feet required to accommodate oversize vehicles.[65] Key opportunities to reduce bridge strikes include deploying better signage marking low-clearance bridges and advanced warning systems, improving the accuracy of clearance data, and stricter enforcement of over-height vehicles.

State DOTs and transportation agencies are actively deploying operational, infrastructural, and technological strategies to mitigate the likelihood and severity of bridge and tunnel strikes. These efforts are often guided by best practices, such as those identified in the National Cooperative Highway Research Program's Guide on Preventing and Mitigating the Risk of Bridge and Tunnel Strikes by Motor Vehicles.[66] Yet, even with robust engineering controls, driver behavior and human error remain persistent contributing factors in bridge and tunnel strikes.

The trucking industry also shares a vested interest in preventing these incidents. Beyond the immediate threat to operator safety and cargo integrity, a bridge strike carries severe economic repercussions. Carriers are frequently held liable for costly infrastructure repairs and environmental cleanup, resulting in expensive claims that can drive up insurance premiums or jeopardize coverage eligibility.

In places with a significant military presence, engagement with base commanders is vital to ensure military freight requirements are included in freight planning. The Draft NMFN includes all segments of the Strategic Highway Network (STRAHNET; see page 62 for more information), the transportation network designated for primary military movements. Ensuring military freight needs are adequately met can reduce the threat of potential bridge and tunnel strikes from over height or oversized military vehicles.

Figure 10. Crash Factors Associated with Bridge & Tunnel Strikes.[67]



Automated detection technologies, including weigh-in-motion sensors, clearance monitoring, and strain gauges, are increasingly used to detect over-height vehicles, monitor stress, and identify deteriorating bridges and tunnels. These tools allow faster incident response and provide data to guide capital investment decisions, particularly for freight-intensive corridors with bridge and tunnel infrastructure.

Both FHWA via Advanced Transportation Technologies and Innovation (ATTAIN) grants[68] and the Federal Motor Carrier Safety Administration (FMCSA) via the Expanded ITD program[69] provide funding opportunities for States to expand their use of these technologies. NHFP funding can also be used for bridge strike prevention systems on the NHFN.

Critical Bridges on Draft NMFN Highways

Critical infrastructure failures are among the most visible and consequential threats to freight mobility. Because bridges typically span otherwise impassable barriers, a single closure can create outsized detours and systemwide impacts. According to the National Bridge Inventory, the Draft NMFN contains more than 1,600 bridges rated in 'poor' condition, many of which lack redundancies within the regional network (Table 6). The failure of any one bridge, terminal, or intermodal facility can create wide-reaching ripple effects across regions and supply chains.

TABLE 6. NUMBER OF DRAFT NMFN BRIDGES BY REQUIRED ADDITIONAL DETOUR MILES AND FUNCTIONAL CLASS[70]

FUNCTIONAL CLASS (FC)	NO IMPACT (2 OR FEWER MILES)	MINIMAL IMPACT (2-9 MILES)	MODERATE IMPACT (10-24 MILES)	HIGH IMPACT (25-49 MILES)	EXTREME IMPACT (50+ MILES)	TOTAL
Interstates (FC1)	44,230	7,652	1,993	584	791*	55,250
Other freeway or expressway (FC2)	7,512	1,589	300	100	66	9,567
Other principal arterial (FC3)	6,857	1,879	884	553	687	10,860
Minor arterial (FC4)	711	224	73	100	46	1,154
Major collector (FC5)	498	102	42	4	10	656
Minor collector (FC6)	0	0	0	0	0	0
Local (FC7)	42	4	0	0	1	47
TOTAL	59,850 (77.2%)	11,450 (14.8%)	3,292 (4.2%)	1,341 (1.7%)	1,601 (2.1%)	77,534

*53 Interstate bridges with a reported 50+ mile detour rated as in Poor overall condition

Highways and Trucking Innovations

AUTOMATION AND AUTONOMY

Automated vehicle (AV) technology continues to advance in the freight industry.[71] Freight truck operators are testing AV applications that could change the way cargo moves in the freight system. Multiple companies have operated Class 8 tractor-trailers equipped with automated driving systems (ADS) on public highways with minimal or no human intervention, including recent driverless freight runs in Texas.[72] [73] [74] Texas is one of 19 States that, as of 2024–2025, have statutes explicitly permitting AVs to operate on public roads beyond limited pilot sites.[75] In April 2025, the National Highway Traffic Safety Administration (NHTSA) introduced a national Automated Vehicle Framework to unleash American ingenuity, maintain key safety standards, and prevent a harmful patchwork of State laws and regulations.[76] Early implementation actions are to modernize Federal Motor Vehicle Safety Standards for vehicles equipped with ADS[77] and expand the Automated Vehicle Exemption Program to include research and demonstration on American-made prototype AV technology.[78]

VEHICLE-TO-EVERYTHING COMMUNICATIONS

Vehicle-to-Everything (V2X) systems allow trucks, trains, and other vehicles to communicate with surrounding infrastructure and road users in real time. Applications include warnings of upcoming work zones, stopped vehicles, or blocked highway-rail grade crossings. FHWA's Connected Vehicle Pilots have demonstrated that V2X can reduce crashes and near-misses, particularly in congested urban environments and at intersections. For freight, wider adoption could improve routing reliability and reduce secondary incidents that delay goods movement. V2X requires a significant investment in both physical roadside infrastructure (such as cameras, sensors, and roadside units) and interoperable data standards. Furthermore, deployment depends on coordination with Federal agencies to manage the communication spectrum for required sensors.[79]

USDOT invests millions in V2X pilots. FHWA's ATTAIN program funds complementary corridor and city upgrades that make signal systems "connected vehicle ready" and expand interoperable roadside equipment.[80] USDOT hosts a V2X Accelerator program aimed at supporting interoperable connectivity accelerators to increase V2X adoption rates nationwide.[81] Strengthening Mobility and Revolutionizing Transportation (SMART) grants have funded "connected intersection" verification programs, among other project types. These intersections broadcast standardized, secure traffic signal timing and lane geometry information so automakers can safely enable in-vehicle warnings and cities can deploy bus signal priority and emergency vehicle preemption or test smart curbs, loading zones, and hazard alerts.[82] Across efforts, the emphasis is on interoperability across vendors and States, measurable safety and reliability benefits, and identifying clear pathways to build new technologies at scale.

MODULAR INFRASTRUCTURE TO REDUCE BUILD TIME

New construction techniques, such as accelerated bridge construction and modular components, enable faster replacement of damaged structures and reduce the time freight routes are out of service. Several State DOTs have demonstrated that accelerated bridge construction can reduce closure times from months to days, minimizing disruption to freight carriers.

While still in early adoption, advanced infrastructure and materials hold promise for lowering lifecycle costs and improving system reliability. State DOTs and MPOs can accelerate deployment by incorporating monitoring technologies into rehabilitation projects, piloting smart materials on freight-critical corridors, and sharing performance data across jurisdictions. FHWA Center for Accelerating Innovation programs such as Every Day Counts (EDC) and Accelerated Innovation Deployment (AID) provide funding and resources that promote adoption of ultra-high-performance concrete[83] and other innovative materials and infrastructure.

URBAN AND LAST-MILE INNOVATIONS

Incorporating freight into broader initiatives is important for ensuring future street designs account for goods movement as well as passenger travel. USDOT is supporting such efforts through Advanced Research Projects Agency-Infrastructure (ARPA-I), which funds high-risk, high-reward next-generation transportation technologies that will maintain America's position as a global leader in the sector.[84]

Pilot initiatives in populated areas are showing promise in complementing inter-city freight patterns. For example, cargo e-bikes are being piloted in dense city centers where they can complete short trips more efficiently and with less congestion impact than vehicles.[85] Several U.S. cities are also experimenting with microhubs or urban consolidation centers, which stage goods closer to customers to reduce VMT and improve reliability in high-demand areas.[86] Sidewalk robots, tested on college campuses and in select cities, can carry small packages, providing an alternative to passenger vehicles used for deliveries and, in some instance, short light duty truck trips.

Supporting American Truckers

Key skills required for jobs in the freight sector are evolving as new technologies in warehousing and trucking grow and expand. Ensuring that truck drivers and others in the freight industry understand how to operate and maintain more advanced and automated vehicles, and how to optimize the use of digital logistics and telematics software is important for maintaining a skilled workforce. The American Trucking Association (ATA) finds that truck drivers are, on average, an older profession than the rest of the U.S. workforce, with

the average private fleet driver aged 57.[87] As the existing workforce retires, new drivers must be recruited from younger generations and train them in necessary freight industry skills to fill these roles to avoid a driver shortage.

USDOT has taken action to cultivate a skilled driver workforce. In 2025, the USDOT announced a Pro-Trucker Package that expands truck parking and modernizes driver resources. The package includes over $275 million in investments towards expanding truck parking availability and establishing additional competitive grants for truck parking projects, modernizing the Consumer Complaint database, and updating FMCSA's DataQ system to be more transparent.[88] Additionally, a new "Split Duty Period" pilot program will allow drivers to pause their 14-hour driving window for no less than 30 minutes and no more than three hours. A Flexible Sleeper Berth pilot program has also been announced, which will explore additional sleeper berth split options beyond the current "8/2" and "7/3" configurations.[89]

NON-DOMICILED LICENSING AND ENGLISH LANGUAGE PROFICIENCY REQUIREMENTS

Effective enforcement of truck operator regulations is critical to ensuring safety and operational integrity of the trucking industry. FMCSA requires drivers holding a non-domiciled commercial driver's license (CDL) must meet the same testing, skills, and medical certification standards as American-based drivers. English language proficiency ensures drivers can sufficiently understand highway signs, communicate with law enforcement, and complete necessary reports supporting effective interaction in emergencies and during inspections.

Robust enforcement of these requirements is essential to mitigate risks associated with miscommunication, improper credentialing, and unsafe operation of large commercial vehicles. FMCSA's 2025 audits and Annual Program Reviews of State CDL programs have identified systemic non-compliance in the issuance of non-domiciled commercial driver's licenses, alongside at least five recent fatal crashes involving non-domiciled CDL holders.[90] Research in 2008 found that drivers cited for limited English proficiency have significantly higher crash and out-of-service rates than comparable drivers.[91] Together, these findings underscore the safety importance of rigorous State verification of CDL eligibility requirements—especially ensuring drivers can understand safety signage and respond to law enforcement inquiries.

FMCSA has also strengthened the criteria required for a non-domiciled CDL, including an employment-based visa and a Federal immigration status check using the Systematic Alien Verification for Entitlements (SAVE) system. This effort, along with a continued nationwide audit of States' compliance with non-domiciled CDL rules, ensures that qualified drivers are the only ones operating trucks on the roadways, making it safer for all road users.[94]

QUALITY OF LIFE

Truckers' quality of life is currently strained by a mix of long hours, unpredictability of schedule, challenging work conditions, and lack of needed infrastructure (parking and rest stops). Drivers, particularly long-haul truck drivers, deal with long and unpredictable shifts, split schedules, and mandatory overtime.

When truck drivers stop to rest, facilities are often unsafe or lack basic amenities. Clean restrooms and showers are not guaranteed or are often unavailable and items like healthy food and laundry are hard to find. On top of long hours and difficulty accessing basic amenities, truck drivers encounter physical strain, unsafe conditions on the road, exposure to weather or chemicals, on-the-job injuries, irregular sleep, and economic pressures as a part of their day-to-day job.

FMCSA recently launched the first phase of an update to the National Consumer Compliant Database (NCCDB) modernization. This portal update will allow drivers and consumers to report violations of the Federal Motor Carrier Safety Regulations including complaints against property brokers, safety issues, fraud, and other concerns. The NCCDB empowers the freight workforce to speak up about unsafe practices and streamlines the agency's response process.[92]

RAILROADS

KEY INSIGHTS AND MODAL CHALLENGES

- Freight rail traffic is concentrated on high-density corridors essential to national and export supply chains.
- Technology and physical infrastructure investments by both the public and private sector have improved rail freight safety over the last two decades.
- Precision railroading and longer trains affect network efficiency and create community level impacts from blocked highway crossings.
- Private ownership limits public visibility into rail condition, performance, and investment decision-making.
- Short line infrastructure constraints can limit first- and last-mile connectivity for key economic sectors.

The U.S. freight rail network consists of 136,382 rail miles operated by six Class I railroads, nine Class II railroads, 22 regional railroads, and more than 580 local railroads.[93, 94] Theses counts reflect ongoing industry consolidation, most notably the 2023 merger of Canadian Pacific and Kansas City Southern into a single tri-national network.[95] Class I railroads account for nearly 67 percent of the industry's total mileage and 94 percent of revenues.[96] The system also encompasses the Strategic Rail Network (STRACNET), designated for military cargo transportation. The Federal Railroad Administration (FRA) and U.S. Transportation Command (USTRANSCOM) coordinate on the STRACNET designations with the goal of reliable and efficient military cargo movements by rail. Freight railroads are mostly privately owned and operate on infrastructure they maintain themselves or share with another private railroad. Rail is the primary mode used for shipments moving 1,000 to 2,000 miles.[97]

Rail demand is positioned to grow (Table 7). Rail freight projections assume sustained demand for long-haul, bulk, and intermodal movements, supported by industrial production, energy and agricultural flows, and cross-border manufacturing trade. Forecasts reflect rail's cost efficiency over long distances and its role in serving ports, inland hubs, and major production regions, with modal shares influenced by commodity mix and network capacity rather than rapid structural change.

TABLE 7. FORECASTED RAIL GROWTH BY TONNAGE AND VALUE, 2025-2050[98]

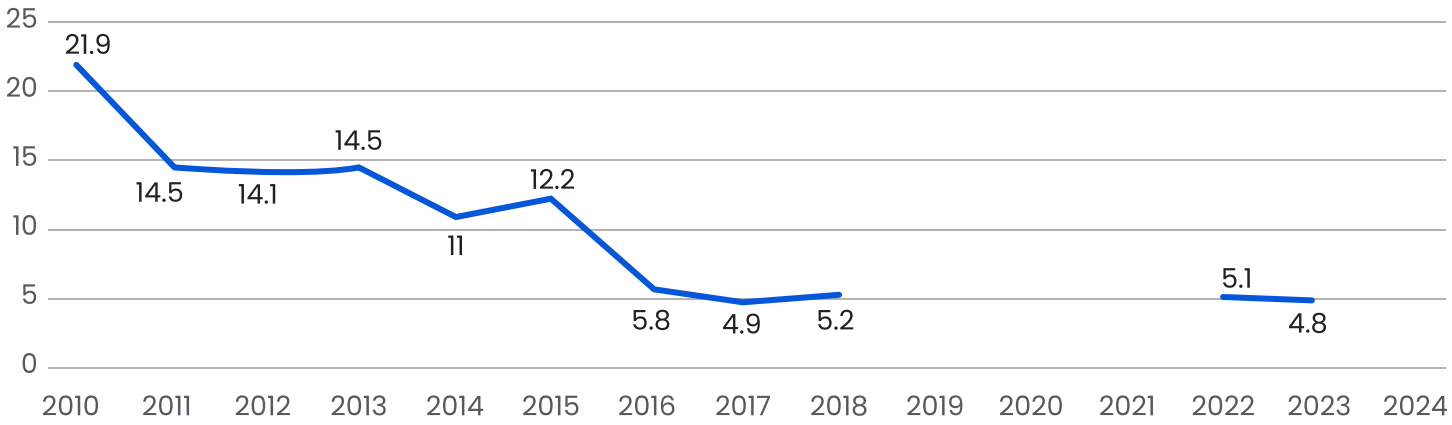
	TONNAGE (THOUSANDS)	CHANGE FROM 2025	DOLLARS (MILLIONS)	CHANGE FROM 2025
2025	1,630,095	-	574,093	-
2030	1,764,847	8%	645,551	12%
2035	1,857,217	14%	690,251	20%
2040	1,967,298	21%	746,495	30%
2045	2,102,102	29%	812,358	42%
2050	2,256,984	38%	897,527	56%

Draft NMFN Freight Rail Conditions

Rail condition influences freight reliability. Good track, structures, and signals support normal speeds and predictable schedules. Track defects, clearance limits in tunnels or bridges, and speed restrictions ("slow orders") reduce speeds, add yard dwell, and can shift traffic to other routes or modes.

FRA's Automated Track Inspection Program (ATIP) gathers data to assess the effectiveness of railroads' track maintenance and inspection processes and to inform FRA's manual inspection activity. Through ATIP, FRA evaluates railroads' track geometry for safety exceptions, among several other characteristics. Since 2010, total exceptions per 100 miles inspected by FRA's ATIP vehicles decreased significantly, indicating track conditions may be improving over time from improved maintenance practices or older lines being decommissioned (Figure 11).

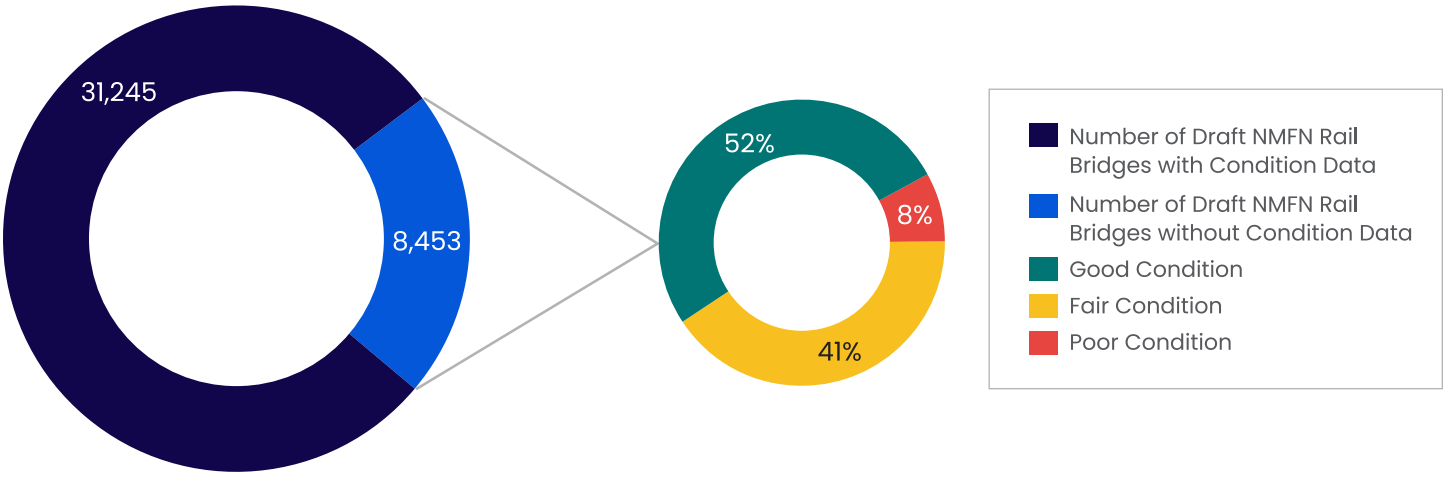
Figure 11. Automated Track Inspection Program Exceptions Per 100 Miles Surveyed, 2010-2024[99]



Note: Exceptions mean track did not meet the regulatory requirements of 49 CFR Part 213. Inspection locations vary by year and are prioritized by factors such as safety risk analysis and operation types. No data available for years 2019, 2020, 2021, 2024.

Because most freight rail infrastructures are privately owned, comprehensive bridge condition data are limited. For the share of Draft NMFN rail bridges with publicly available ratings—about 21 percent of total rail bridges—about 8 percent are rated in poor condition (Figure 12). Estimates from multiple studies also indicate[100] that one-third to one-half of short line track does not meet the 286,000-pound railcar standard, which implies a significant capacity constraint distinct from physical condition of the tracks. Together, these indicators point to targeted needs in bridge rehabilitation and track upgrades meet the 286,000-pound standard that will support reliable, cost-effective freight movements, both of which are eligible project types under FRA's Consolidated Rail Infrastructure and Safety Improvements (CRISI) competitive grant program.

Figure 12. Rail Bridge Condition Ratings on the Draft NMFN, 2022[101]



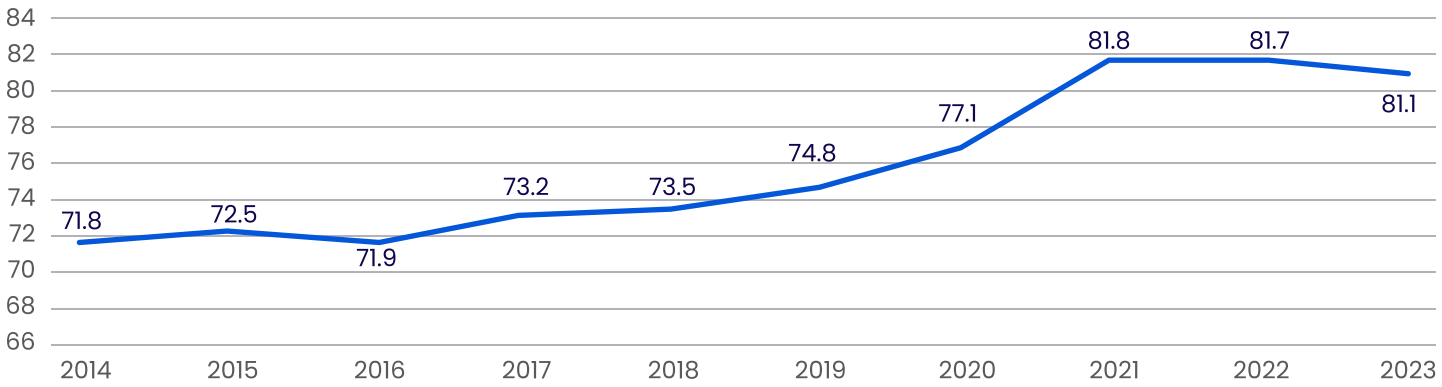
Note: *Estimated using NBI rail bridge data locations and Draft NMFN rail segments. About 21 percent of rail bridges on the Draft NMFN's rail segments appear in the National Bridge Inventory with an overall rating of good, fair, or poor. Condition of the remaining 79 percent are unknown, likely because they are privately owned infrastructure without reporting requirements.

Railroad Performance

PRECISION SCHEDULED RAILROADING (PSR) AND LONG TRAINS

PSR is a strategy all Class I railroads use to increase both efficiency and reliability.[102] It relies on less labor and fewer capital assets such as locomotives and railcars by running fewer but longer trains. Shippers and labor report mixed service effects.[103] As of the mid-2020s, roughly 25 percent of trains exceeded 7,500 feet, with some trains reaching 14,000 feet or greater (Figure 13).[104] However, yard capacities and rail sidings built for shorter trains sometimes cannot hold longer trains, causing them to spill onto mainline tracks and block at-grade crossings or produce extra main rail line dwell times.

Figure 13. Average Class I Railroad Train Length (Number of Cars)[105]



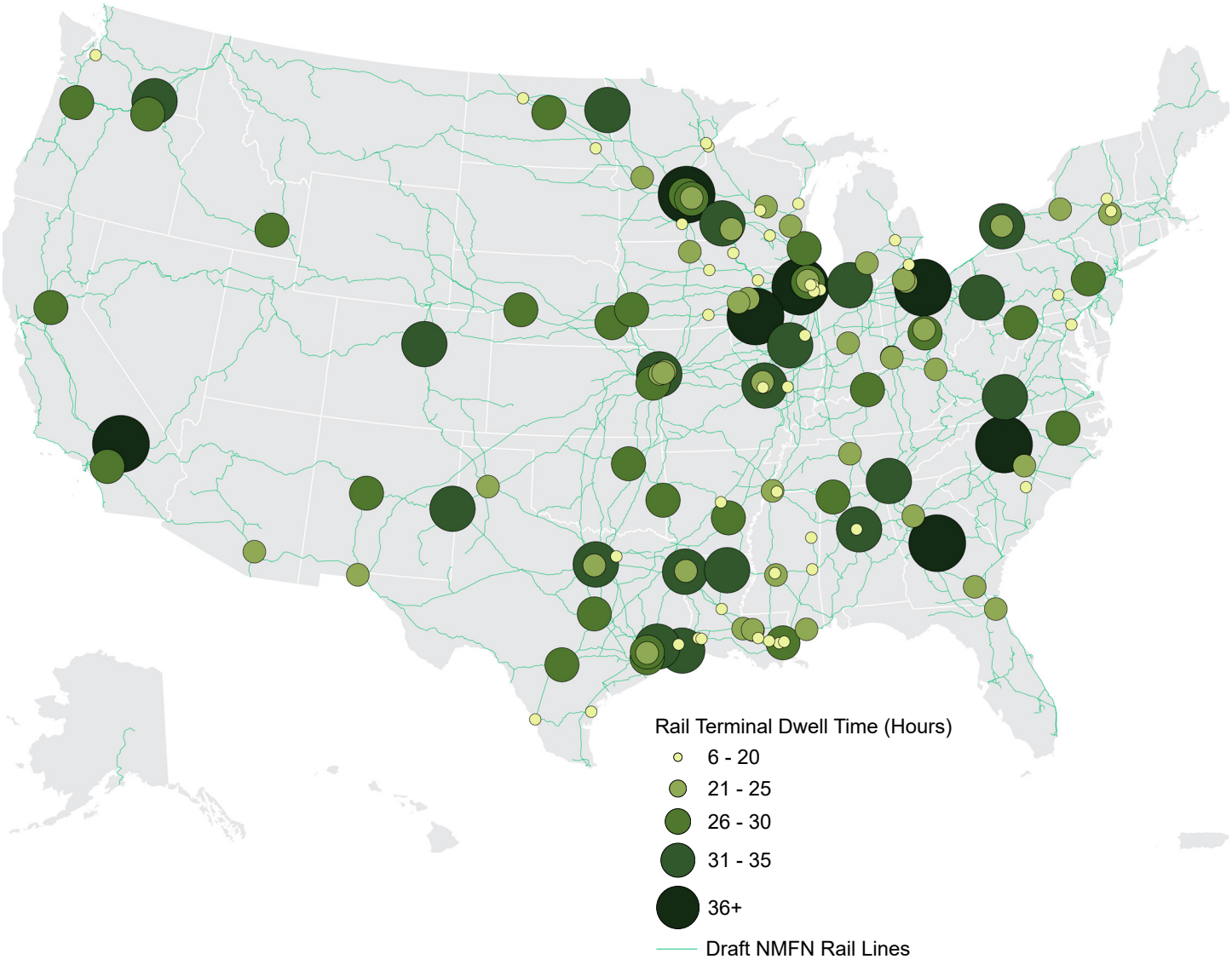
Long trains can block multiple parallel grade crossings at once over an extended period, particularly where trains are assembled or disassembled outside yards, which may increase delays. While the net effects on local congestion are site-specific and data describing these effects are currently limited,[106] FRA's Railroad Crossing Elimination (RCE) competitive grant program can be used to mitigate these impacts by funding grade separations to reduce crossing closures. The program directly addresses the types of multimodal delays and safety concerns that are exacerbated by the increased presence of longer trains in community corridors.

TERMINAL PERFORMANCE

Two important measures of Class I railroad levels of service are train speed and terminal dwell hours, which are reported to the Surface Transportation Board (STB) on a weekly basis. The more railroads can improve these metrics, the timelier and more reliable their service will be. Average train speeds tend to be between 20 and 30 miles per hour (MPH) for Class I railroads. In the third quarter of 2025, the average speed for Class I railroads was 24 MPH,[107] which was 9.5 percent faster than the previous quarter and four percent faster than the third quarter of the previous year.[108]

Rail terminal dwell times affect not only the reliability of rail, but of the entire multimodal freight network as it influences truck turn times and the timing of rail movements at ports and inland ramps. Terminal dwell times at large Class I rail terminals range from 6 to 38 hours (Figure 14), with a systemwide average between 15 and 30 hours. In the third quarter of 2025, average terminal dwell time for Class I railroads increased 5.1 percent from the previous quarter to 20.6 hours, but marked a 1.2 percent improvement compared to the same quarter in the previous year. Though most terminals are privately owned and operated, the impact of extended dwell can appear on public connectors and regional roadways. As a result, public agencies play supporting roles in developing and maintaining connector condition and operations, crossing treatments near terminals, short-stay truck parking, coordinated construction and incident management, and targeted partnerships on rail approaches where shared outcomes are clear. This approach respects private operations while addressing the consequences of delay to the broader traveling public.

Figure 14. Average Dwell Times at Largest Class 1 Railroad Terminals[109]



Note: individual points represent the 2023 annual weekly average terminal dwell time measured in hours for each of the six Class I railroad carriers' top 10 and top 11-20th largest terminals by railcar capacity.

Recent Public Sector Investments in Freight Rail Infrastructure

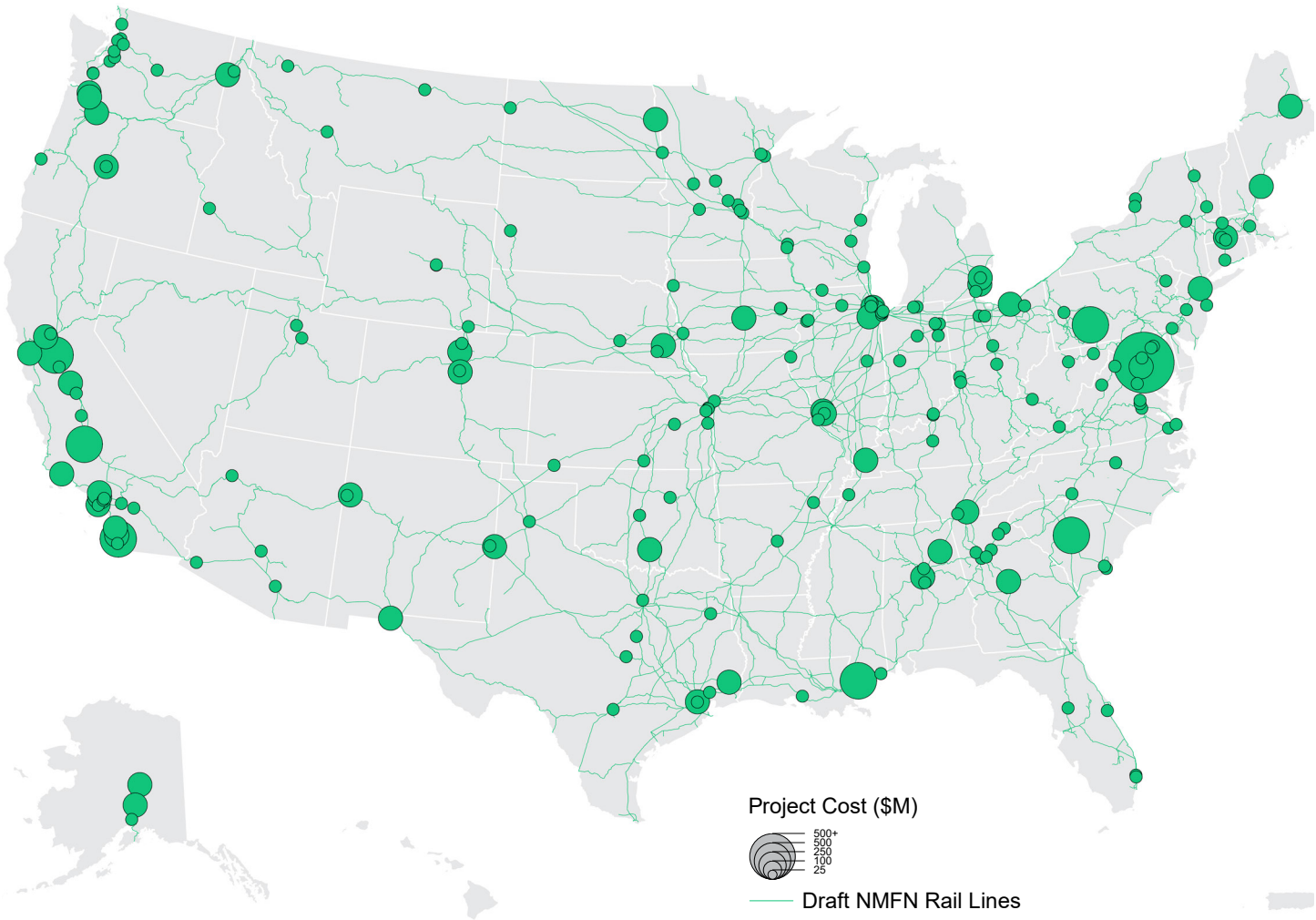
State and Federal competitive grant programs have recently invested significantly on rail segments of the Draft NMFN. Since 2022, USDOT competitive grant programs have awarded $4.1 billion to over 200 freight-focused rail projects (Figure 15). These investments primarily focused on capacity expansion, state of good repair improvements, safety, and technology advancements (Table 8).

Like all transportation infrastructure investments, rail investments on the Draft NMFN generate economic benefits to the public. Between $1.95 and $3.20 in estimated benefits are generated from every dollar invested into the rail network, based on a sample of announced competitive grant awards between 2022 and 2025.[110] Rail projects typically generate these benefits by encouraging modal shift away from highways, which reduces congestion costs on crowded highways, and improves network fluidity and efficiency.

TABLE 8. SFP AND COMPETITIVE GRANT PROJECTS ON DRAFT NMFN RAIL SEGMENTS (2022-2026)[111]

PROJECT CATEGORY*	RAIL PROJECTS	SPENDING (BILLION $)
Capacity expansion	165	$2.9
Maintenance/state of good repair	23	$0.7
Safety	9	$0.2
Technology	8	$0.1
Other	1	$0.2
Total	206	4.1

Figure 15. Rail Investments on the Draft NMFN: National Highway Freight Program, Competitive Grant Programs, and Select State Funds (FY2022-2026)[112]

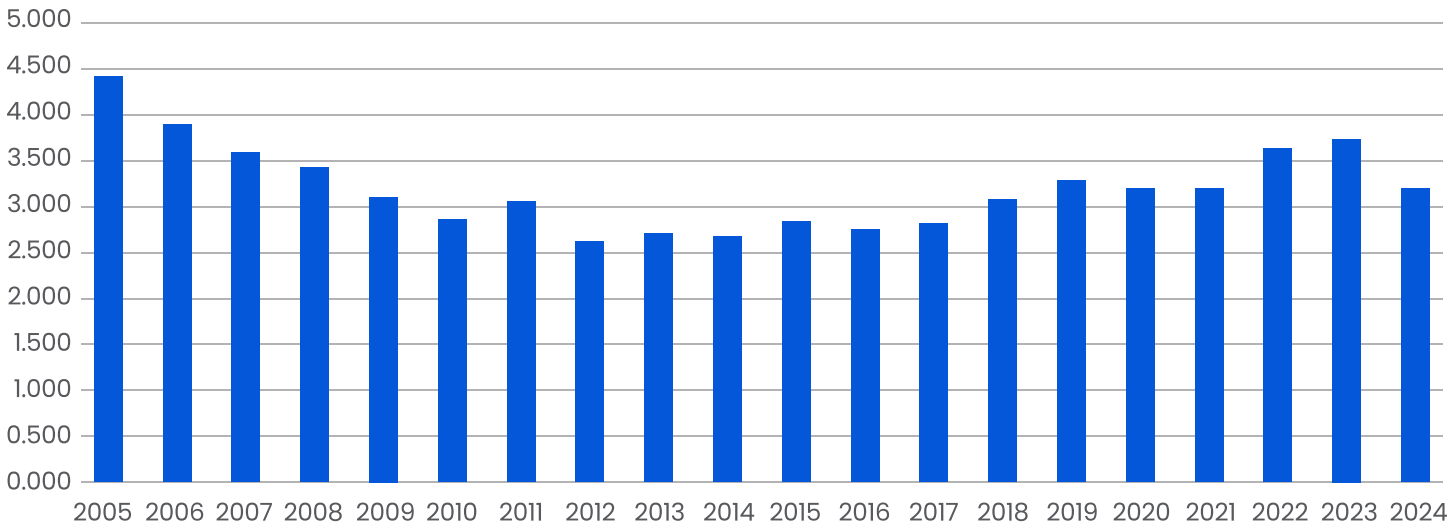


Class I railroads, which are generally ineligilbe for Federal grant program funding, also continue to fund capacity improvements with current programs covering double and sometimes triple track segments, adding sidings, terminal expansions, and technology, investing $26.7 billion in 2023 alone.[113] These investments in capacity indicate where the industry expects growth, like core corridor belts that connect inland hubs such as Phoenix, Arizona with West Coast gateways, and on routes linking the Midwest, Gulf Coast, and Mexico.[114]

Railroad Safety

Train accident and derailment rates per million miles have declined slightly over the last two decades. This trend included a period of increases from the mid-2010s to 2023 before slightly decreasing in 2024.[115] There were 1,034 freight train derailments in 2024, which represents a 54 percent decline relative to 2005.[116] Today, derailments often occur at slow speeds in yards rather than along main lines. Trespassing and highway-rail grade crossing incidents remain the leading causes of rail-related fatalities. Continued use of train technology, grade crossing protections, and trespass prevention programs has improved safety, but rising freight demand and recent high-profile derailments underscore the need for sustained attention by all stakeholders, including local communities. The accident rate per million train miles for all freight rail dropped 27.2 percent between 2005 to 2024, from 4.408 to 3.207, respectively (Figure 16).[117]

Figure 16. Freight Rail Accident Rate Per Million Miles (Excluding Grade Crossing)[118]



POSITIVE TRAIN CONTROL

Positive train control (PTC) is a Federally mandated safety system designed to slow or stop trains automatically to eliminate certain human-error-related crashes, including train-to-train collisions, overspeed derailments, incursions into work zones, and movements of trains through switches left in the wrong position. As of December 2020, PTC was fully implemented on all 57,536 rail miles subject to the PTC mandate. PTC technology governs rail operation on Class I railroad mainlines that transport toxic- or poison-by-inhalation hazardous materials and mainlines where passenger railroads operate, with limited exceptions. The system's nationwide deployment represents one of the most significant rail safety technological improvements in recent decades. Performance data show PTC systems have consistently prevented incidents or accidents where human operators failed to act. FRA and STB oversight continues to focus on improving PTC technology's reliability, sustaining interoperability between railroads, and ensuring railroads maintain and update their PTC systems over time. Railroads are required to submit quarterly reports on PTC systems' performance, including information about the technology's operation and failures.

CASE STUDY: EAST PALESTINE, OHIO TRAIN DERAILMENT

On February 3, 2023, a freight train derailed near East Palestine, Ohio. Twenty cars carrying hazardous materials were involved, including tank cars with vinyl chloride, a highly flammable and toxic chemical. Fires burned for days, and a controlled release and burn was conducted to reduce the risk of explosion. Investigators determined that an overheated wheel bearing triggered the derailment. The event highlighted critical gaps in decision-making protocols for wayside detector alerts, the pace of transitioning to updated tank car standards, and the timely transfer of hazardous materials information to first responders.[119]

The impacts on the community were severe. More than 1,000 residents were evacuated, local waterways experienced fish die-offs, and concerns persist about soil, air, and drinking water contamination. Many residents reported health symptoms and long-term distrust of official communications. Volunteer emergency responders were challenged by incomplete and delayed data about the materials involved, highlighting gaps in preparedness and coordination.[120]

Beyond East Palestine, the derailment disrupted rail flows along a key corridor and prompted renewed debate about hazmat freight safety. Federal agencies and Congress called for faster adoption of DOT-117 tank cars, enhanced wayside detection technology, and requirements for immediate electronic sharing of hazardous cargo manifests. The case underscores how a single failure can ripple through supply chains, while also imposing heavy costs on communities—making hazmat resilience both a public safety and a freight system priority.[121]

HIGHWAY-RAIL GRADE CROSSINGS

Highway-rail grade crossings, the intersection of a railroad track with a road or pathway, are persistent points of conflict between trains, vehicles, and pedestrians. Even with widespread deployment of gates, lights, and warning systems, failures and collisions still occur. According to FRA, there were 2,250 collisions and 263 fatalities in 2024 at highway-rail grade crossings nationwide.[122] Several factors can influence instances of these crashes, with driver behavior being the most prevalent. FRA works with commercial mapping application providers to integrate railroad crossings and alternative routes into their products to direct drivers to safer routes. However, from 2020 to 2024, there were over 1,000 reported system activation failures[123] reported nationally,[124] which significantly heightens crash risk when infrastructure does not perform as designed.

The RCE grant, created through the IIJA, funds projects with measurable impacts to mitigate or avoid incidents such as highway-rail grade crossing crashes. The program's first two rounds of awards gave more than $1.7 billion to over 180 at-grade crossing projects in 44 States. Thirty percent of these awards were projects in rural and Tribal communities.[125] Continuing to improve the ways we identify and prioritize funding to at-grade crossing risks is one of many ways to increase rail safety, and an important focus of USDOT in coming years.

RAIL TRESPASSERS

Trespassing on railroad property is the leading cause of rail-related fatalities in the United States. There were 818 trespasser fatalities in 2024, or 88 percent of all train-related fatalities. These incidents involve any person located on railroad property, including pedestrians walking along tracks or taking shortcuts across rail corridors. Alcohol and drug use, distraction from headphones or phone use, and unauthorized recreational activity are common contributing factors. These figures exclude suicides and intentional harm incidents, which is one of the most common causes of trespassing incidents.[126]

Trespassing events that lead to fatalities are not only a safety issue but have implications for freight operations as well. Crews must stop the train to secure the area, call emergency responders to investigate, and aid in documentation of the incident. A delay of up to two hours for each event is common, impacting supply chain fluidity.

HUMAN ERROR-RELATED ACCIDENTS

While rail freight accidents are infrequent, human error is typically a factor in those that do occur, including incidents and accidents related to switching operations in yards and on mainlines.[127] In order to eliminate these rare but serious occurrences, FRA focuses on reducing accidents caused by human error through implementation of technologies such as technology-assisted infrastructure, rolling stock inspection, and train operations; employee training and railroad oversight; and implementation of system safety and risk reduction programs, including the broadening of railroad participation in close call reporting. Between 2023 and 2025, FRA published two Safety Advisories and twelve Safety Bulletins recommending remedial action for railroads and raising awareness of the risks associated with switching operations and shove moves.

Operational Disruptions

RAIL EMBARGOES

Rail embargoes are temporary restrictions placed by railroads on accepting or delivering certain freight shipments in specific locations when network congestion becomes severe. Embargoes are a traffic management tool that protects overall network efficiency and safety, when external factors threaten network fluidity. Though railroads should make every reasonable effort to work with shippers in avoiding such extreme situations, embargoes remain an unfortunate last resort to ensure adequate rail service levels and capacity for all rail shippers.

Consequently, congestion-related embargoes can serve as a proxy for overall supply chain throughput challenges that stem from a wide variety of possible causes, such as shippers not loading and unloading cars promptly for whatever reason, rail partners refusing cars at interchange due to network congestion issues, delays at port terminals, or significant weather disruptions. During 2020 and 2021, at the height of the COVID-19 pandemic supply chain disruptions, Class I railroads issued 2,244 rail line embargoes. During the recovery period between 2023 and 2024, a total of 845 embargoes were issued—a more than 60 percent decline from the previous two years, and commensurate with the 830 congestion-related embargoes issued in the two years pre-pandemic (2018-2019).[128] However, the average number of days under congestion embargo increased in the recovery period relative to the pandemic period, from 26.4 days to 39.3 days, likely indicating supply chain resiliency issues at those remaining locations that still struggle with rail embargoes. [129]

INFRASTRUCTURE CRITICALITY AND SINGLE POINTS OF FAILURE

Intermodal and long-distance, high-value rail traffic is significantly concentrated in a small number of major hubs. Chicago is by far the largest among them with 50 percent of all intermodal trains and 25 percent of all freight trains passing through the city at some point during their journey.[130] That concentration can introduce systemic risk into the rail network should some catastrophic event occur, such as a regionwide power outage or an unusually strong weather event. As a result, Federal agencies, railroads, and regional partners have invested heavily in Chicago-area capacity projects and monitor gateway performance closely.

There are structural and historical reasons for Chicago's rail dominance, including its historical position as the point between eastern and western railroads, a concentration of logistics companies and warehouses, and its wide array of connections to highway systems and proximity to the Mississippi River system and the Great Lakes. However, several other metropolitan areas have similar advantages. Continued population and manufacturing growth in the Southeast could encourage similar opportunities for other metropolitan areas in the years ahead. Consequently, investing in additional rail yard capacities and multimodal connections in cities like Memphis, Saint Louis, and others may provide an additional layer of systemic redundancy, enhance competition, and improve the long-term freight outlook overall.

Aging Workforce

The U.S. rail workforce is relatively small and highly skilled. Class I freight railroads employ just over 115,000 workers, about 85 percent of whom are represented by a dozen unions, with roughly one in six employees drawn from the veteran community.[131] After roughly a decade of headcount reductions driven by leaner operating models and technology adoption, freight railroads have begun rebuilding staff, but most projected openings now come from retirements and turnover rather than net new growth.[132]

Over the next 5-15 years, the skills required for most rail jobs are likely to evolve rather than disappear as railroads implement more PTC, remote condition monitoring, automated inspection, and advanced dispatch and energy-management tools. These changes will shift many craft, maintenance, and operations roles toward tech-enabled troubleshooting, diagnostics, and system integration, and create new "hybrid" jobs at the boundary of operations, IT, and data analysis. Priority needs in building the rail workforce include building predictable talent pipelines into craft and technician roles through partnerships with unions and technical colleges, investing in upskilling and credentials so workers can operate and maintain advanced systems, improving schedule predictability, and younger worker recruitment in regions where rail investment is growing.

A 2020 FRA survey found that most respondents believed succession programs do not adequately address the loss experienced when employees retire.[133] With a significant portion of the freight workforce approaching retirement, it is crucial to recruit and retain younger workers in freight fields while providing opportunities and programs to upskill those currently in the workforce.

Rail Automation

While automation is not expected to replace the human workforce, increased adoption of automation technology may help alleviate gaps created by an aging workforce. Railroads are expanding the use of automation to improve safety and operational efficiency. Digital dispatching systems increasingly integrate real-time data to optimize train movements and reduce delays across congested corridors. Wayside detection technologies, including acoustic bearing monitors, hot-box detectors, and machine vision systems allow defects in wheels, bearings, and tracks to be identified earlier and often identify problems not detectable by a human.[134] Automated track inspection vehicles using machine vision to supplement traditional inspections provide continuous data on rail geometry and surface conditions.[135]

More broadly, FRA supports freight rail innovation through a variety of targeted research and technology development initiatives. These include exploration of advanced detection and sensor systems that could enhance operational safety and support future automation of train operations.[136]

INLAND WATERWAYS & MARINE HIGHWAYS

KEY INSIGHTS AND MODAL CHALLENGES

- Inland waterways move large volumes of bulk commodities supporting nationally important industries.
- Aging locks and dams create reliability risks and unplanned system disruptions.
- Low- and high-water events increasingly affect navigability and vessel transit times.
- Vessel-bridge allisions pose significant safety and operational concerns.
- Waterway disruptions often shift freight demand to already constrained surface modes.

The Nation's inland waterways span about 25,000 miles of active, navigable inland and coastal channels.[137] Key routes include the upper and lower Mississippi River, Arkansas River, Illinois and Ohio Rivers, Tennessee River, and the Columbia River System. The Gulf, Atlantic, and Pacific Intracoastal Waterways, along with the Great Lakes and the St. Lawrence Seaway, also serve as essential links in the Maritime Transportation System (MTS). The U.S. Army Corps of Engineers (USACE) primarily manages the inland waterways, maintaining locks and dredging channels to ensure reliable navigation, while the Great Lakes St. Lawrence Seaway Development Corporation (GLS) operates and maintains the U.S. portion of the St. Lawrence Seaway, including the locks on Seaway System in coordination with Canadian officials. In 2022, more than 45,000 vessels operated on the inland and coastal waterway system, including cargo ships, tugs, and other vessel types.[138]

The Maritime Administration (MARAD) designates Marine Highway routes based on nominations from State and local entities. These 35 all-water routes provide alternatives to overburdened highways, easing congestion on landside freight corridors and addressing other logistical challenges. The routes include inland waterways, coastal passages, and connections serving Alaska, Puerto Rico, Hawaii, and American Samoa.

The inland waterways and Great Lakes primarily carry large volumes of bulk commodities such as coal, crude petroleum, grain, and farm inputs like fertilizer. These shipments move in large volumes over long distances and serve industries critical to the U.S. economy. Most inland waterway freight travels through the Mississippi River System to the Gulf Coast. More than 2.3 billion tons of commodities moved on our Nation's inland, Great Lakes, and Coastal Waterways in 2022.[139]

Waterborne freight is expected to grow modestly through 2050 (Table 9). Forecasted growth in waterway freight is driven by assumptions about continued bulk commodity demand, export activity, and the availability of navigable channels and port infrastructure. Forecasts reflect the mode's competitive advantage for high-volume, low-value commodities and international trade, with growth shaped by infrastructure reliability, water conditions, and global market access rather than shifts in domestic consumption patterns. The MTS is expected to continue carrying bulk movement of grain, fertilizers, petroleum products, aggregates, and iron ore, because it scales efficiently when road and rail capacity is tight.

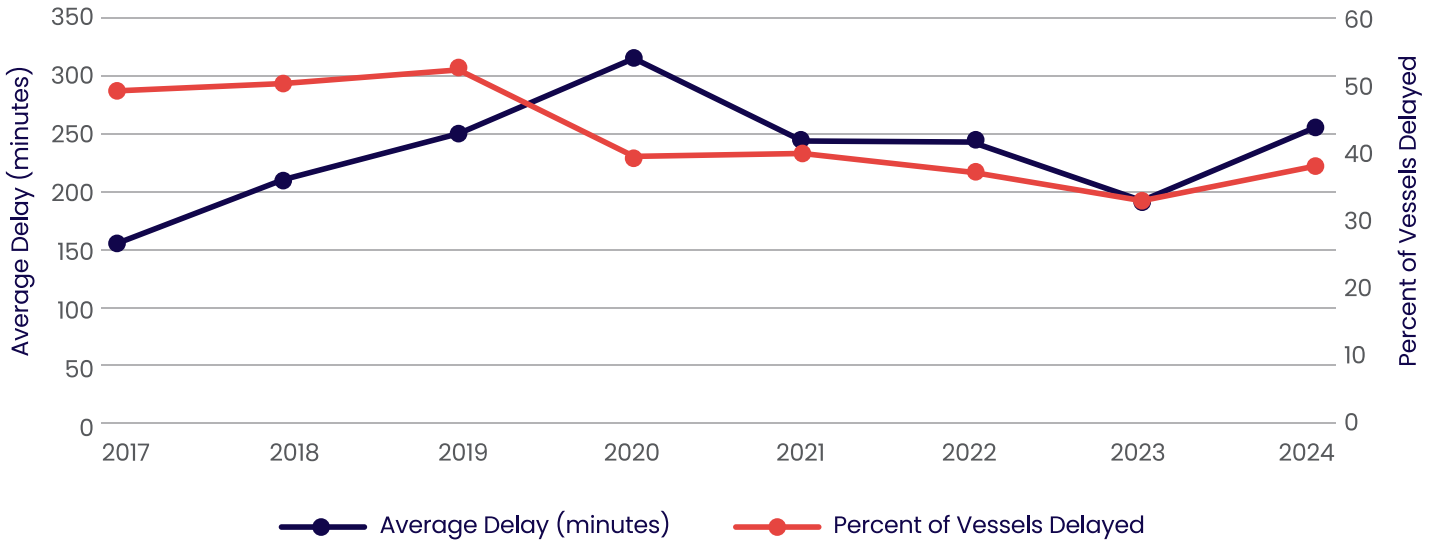
TABLE 9. FORECASTED WATERBORNE FREIGHT GROWTH BY TONNAGE AND VALUE, 2025-2050[140]

	TONNAGE (THOUSANDS)	CHANGE FROM 2025	DOLLARS (MILLIONS)	CHANGE FROM 2025
2025	819,772	-	266,429	-
2030	853,960	4%	279,043	5%
2035	883,175	8%	292,050	10%
2040	918,422	12%	306,848	15%
2045	969,875	18%	327,601	23%
2050	1,030,933	26%	352,805	32%

Draft NMFN Waterway Conditions

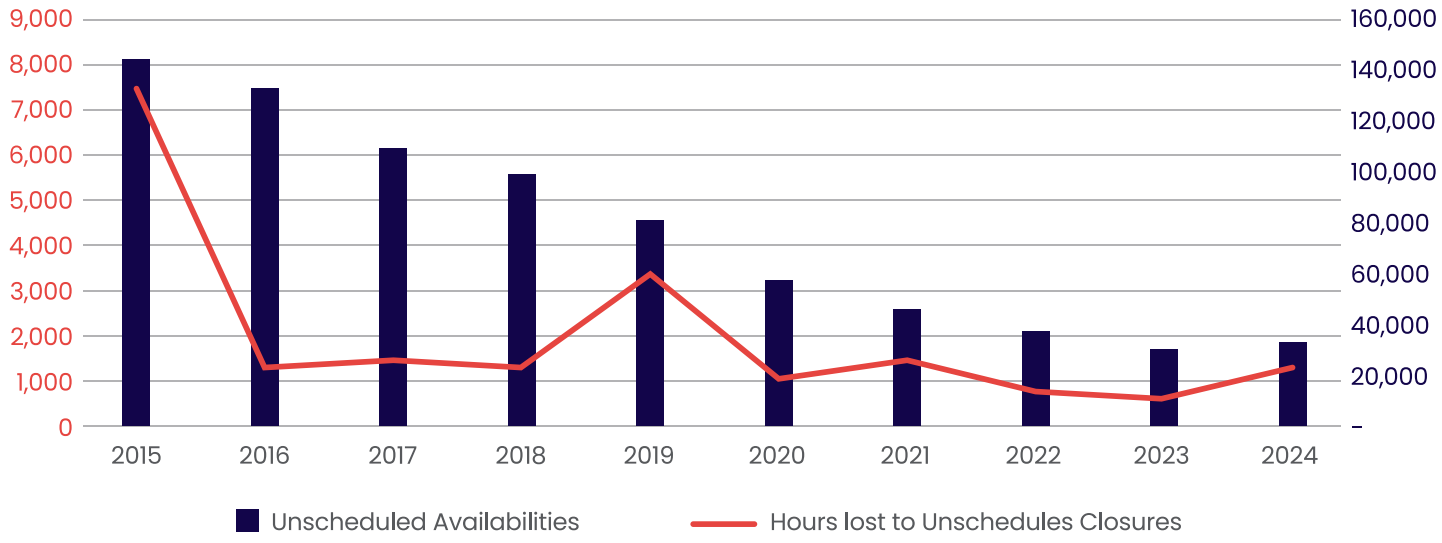
Waterway condition shapes barge and vessel efficiency, and national demand growth point to growing waterway volumes where channels and locks are reliable. Maintaining channel depth and width, having reliable locks and dams, and functioning aids to navigation allow planned drafts and transit times. As of 2024, 80 percent of all navigable lock and dam structures on the inland waterways system exceeds its designed life.[141] As locks age, they become increasingly unreliable, leading to more unplanned closures due to the need to repair facilities (Figure 17). USACE reported four lock failures in 2024 alone.[142] In cases where locks fail and there are not parallel locks available, waterborne freight would need to switch to alternative modes of travel. Just one 14-barge tow carries the equivalent of 1,050 trucks or 216 rail cars.[143]

Figure 17. Average Delay at Inland Waterway Lock[144]



The total number of unscheduled events at locks fell significantly between 2015 and 2024, but the total hours lost from unplanned outages remained somewhat flat across the same period (Figure 18). Beyond barge delays, extended closures at major locks can add over $1 billion in shipper costs annually and trigger large diversions to rail and truck, in some basins on the order of hundreds of thousands of truck trips and about 150 million truck miles.[145] Because a single lock often anchors long, concentrated corridors, disruptions can appear across multiple States and show up on the public roads that connect the waterway.

Figure 18. Inland Waterway Locks Unscheduled Unavailability Instances and Operation Hours Lost, 2015-2024[146]



Recent Public Sector Investments in Maritime Freight Infrastructure

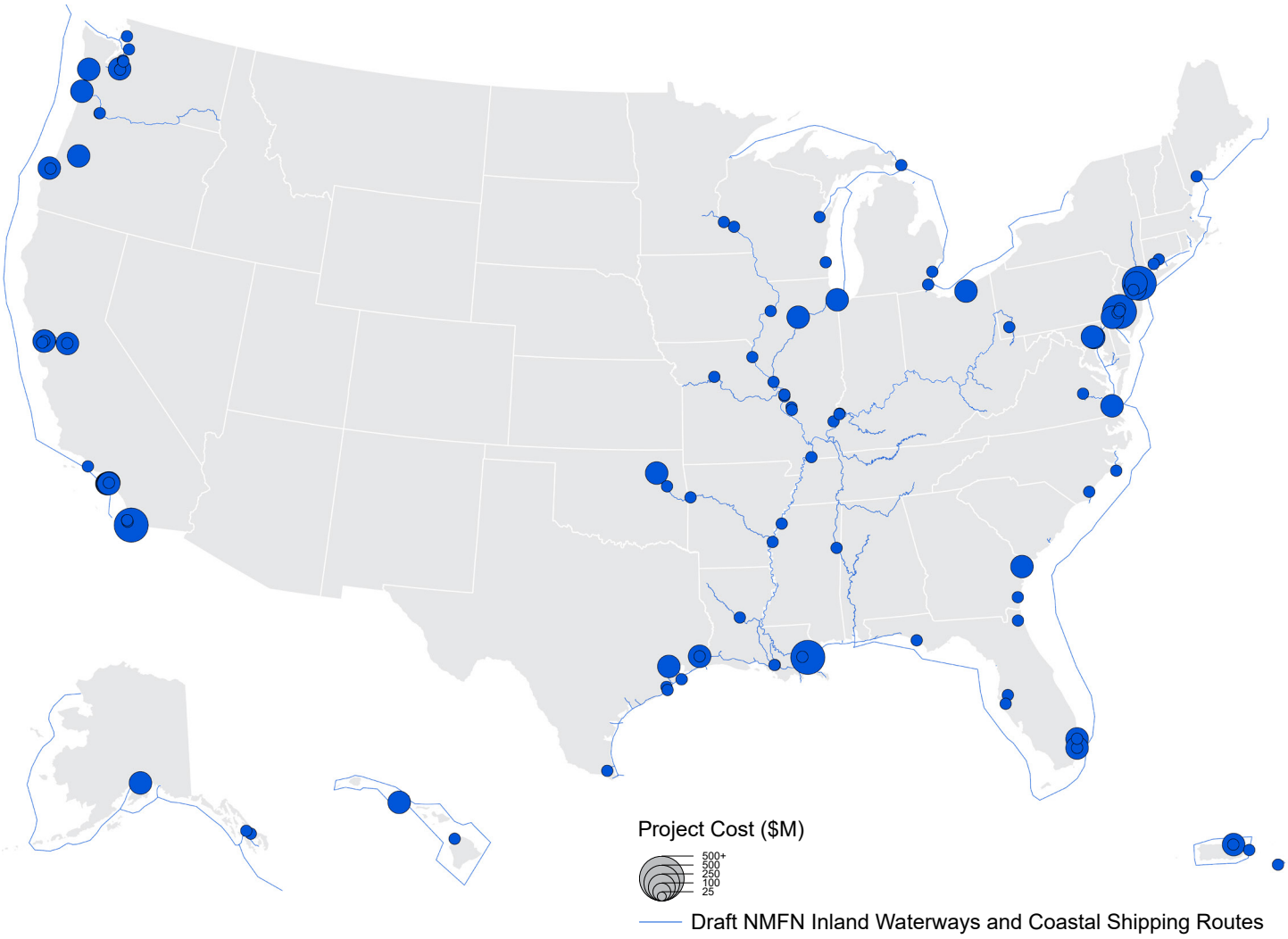
Since 2022, approximately $3.1 billion has been invested into the Draft NMFN waterway segments across 144 projects (Figure 19). About 90 percent of these funds were sourced from Federal competitive grants. While other public and private funding sources also contribute significantly to the MTS, they were not included in this specific financial analysis.

Approximately half of the analyzed funds were directed at capacity expansion projects, while another third supported state of good repair and maintenance work. Based on a sample of these projects, the investments returned an estimated $1.39 to $1.83 in economic benefits for each dollar invested. These returns result from shifting goods off congested highways and reducing overall transportation costs relative to competing modes.[147]

TABLE 10. SFP AND COMPETITIVE GRANT PROJECTS ON DRAFT NFMN MARITIME SEGMENTS (2022-2026)[148]

PROJECT CATEGORY*	MARITIME PROJECTS	SPENDING (BN)
Capacity expansion	59	$1.6
Maintenance/state of good repair	48	$0.9
Safety	-	-
Technology	35	$0.5
Other	2	$0.1
Total	144	$3.1

Figure 19. Waterborne Freight Investments on the Draft NMFN: National Highway Freight Program, Competitive Grant Programs, and Select State Funds (FY2022-2026)[149]



FUNDING FOR INLAND WATERWAYS

Funding for maintenance and expansion of America's navigable rivers comes from several sources. The Inland Waterways Trust Fund (IWTF) contributes 25 percent of funding for eligible construction and major rehabilitation projects and is funded by a per-gallon diesel tax on commercial barge fuel.[150] In fiscal year 2024, the IWTF generated about $123 million in diesel fees.[151]

Highly cost-effective transport via inland rivers keeps U.S. agricultural commodities competitive on the global market despite our higher labor and production costs relative to major competitors.[152] Even a very modest cost increase of a just a few percentage points could significantly reduce the Nation's ability to export American agriculture. A decrease in agricultural export volumes would subsequently reduce the collection of user fees and impact on the capacity to reinvest in the system, potentially leading to a cycle of disinvestment.

Safe Maritime Operations

Freight movement on the Nation's inland and coastal waterways is generally safe, but unique risks persist where commercial vessels interact with other users and infrastructure. Collisions between barges or tankers and recreational boats remain a recurring concern, particularly on shared channels and near popular marinas. Channel obstructions, outdated navigational aids and surveys, and limited visibility can increase the likelihood of incidents.

From 2020 to 2024, approximately 3,885 incidents involving public freight, freight ships, and freight barges were reported on U.S. waterways – an average of 777 incidents per year. These incidents include equipment failure, collisions, grounding, and crewmember injury, among others.[153] Nationally, recreational operators account for most boating incidents, with causal factors like operator inattention, improper lookout, and rule violations leading to most freight vessel-involved crashes.

In addition to vessel-to-vessel collision risks, bridge allisions occur when a vessel strikes a bridge. There is growing awareness and regulatory attention on this topic in the wake of the 2024 Dali cargo ship allision with the Francis Scott Key Bridge in Baltimore harbor. Preventing vessel-infrastructure strikes through increased communication among vessel operators and infrastructure owners and more frequent safety checks across infrastructure and its users can prevent harmful incidents that could result in injuries and cause delays. A study after the Dali incident found that several major U.S. bridges face a surprisingly high probability of a large vessel strikes.[154] The National Transportation Safety Board (NTSB) has urgently recommended that 30 public agencies owning 68 bridges across 19 States conduct vulnerability assessments to determine the risk of bridge collapse to help avoid an incident like the Key Bridge.[155]

SOURCE: https://en.wikipedia.org/wiki/Francis_Scott_Key_Bridge_collapse

CASE STUDY: DALI ALLISION AND THE FRANCIS SCOTT KEY BRIDGE COLLAPSE (BALTIMORE)

On March 26, 2024, the container ship Dali struck the Francis Scott Key Bridge, causing its collapse and blocking the Fort McHenry Federal Channel that serves the Port of Baltimore. The USACE led a unified salvage operation and restored the channel to full width and depth 76 days after the incident.[156]

Baltimore is a nationally significant roll-on/roll-off and auto gateway. In 2023, it handled 847,000 cars and light trucks and set a record for farm and construction machinery tonnage. Total general cargo reached about 11.7 million tons, valued at roughly $81 billion.[157] The Francis Scott Key Bridge carried about 34,000 vehicles per day in 2023. Its loss forced traffic onto the two Baltimore harbor tunnels, which already restrict certain hazardous materials movements.[158]

The immediate economic effects were measurable. Local losses from the port closure were roughly $15 million per day while deep-draft access was limited. Vessel calls began diverting to nearby East Coast ports with regional gateways that could absorb most container volumes, though with added costs, bunching, and longer drays.[159] For cargo where Baltimore has a strong niche such as autos, heavy equipment, and certain bulk commodities, carriers and shippers arranged alternate routings and processing capacity at other Gulf and Atlantic ports until the channel reopened.[160]

For the freight system, the incident functioned like a temporary closure of a high-criticality node. Deep-draft movements paused, rail and trucking patterns shifted to support diversions, and approach roads and terminals in adjacent ports experienced higher peaks. Schedule recovery and equipment repositioning extended impacts well beyond the reopening date, consistent with past port disruptions.[161]

In March 2025, the NTSB “urgently” recommended that 30 owners of 68 bridges similar to the Francis Scott Key Bridge conduct vulnerability assessments to determine the risk of bridge collapse from a vessel hitting it using AASHTO’s Method II calculation and take immediate risk mitigation actions.[162]

Flood and Drought Impacts of Waterway Navigability

Inland waterway freight in the United States faces significant risks from floods, low water, and seasonal ice. These conditions can shut down channels, restrict barge drafts, and disrupt schedules. While floods have historically been the dominant hazard for systemwide closures, drought and low water are now a rapidly growing source of navigation risk, especially for agricultural exports and bulk commodity supply chains that depend on the Mississippi River system.

During low-water events, barges must "light load" to avoid grounding. A one-foot reduction in draft forces vessel operators to lighten loads by approximately 200 tons per barge. For example, during the record drought of 2022, draft restrictions as low as 9.5 feet reduced barge capacity by up to 27 percent. Moving the same amount of tonnage under these conditions requires more barges and smaller tow sizes, which creates additional traffic on the water and worsens congestion issues often further complicated by unscheduled events at locks.[163]

While the U.S. Army Corps of Engineers (USACE) is primarily charged with maintaining waterway navigability, other public agencies can reduce navigation risks by directing funding toward lock, port, and connector projects. These investments keep key river segments usable across a wider range of water conditions and protect nationally critical nodes. Strengthening multimodal backup options by improving rail and highway access to river ports also ensures that shippers have reliable alternatives when water conditions limit barge service. These resilience and connectivity efforts are supported by Federal competitive grant programs, such as the Port Infrastructure Development Program (PIDP) and other multimodal programs.

SOURCE: https://www.porttechnology.org/news/port-of-long-beach-records-busiest-september-ever/

CASE STUDY: DROUGHT CONDITIONS INCREASE COST AND CONGESTION ON THE MULTIMODAL FREIGHT NETWORK

Since late 2022, low water has repeatedly constrained two of the Western Hemisphere's most important freight corridors. On the Mississippi River System, drought conditions in fall 2022 and again in mid-2023 lowered river stages, triggering tug and barge size restrictions, rolling channel closures for dredging, and causing multi-day delays.[164] In 2023, the lowest water levels coincided with peak shipping season for corn and soybeans, the Nation's largest export crops, reducing access to key ports such as New Orleans, which exports nearly 40 percent of U.S. grains and nearly 50 percent of U.S. soybeans.[165] The U.S. Department of Agriculture (USDA) reports draft reductions of 5 to 15 percent across key reaches, tow-size cuts of 14 to 25 percent on the Lower Mississippi, and 24 to 48-hour transit delays to the Gulf during 2023; spot barge rates in late August–September 2023 spiked to more than 100 percent above the recent three-year average as capacity tightened.[166] Higher barge costs made grain more expensive locally.[167] As a result, exporters temporarily stopped using Louisiana ports and sent grain through East and West Coasts instead.[168]

On the Panama Canal, a 2023 freshwater shortfall forced the Canal Authority to cap daily transits and tighten draft limits, reducing throughput from normal levels and lengthening queues.[169] The Authority began lifting constraints through 2024 as lake levels improved (moving to 32 daily transits and raising Neopanamax draft to 45 feet in June, and 49 feet draft and total daily transits to 35 by August),[170] and by early 2025 many restrictions had eased, with reported daily transits around 33–36 depending on maintenance and demand.

These constraints ripple far beyond the affected waterways. When river capacity falls, bulk flows (grain, fertilizer, aggregates) shift to rail and truck, raising volumes on parallel corridors and stressing first- and last-mile connectors and staging areas. When Canal slots tighten, carriers re-route via the Suez or around capes or shift boxes to West Coast gateways with inland rail, changing inland train and truck patterns. Low-water restrictions have driven higher barge rates and added days of transit time; ocean carriers have faced booking uncertainty and schedule variability at the Canal (and, during 2023–24, paired constraints with other global disruptions).

The higher and more volatile transportation costs encourage shippers to add stockpile inventory and add slack to transportation schedules, which can shift warehouse and freight demand inland and change truck and rail flows for weeks after waterway constraints ease.

October 9, 2023: An aerial view shows low water levels on the Mississippi River in Belle Chasse, Louisiana, revealing pipes that are typically underwater. The low water levels caused barges and ships to run aground along parts of the Mississippi River in October and created saltwater intrusion concerns in southern Louisiana. Photo credit: Justin Sullivan/Getty Images.

Automation and Autonomy in Maritime Transportation

Automation-enabling technology is increasingly available for both ships and ports. Port automation has gradually increased over the past 20 years, and all 10 of the largest U.S. container ports use at least one type of automated technology in cargo operations.[171] Automated cargo handling equipment can include automated gantry cranes and straddle carries which can move containers to the yard and stack them on trucks or trains with little to no human intervention. Process automation systems can include sensors at gates to automatically track equipment, vehicles, and containers entering and exiting the port, digital twins to virtually test new processes without impacting port operations, and advanced optimization systems.[172] While port automation can offer some operational benefits, deployment of automated technology must be evaluated carefully considering potential cybersecurity vulnerabilities. Continuing to invest in research and development for maritime facilities, while simultaneously investing in maritime workers, will help to further advance innovative automation techniques.

Ships themselves may include some automated processes, but fully autonomous vessels are uncommon. At the time of writing, the International Maritime Organization (IMO) is finalizing a Maritime Autonomous Surface Ships (MASS) standard, which is highlighted in the White House's Maritime Action Plan (MAP).[173] MASS recommends that all autonomous ships have a human safety operator either on board or remotely monitoring vessels.[174] Autonomous commercial vessels could perform short cargo hauls in the MTS or be equipped to enter and leave ports,[175] but this developing technology will require collaboration with the IMO and other Federal agencies such as the U.S. Coast Guard.

DIGITALIZATION AND ARTIFICIAL INTELLIGENCE

Port community systems and integrated data hubs are important to consider as digitalization matures. Globally, many major ports operate centralized platforms that allow carriers, shippers, terminals, and regulators to share data in real time. In the U.S., adoption is more uneven. A 2024 U.S. Government Accountability Office (GAO) review found that while all 10 of the largest U.S. container ports have implemented some form of digital gate or cargo-tracking technology, only a few have advanced to integrated community systems.[176] Wider adoption could help reduce congestion, improve reliability, and strengthen resilience by providing greater visibility across supply chains.

Technologies like remote-operated cranes, automated stacking systems, and equipment guided by sensors and software are also changing how physical work happens on the dock. An emerging wave of innovation uses AI and digital twins to simulate and manage operations in real time. The Port of Corpus Christi's Overall Port Tactical Information Computer System (OPTICS), for example, is an active 3D digital twin that combines on dock facility information, geographic information systems, and live sensor and vessel data to provide a real-time operational picture for port staff and public-safety partners.[177] Together, these tools are shifting port jobs toward more data-driven planning, remote operations, and systems maintenance while giving carriers and shippers earlier, more reliable signals about when cargo will be available and how dependably it can move inland.

USDOT supports the continued innovation in maritime transportation through the recently established United States Center for Maritime Innovation (USCMI). USCMI is a federally funded institute that supports the study, research, development, assessment, and deployment of emerging marine technologies and practices related to the MTS.

Investment in the Maritime Freight Workforce

Revitalizing the maritime industry requires investment and support for existing and new maritime workforce development programs. Existing programs and rapid training models must be scaled to meet long-term skill demand. The MAP lists several recommended policy actions for modernizing, expanding, and enhancing maritime industry training needs. These actions include addressing urgent deferred maintenance issues at the U.S. Merchant Marine Academy, modernizing the Merchant Mariner Credentialing Program, and enhancing facilities to accommodate future growth.

The MAP also identifies the need for developing trade skills including welding, computer numerical control machining, non-destructive testing, and additive manufacturing through developing regional talent pipelines, community college and apprenticeship partnerships, and military-to-mariner career transitions. In addition to growing the workforce, MAP calls for better data management to organize and activate the nation's existing mariners and reservists. It encourages the Federal government to incorporate training and workforce incentives into existing contracts and grants, and create new training and apprenticeship grants, tax incentives and funding partnerships to build a pipeline for these critical skills.

REVITALIZING SHIPBUILDING SKILLS

MARAD funds the Small Shipyard Grant Program to support advanced training, workforce development, and new technologies that strengthen U.S. shipbuilding and repair capabilities. The ship building and repairing industry employs more than 100,000 workers, and support maritime operations that move freight efficiently and grow the U.S. economy. Since 2008, this grant program has provided $320.5 million to qualified maritime facilities. Small Shipyard grants funds can be used to build capital projects and to train mariners and workers. Building a skilled workforce to build and repair ships benefits the U.S. labor market and improves efficiency and productivity for the maritime and multimodal freight network. Strengthening the U.S. shipbuilding industry expands local employment, builds the domestic economy, and supports competition in the global marketplace.

AVIATION

KEY INSIGHTS AND MODAL CHALLENGES

- Air cargo supports high-value and time-sensitive supply chains.
- Cargo activity is concentrated at about a dozen national hub airports.
- Landside access and roadway congestion constrain airport freight operations.
- Air cargo performance depends heavily on reliable first- and last-mile highway connectivity.

Air transport plays a specialized role in the freight system, moving low-tonnage, high-value products that require rapid delivery.[178] Typical products shipped by air include electronics, precision instruments, pharmaceuticals, medical equipment, and time-sensitive packages and letters. Air cargo moves both on dedicated freight aircraft and in the cargo bellies of passenger airplanes. Of all freight modes, air cargo tends to have the most overlap with passenger travel, as vehicles often blend freight and passenger transportation.

In 2024, three airports—Anchorage, Memphis, and Louisville—handled nearly one third of the Nation's total landed weight for all-cargo operations. [179] Memphis and Louisville serve as major hubs for FedEx and United Parcel Service, respectively, while Anchorage operates as a key refueling point for international trade with Asia. Since 2000, landed weights have grown by 46.1 percent at the top 25 airports and by 26.5 percent at all cargo airports nationwide.

Air cargo demand reached an all-time high in 2024, and long-run outlooks anticipate continued expansion (Table 11). Projections assume continued growth in high-value, time-sensitive shipments tied to manufacturing, e-commerce, and global supply chains. Forecasts reflect air freight's specialized role within the freight system, with volumes driven by economic growth, product value density, and speed requirements rather than broad changes in freight tonnage.

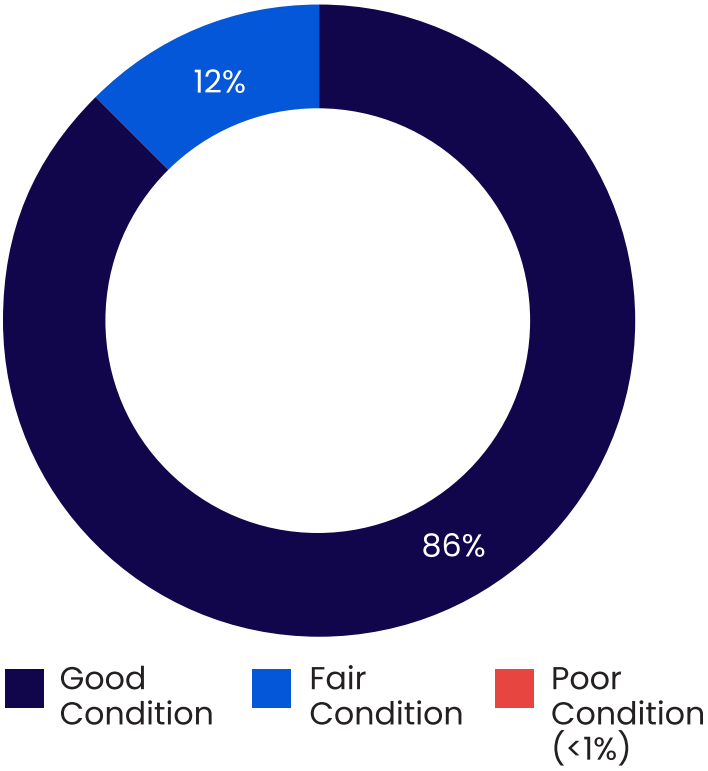
TABLE 11. FORECASTED AIR FREIGHT GROWTH BY TONNAGE AND VALUE, 2025-2050 (INCLUDE TRUCK-AIR)[180]

	TONNAGE (THOUSANDS)	CHANGE FROM 2025	DOLLARS (MILLIONS)	CHANGE FROM 2025
2025	7,029	-	609,550	-
2030	7,828	11%	693,690	14%
2035	8,663	23%	784,080	29%
2040	9,713	38%	902,724	48%
2045	10,984	56%	1,046,191	72%
2050	12,462	77%	1,213,257	99%

Airfield Conditions

Draft NMFN airport runways are in very good condition as compared to all national airports. About 86 percent of runway pavements at commercial, reliever, and select general aviation facilities on the Draft NMFN were in good condition in 2025 (Figure 20), while fewer than 1 percent of runway pavement was rated "poor condition." Systemwide, only about 79 percent of runways were rated in 'good' condition in 2024, with about 2 percent of pavements in "poor condition." Maintaining airport infrastructure and ensuring assets are kept in a state of good repair ensures that freight operations can continue to operate efficiently.

Figure 20. Airport Runway Pavement Conditions on the Draft NMFN[181]



Landside Infrastructure Constraints & Investment Needs

The most significant bottlenecks in air cargo occur at loading and unloading points, in storage facilities, and during intermodal transfers to other freight modes. At least eight SFPs identified critical air cargo challenges, including aging on-airport warehouses, insufficient truck parking near airports, and landside road congestion. These plans emphasized that infrastructure, much of which was built decades ago, cannot accommodate modern freight volumes or larger truck configurations, resulting in significant operational bottlenecks.[182]

These physical constraints are often compounded by operational challenges. For instance, at curbside truck transfers and aircraft gate operations, throughput is constrained in part by uneven adoption of electronic documentation and automated load-status messaging. Security software increasingly requires access to high-quality pre-departure data integrated into ground handling operations, and incomplete or inconsistent data exchange can delay and disrupt freight flows.[183],[184] Delays and inefficiencies in ground movements reduce air cargo reliability, as shipments must meet strict flight cutoff times to preserve its value as a time-sensitive freight mode.

The Air Forwarders' Association expects continued growth in air cargo, driven not only by sustained demand for e-commerce but also increases in just-in-time manufacturing, international trade, and specialized cold chain shipments.[185] To meet this expansion, investment will need to focus on increasing airside-to-landside capacity[186], upgrading NHS connectors between cargo areas and highways[187], and implementing standardized, interoperable digital infrastructure. Physical enhancements could include flexible freighter parking aprons, cargo taxiway upgrades, and truck-optimized cargo facilities. Digital improvements might involve common data standards, interoperable appointment systems, and live shipment status tracking to reduce dwell time.

Through the Federal Aviation Administration's (FAA) Airport Improvement Program, USDOT can fund cargo aprons, taxiways, and eligible on-airport projects. Competitive grants like the Nationally Significant Multimodal Freight and Highway Projects program (INFRA), National Infrastructure Project Assistance program (Mega), and Better Utilizing Investments to Leverage Development (BUILD) program can target the last-mile road connectors that enhance overall reliability of the national air cargo system.

BRINGING AIR TRAFFIC CONTROL INTO THE 21ST CENTURY

USDOT is leading a comprehensive, multi-year upgrade of the Nation's aging air traffic control system, with most improvements expected before the end of 2028. Through this initiative, updates and modernizations to communications equipment, radar, and air traffic control facilities will improve air safety and reduce flight delays. The upgraded systems will impact cargo and passenger air operations alike and help to improve the reliability of the multimodal freight systems' most time-sensitive cargo.

Safe Air Transport Operations

Air cargo operations face safety challenges on the ground. Stakeholders report that aging warehouses were more likely to have narrow spaces, blocked or obstructed doors, and low ceilings which impede the ability to safely and efficiently move and store cargo. Airfield roadways built for 40-foot tractor trailers create tight-turning and unsafe maneuvers for today's 53-foot trucks. These constraints, especially during night operations, elevate the risk of collisions between trucks and ground service equipment and increase hazards for workers.[188]

As cargo volumes grow, particularly in high-value, time-sensitive segments, pressure on ground facilities is intensifying. Addressing these risks extends beyond physical design to operational coordination. USDOT can help by convening industry stakeholders to share safety concerns directly with airport operators, closing data gaps flagged by GAO[189] and aligning digital documentation standards with security protocols such as U.S. Customs and Border Patrol's Air Cargo Advance Screening.

Human factors also play a significant role in safe operations. FAA's Fatigue Working Group, formed to advance research on fatigue in aviation settings, identified priority needs in 2021, including: expanded fatigue data for cargo and shorthaul flight crews and unmanned aircraft systems; better fatigue management strategies for routine operations; understanding fatigue impacts from increased automation; ongoing education and awareness programs; and evaluating controlled rest policies. Safe air transport needs a holistic approach, incorporating facility design, traffic management, data coordination, and human performance.[190]

NEW AND EMERGING AVIATION

Unmanned aircraft systems (UAS) such as drones are beginning to play a role in freight, from small package delivery to pilot programs for short-haul cargo. These technologies could reduce highway congestion and expand service in rural areas, but they also introduce new safety and security considerations. FAA is working to integrate drones safely into the National Airspace[191] through efforts such as the BEYOND program.[192] Recent FAA rulemakings also aim to normalize beyond visual line-of-sight operations,[193] which would enable more routine package, food, and medical deliveries by air.[194] Longer-term, advanced air mobility (AAM) concepts,[195] including electric vertical takeoff and landing aircraft, could also expand options for high-value, short-haul freight.[196]

Public agencies will need to balance innovation with oversight to ensure AAM operations are safe, traceable, and well-coordinated with existing airport and community systems. To support integration of AAM technologies, USDOT published the Advanced Air Mobility National Strategy in 2025, which addresses AAM cargo planning, workforce, and infrastructure in further detail.[197] The Strategy defines a series of actions for Federal agencies in collaboration with other public agencies and private entities.

Airports are testing Autonomous Ground Vehicle Systems (AGVS) such as maintenance equipment and employee shuttles. Current guidance recommends separate areas for AGVS testing, demonstration, and moving or loading and unloading aircrafts.[198] As AGVS technology advances, autonomous ground vehicles could support efficient operations of cargo and passenger flights.

AVIATION WORKFORCE DEVELOPMENT

Current Federal workforce initiatives to promote careers in the aviation section include an Enhanced Air Traffic Collegiate Training Initiative Program (AT-CTI) and modernized Tower Simulation Systems for air traffic controller training.

The AT-CTI program has onboarded nine additional schools to provide the same curriculum and advanced training technology that is offered at the FAA's Air Traffic Controller Academy in Oklahoma City. Initiatives to boost the controller workforce were also offered including financial incentives for graduates and new hires to complete initial training milestones, increasing the number of instructors, establishing a tutoring lab, and streamlining hiring for controllers with previous experience. USDOT hired 2,026 new controllers in fiscal year 2025, exceeding the goal of hiring 2,000 new controllers.[199]

PIPELINES

KEY INSIGHTS AND MODAL CHALLENGES

- Pipelines move large energy and industrial volumes with high efficiency and geographic rigidity.
- Public sector roles in pipelines include improving permitting processes and enforcing rigid safety standards.

Pipelines serve as the primary mode for transporting liquid and gas energy resources, moving raw materials from production areas to refineries and petrochemical plants. They also deliver finished products to terminals, power plants, and other end users. In 2022, the U.S. system included 300,851 miles of gas transmission lines and 228,553 miles of pipelines for crude oil, refined oil products, and natural gas liquids.[200]

Pipeline demand for both liquid and gas products is expected to expand as America unleashes its energy potential in the coming years (Table 12). Expanded production in shale basins and at export and refinery locations, primarily along the Gulf Coast, are expected to drive growth. North American liquefied natural gas export capacity is projected to double by 2028,[201] with new fields and ongoing shale output bringing higher volumes of crude and natural gas liquids to Gulf refineries and docks. These forecasts reflect the capital-intensive and location-fixed nature of pipeline infrastructure, with growth tied to long-term energy demand and network build-out rather than short-term market fluctuations.

Pipeline Investments

Since 2020, U.S. pipeline investment has focused on expanding throughput, while the total hazardous-liquid and gas transmission mileage has stayed broadly level.[202, 203] As of 2025, PHMSA only funds one public pipeline infrastructure program, the Natural Gas Distribution Infrastructure Safety and Modernization (NGDISM) Grant Program.[204] Public and private investment together targeted debottlenecking and compression raised flow on existing corridors. In 2024, natural-gas projects added ~6.5 Bcf/d of capacity from producing basins toward demand centers in the Mid-Atlantic and Gulf markets.[205]

Over that same time span, cross-border links with Canadian gas imports underpinned U.S. winter reliability. Recent compressor-based upgrades increased deliverability into the Pacific Northwest. Pipeline efficiency depends on reliable connections to public infrastructure. Currently, major constraints exist on the 'last-mile' roadways serving these facilities, where designated freight connectors frequently underperform compared to the rest of the National Highway System.

Safe Operations of Transmission Pipelines

Pipelines are generally the safest and most efficient way to move liquid and gaseous energy commodities, but incidents still occur each year with serious consequences. From 2020 through 2024, an annual average of 413 pipeline incidents occurred nationwide on hazardous liquid or gas transmission pipeline systems. These incidents caused annual averages of 2.6 deaths, 6.4 injuries, and $339 million in damages, which represent significant improvements from the 20-year historical trend.[206] Leading causes include corrosion, third party damage, control room management failures, incorrect operation, and equipment failure.[207] High-consequence areas such as densely populated or environmentally sensitive zones account for a substantial share of safety risk, guiding where inspections, maintenance, and enforcement efforts are most focused.

TABLE 12. FORECASTED PIPELINE GROWTH BY TONNAGE AND VALUE, 2025-2050[208]

	TONNAGE (THOUSANDS)	CHANGE FROM 2025	DOLLARS (MILLIONS)	CHANGE FROM 2025
2025	4,343,452	-	1,188,696	-
2030	4,512,118	4%	1,221,922	3%
2035	4,609,486	6%	1,221,277	3%
2040	4,686,498	8%	1,211,845	2%
2045	4,824,878	11%	1,218,128	2%
2050	5,007,606	15%	1,238,453	4%

CASE STUDY: COLONIAL PIPELINE: CYBER RISKS TO PHYSICAL INFRASTRUCTURE

On May 7, 2021, a ransomware attack led Colonial Pipeline to shut down its refined-products pipeline system as a precaution.[209] Colonial is a ~5,500-mile network that moves about 2.5 million barrels per day—equivalent to more than 100 million gallons—of gasoline, diesel, and jet fuel from the U.S. Gulf Coast to the Southeast and Mid-Atlantic, supplying roughly 40–45 percent of East Coast fuel demand.[210] The company began a controlled restart on May 12 and reported normal operations by May 15.[211]

The shutdown produced immediate market and operational effects across multiple States. Retail gasoline prices rose and availability tightened in parts of the Southeast and Mid-Atlantic. The U.S. Energy Information Agency (EIA) reported that national average price crossed $3.00 per gallon on May 17 for the first time since 2014.[212] Federal agencies activated contingency measures: FMCSA issued a regional emergency declaration providing hours-of-service relief for fuel haulers; the U.S. Environmental Protection Agency (EPA) granted temporary fuel waivers; and the U.S. Department of Homeland Security (DHS) approved targeted Jones Act waivers to enable movements by tanker between U.S. ports while pipeline service recovered.[213] The Department of Energy (DOE) supported coordination across federal, state, and industry partners, providing situational awareness and detailed analysis of impacts, and moved fuel supplies to impacted areas to mitigate impacts to consumers.

During the state of emergency that followed, Federal and State agencies came together to address the shortage. USDOT supported limited manual pipeline operations and enabled more fuel deliveries at Eastern Seaboard ports and on Interstate and Federal Highways in 10 States. After the emergency passed, the Federal Government implemented new and proactive cybersecurity plans. The Cybersecurity and Infrastructure Security Agency set up the public-private Joint Cyber Defense Collaborative and the DHS-Federal Bureau of Investigations (FBI) Joint Ransomware Task Force. Executive Order 14028, Improving the Nation's Cybersecurity, along with the Cyber Incident Reporting for Critical Infrastructure Act of 2022 and the Transportation Security Agency (TSA)/DHS Cybersecurity Directive, all followed the Colonial Pipeline incident. These new laws and directives created ransomware reporting requirements and set performance-based standards for preventing cyber incidents against critical infrastructure.

The incident showed how a digital event can trigger systemwide logistics impacts even without physical damage. A single operator's outage shifted movements to truck, barge, and limited rail links, concentrated queues at marine and terminal nodes, and required rapid coordination on staging, extended gate hours, and enforcement support on approach roads.

INTERMODAL FREIGHT & TRADE GATEWAYS

KEY INSIGHTS AND MODAL CHALLENGES

- Intermodal facilities concentrate freight flows across multiple transportation modes.
- Changes in warehousing siting and operations are influencing how and when freight moves at major trade gateways.
- Trade patterns and industrial investments are shifting demand across ports and gateways.
- Data sharing and operational coordination are as critical as physical capacity.

Intermodal freight refers to shipments that transfer between transportation modes, most often among ships, trains, and trucks, using standardized containers. Containerization has enabled the rapid growth of international trade in the last several decades and has reshaped domestic freight distribution patterns. At high-volume ports, on-dock rail facilities allow containers to be transferred directly to trains, minimizing truck drayage and improving efficiency. Since 2000, rail intermodal volumes have grown by 52 percent, and in 2022 U.S. railroads moved nearly 13 million intermodal units, accounting for roughly one-quarter of all rail carloads.[214]

Increasingly, inland ports and intermodal logistics hubs have emerged to reduce congestion at coastal gateways and extend the reach of the intermodal system further into the U.S. interior.[215] They create value by shortening truck drayage, accelerating intermodal transfers, and increasing routing options.

Intermodal growth through 2045 is expected to be driven by increasing volumes of containerized trade and technology and automation improvements at key nodes throughout the supply chain, such as truck appointment systems, that are expected to shorten dwell times (Table 13). Forecasts reflect intermodal's role in connecting ports, rail hubs, and major consumption centers, with growth driven by trade flows, network integration, and shipper logistics strategies rather than a wholesale shift away from single-mode freight. Continued development of inland port facilities in the Southeast and Southwest will also migrate distribution volumes further inland.

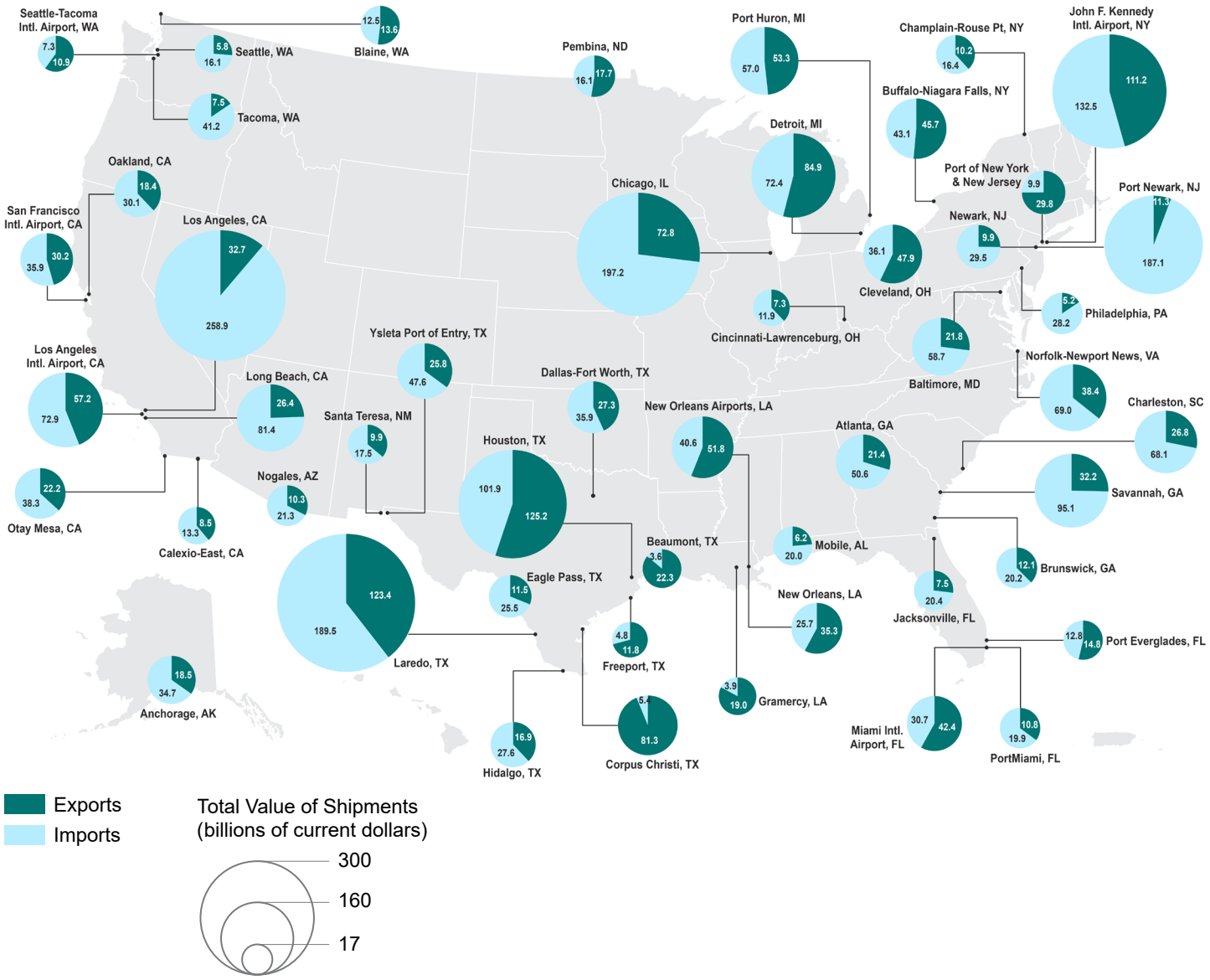
TRADE GATEWAYS

The United States maintains 328 ports of entry[216] for international cargo, including airports, land border crossings, and seaports. The top 50 ports of entry handled nearly all the Nation's trade, with the remaining ports of entry supporting smaller, specialized trade (Figure 21). The top 50 gateways include 14 land border crossings with Canada and Mexico, 13 airports, and 22 maritime ports. Land border crossings are the entry and exit points for trucks and trains moving commodities between the United States, Mexico, and Canada. The largest border crossings for freight traffic are in Laredo, Texas; Detroit and Port Huron, Michigan; Buffalo, New York, the Ysleta Port of Entry (El Paso, Texas); and Otay Mesa, California, with Laredo consistently ranked the busiest land gateway. In 2023, it processed $312.9 billion in freight, primarily by truck and rail. Top commodities exporting through Laredo included vehicles, computer-related machinery, and electrical machinery while salt, sulfur, and plaster and cement represented the top imports.[217]

TABLE 13. FORECASTED INTERMODAL GROWTH BY TONNAGE AND VALUE, 2025-2050 ("MULTIPLE MODES & MAIL")[218]

	TONNAGE (THOUSANDS)	CHANGE FROM 2025	DOLLARS (MILLIONS)	CHANGE FROM 2025
2025	655,405	-	2,716,718	-
2030	702,085	7%	3,073,714	13%
2035	748,648	14%	3,408,208	25%
2040	802,359	22%	3,808,682	40%
2045	868,208	32%	4,284,617	58%
2050	942,528	44%	4,780,873	76%

Figure 21. Top 50 International Trade Gateways by Value of Shipments (Billions of $)[219]



Each port handles a unique mix of commodities. Gulf Coast ports handle significant volumes of bulk commodities such as fuels and grain in addition to containers. The Ports of Houston, South Louisiana, and Corpus Christi typically move more total tonnage than any other U.S. ports, handling significant quantities of bulk and liquid bulk commodities. Containerized cargo flows primarily through ports on the Pacific and Atlantic coasts. In 2022, the top 25 container ports processed 44 million twenty-foot equivalent (TEU) units, with more than half moving through New York, Los Angeles, Long Beach, and Savannah.[220]

Trade-Supporting Infrastructure Investments

Recent Federal freight investments near ports of entry appear weighted toward building import capacity. A USDOT review of announced competitive grant awards and State-programmed NHFP funds indicates that about two-thirds of approximately the $3.46 billion of programmed investments near ports in FY 2022–2026 supports import-oriented trade gateways (roughly $2.30 billion). The remaining about one-third (roughly $1.16 billion) supported export-oriented gateways. As supply chains shift and domestic production increases, USDOT will prioritize infrastructure investment in projects that support increases in measurable exports volumes.

Intermodal Connectivity

Nearly all shipments move across multiple modes. Intermodal connectivity describes how well freight shifts between modes like truck to rail, truck to port or barge, and truck to air cargo. The infrastructure that facilitates these handoffs plays an outsized role in the overall freight network, and includes both the physical network (connectors, clearances, lanes, ramps, sidings, berths, docks) and the terminal processes (gates, appointments, yard moves, equipment availability) that make transfers work on time.

FHWA has identified 1,222 miles of designated intermodal connectors on the NHS.[221] Even short first- and last-mile roadway segments near terminals can drive a large share of total delay and cost. When connectors are in good condition and terminals run predictable processes, loads can transfer to and from trucks and cargo is better able to meet downstream schedules. When these elements break down, delays build quickly across routes, appointments, and interchange windows.

Warehousing & Intermodal Hub Innovation

Digitization in warehouses is reshaping how freight moves through intermodal nodes by tightly coordinating inbound and outbound flows across modes. Modern warehouse management, dock-scheduling, and yard-management systems sync container, trailer, and railcar arrivals with outbound truck and rail departures in real time. Tools such as digital twins let operators redesign freight and dock flows, gaining 20–25 percent increases in efficiency and up to 30 percent lower operating costs without adding buildings.[222] AI "control towers" are increasingly used to optimize dock assignments, labor, and equipment for warehouse freight flows.[223] Recent studies have found digitally integrated warehousing and terminals cut delays at port, air, and multimodal hubs and lower per-unit freight costs, effectively adding intermodal capacity to the freight network without equivalent physical expansion.[224]

Shared warehousing is another model gaining traction, particularly in high-cost metro areas where industrial land is scarce. By pooling warehouse space or staging areas, companies reduce fixed costs and increase flexibility.[225] Meanwhile, USDOT's SMART grants fund pilots for micro-distribution hubs that allow multiple carriers or delivery services to consolidate shipments closer to customers, often paired with smaller vehicles like cargo bikes. While still limited in scale in the U.S., these models show potential for broader adoption.

HOW CAN THE PUBLIC SECTOR IMPROVE MULTIMODAL CONNECTIVITY ON THE DRAFT NMFN?

Airport landside cargo access and screening throughput (air-warehouse-truck)

Establish dedicated truck access and sufficient overall capacity connecting air staging areas to landside facilities and warehousing, reconfigure curbs and dock doors, and scale security screening to match scheduled flight peaks. Airports and local agencies control roadway access, curb space, and facility permits. TSA/CBP coordination is often needed for screening operations and hours, while cargo handlers and integrators manage dock and warehouse processes.

NHS Freight Connector upgrades (truck-rail, truck-port, truck-air, truck-pipeline)

Resurface worn approaches, add lane/shoulder width where trucks need it, fix tight turning radii, improve grades, and build direct ramps to high-capacity roads. Agencies control design standards, project bundling, and construction staging to match terminal schedules. Coordinate with terminal operators and local jurisdictions on work windows, detours, and wayfinding so gate operations stay predictable during construction.

Terminal gate and yard flow improvements (air, maritime port, and intermodal facilities)

Investments that pair capital such as automated identification and data collection, scale lanes, additional processing lanes, and staging areas with operational changes like appointment systems, pre-advice/electronic data interchanges, and extended gate hours can shorten truck turn times and reduce street queues. Public roles include funding incentives, ensuring or expanding curb and access management, and connector operations (signals, truck routes).

Rail approaches and yard capacity aligned to planned trains (truck-rail)

Extend sidings and receiving tracks, upgrade turnouts and signals, and remove approach constraints so trains meet target lengths and hit interchange windows. Public agencies can fund grade separations, approaches on public right-of-way, and safety/interface elements. Railroads control track standards, dispatch, and detailed designs.

Crossing treatments near terminals (road–rail conflicts)

Use signal preemption, queue jump lanes, access roads, and, when justified, grade separations to keep trucks from queuing at at-grade crossings that serve terminals. State and local owners control roadway treatments, design, and right-of-way. Railroads coordinate on timing, signal controls, and any track changes. Prioritize coordination with railroads on locations where truck queues routinely spill back to gates or onto high-speed corridors.

On-dock rail enablement and yard throat fixes (ports)

Add or reconfigure on-dock tracks, relocate or remove track crossovers that slow train speeds, and align vessel-to-train windows so containers move directly to rail without extra dray. Port authorities and states can fund track and throat works within port property and adjust gate/road treatments feeding the on-dock area through programs like MARAD's Port Infrastructure Development Program (PIPD). Railroads and terminal operators control train plans and lift operations.

Truck staging and parking within terminal influence areas (all)

Create safe, legal staging lots and short-stay parking near ports, ramps, and airports so drivers can align hours-of-service with gate and train schedules. Public agencies control siting, zoning, access design, and basic services (lighting, restrooms, security) and can fund build-operate agreements. Terminal operators and carriers can support reservation rules or information systems that steer early arrivals off local streets.

MULTIMODAL & SYSTEMWIDE

KEY INSIGHTS AND SYSTEMWIDE CHALLENGES

- Human factors and hazardous materials transportation remain persistent, systemwide freight safety challenges.
- Equipment availability and limited supply chain visibility constrain freight reliability during normal operations and disruptions.
- Freight system disruptions reveal critical infrastructure dependencies, limited redundancy, and uneven preparedness.
- Cargo theft, cybersecurity threats, and military mobility needs increasingly intersect with civilian freight networks.
- Automation, digitalization, and data innovation are advancing unevenly across the system, sometimes complicating integration across modes and stakeholders.
- Workforce recruitment, retention, contracting models, and quality of life issues affect freight performance across the system.

Human Factors

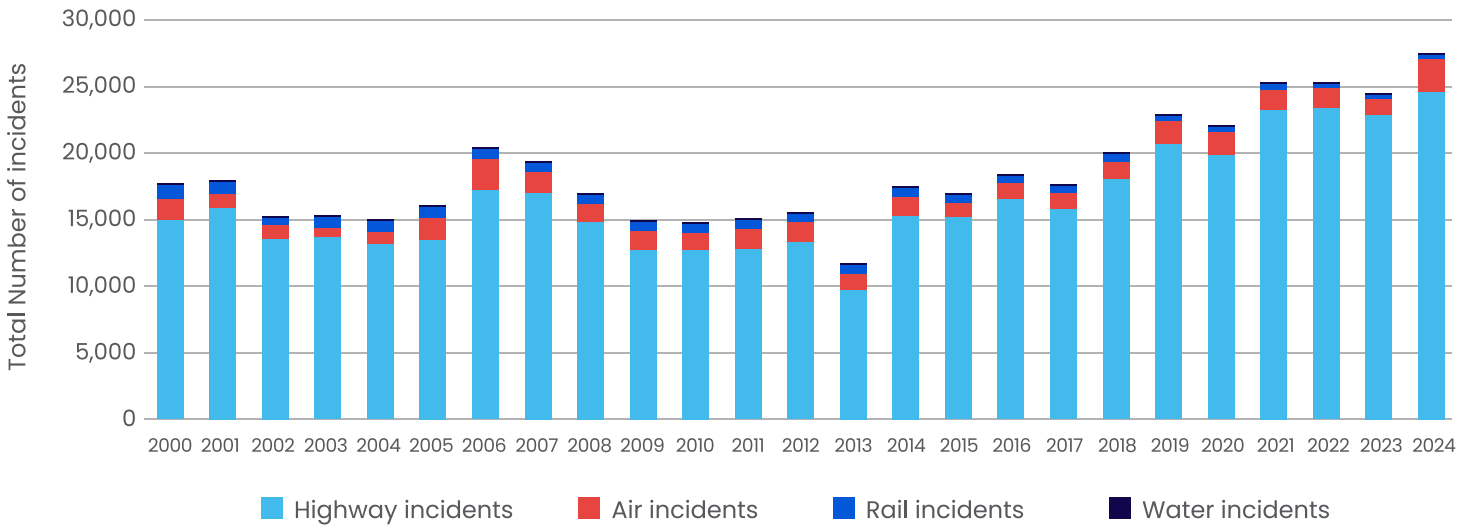
Human factors that impede safety include operator fatigue and drug and alcohol use. While much of this strategy is targeted at freight industry workers, these same concerns extend to members of the public, who contribute to crashes that affect freight operators and their vehicles.

Fatigue affects operators of all transportation modes, whether on the road, on rails, or in the air. FRA, FAA, FMCSA, and the National Institute for Occupational Safety and Health (NIOSH) all research the impacts of operator fatigue to mitigate the risks it poses to safety through fatigue management programs and day-to-day workplace strategies. Initiatives, such as USDOT's call for more truck parking on the Nation's highways, also combat fatigue risks by increasing infrastructure that enables safe operations.

Hazardous Materials

Each day there are about one million daily shipments of hazardous materials, or hazmat, that move through the transportation system. These shipments include fuels, chemicals, fertilizers, medical supplies, and industrial projects. While the vast majority of hazmat moves safely, the risks of crashes, spills, and releases remain a central safety concern because they can endanger workers, first responders, communities, and the environment. More than half of the 170,000 hazmat incidents[226] that happened between 2017 and 2023 occurred along highways and when freight was being unloaded.[227] The average length of non-pipeline hazmat shipments grew from 189 miles in 2017 to 207 miles in 2022.[228] The number of hazmat incidents grew quickly during this same period, driven mostly by highway incidents (Figure 22). The total cost of damages from incidents in 2021 to 2024 fluctuated from $47 million to more than $939 million.[229]

Figure 22. Total Number of Hazardous Materials Transportation Incidents Across All Modes of Transportation Except Pipelines (2000-2024)[230]



Equipment Availability

Availability of critical freight equipment like chassis, containers, railcars, barges, and ground support gear at airports heavily influences schedule adherence across the system. When the right equipment is in the right place, handoffs work on time and trucks, trains, and vessels turn quickly. When equipment is scarce, imbalanced, or misaligned with the availability of freight workers, then delays show up as terminal dwell, missed appointments, longer street queues, and extra dray or repositioning moves that add cost and uncertainty across corridors. Because many nodes like ports, rail yards, and intermodal terminals rely on shared or privately managed equipment pools, availability depends on both coordinated operating practices and asset counts.

Public sector agencies influence equipment availability by investing in and funding key infrastructure (e.g., terminal yards, chassis pools, rail and road access) to speed movement and reduce bottlenecks. They also set standards and coordinate data sharing across modes, enabling better visibility of assets. In addition, they can provide incentives or grants for modernization and convene public-private partnerships to operate more efficient, shared pooling and repositioning programs.

Supply Chain Visibility

Across modes, one of the clearest systemwide freight trends is that end-to-end supply chain visibility has become a top priority. A 2024 survey of more than 500 logistics decision makers ranked supply chain visibility as the top logistics trend out of 15, ahead of diversification, cybersecurity, and e-commerce, and noted that 77 percent of companies were already prioritizing investments in visibility by 2022.[231] On the technology side, a separate 2024 survey found that 77 percent of respondents now view real-time shipment visibility as a "must-have", with use of Internet-of-Things (IoT) tracking devices for real-time shipment monitoring more than doubling in a year (from 23 percent in 2023 to 53 percent in 2024) and another 25 percent planning adoption, underscoring rapid, cross-modal uptake of real-time tracking across truck, ocean, air, and rail shipments.[232]

The need for greater visibility remains acute. McKinsey's 2024 global survey of supply chain leaders reports that while 60 percent of companies now have "comprehensive" visibility into their immediate suppliers, visibility into deeper tiers has declined for the second year in a row.[233] These persistent gaps create a clear role for USDOT and other partners to support common data standards, convene relevant industry and public agencies, and use targeted pilots and grants to expand interoperable, real-time visibility platforms. Stitching together ocean, truck, rail, air, and warehousing data that enable shippers, carriers, and public agencies to detect disruptions early, re-route freight, and use existing capacity more effectively such as USDOT's Freight Logistics Optimization Works (FLOW) initiative, discussed in Part 3 of this plan, will significantly improve visibility across supply chains.

National Defense and Military Mobility

The U.S. freight system supports national defense by enabling timely and efficient movement of military equipment, supplies, and personnel across domestic and international networks. Strategic defense logistics rely heavily on the NHS, particularly the 64,200-mile Strategic Highway Network (STRAHNET), the 41,300-mile Strategic Rail Corridor Network (STRACNET), and key commercial seaports designated as Strategic Seaports (Figure 23). Each of these modal networks are wholly included in the Draft NMFN. In addition, air bases with cargo ramps capable of handling C-17 and C-5 aircraft, railroad track that can accommodate heavy and wide military loads, and deep-draft maritime terminals with high-throughput capacity are essential nodes for defense mobility. USDOT also partners with USTRANSCOM, the Army Transportation Command (ARTRANS), and the Transportation Engineering Agency (TEA) to support planning, investment, and operational readiness needs of the military.

Figure 23. Strategic Transportation Networks Supporting Military Freight[234]

Military freight differs from consumer-driven goods movement in several ways: it often involves convoy coordination, route security, and the ability to mobilize rapidly, including for disaster response or national defense large scale operations. Deployments may require sudden surges of oversize, overweight, or sensitive cargo that must move on short notice. These shipments require permitted routes with adequate bridge clearances, staging areas, and coordination across modes. Civilian congestion, infrastructure constraints, or cyber disruptions along these routes can directly impact the Nation's ability to respond to military or humanitarian needs.

Cargo Theft

Cargo theft reports have grown significantly since 2020, both in the number of incidents and in the value of stolen goods and equipment.[235, 236] The increase poses risks to the security and reliability of domestic supply chains, the safety of workers, and the financial well-being of American consumers and freight companies alike. Commodities commonly targeted include electronics, pharmaceuticals, tobacco and alcohol, apparel, and perishable foods. Geographically, theft clusters were reported in Southern California, Texas, Georgia, Florida, and the I-95 corridor.[237]

In addition to physical removal of goods from trucks or facilities, characterized in the industry as 'straight theft', there has been a sharp rise in strategic cargo theft, in which shipments are fraudulently redirected using forged documents, compromised accounts, or hacked cloud-based systems. Industry reports indicate that strategic theft incidents have grown by more than 1,500 percent between late 2021 and early 2025.[238] Some of these cases involve misuse of AI tools, underscoring the need to secure digital freight management systems and improve the detection and reporting of fraudulent activity.[239]

Cargo theft has consequences beyond immediate losses. Workers face increased risks at theft hotspots, insurers raise rates in high-theft markets, and some carriers reduce service on vulnerable routes. These secondary impacts ripple across supply chains, slowing freight movement and reducing system resilience. The public sector is proposing stronger oversight and greater penalties for cargo theft and fraud in the freight industry and collecting data from multiple agencies to better understand and respond to system vulnerabilities.

In September 2025, USDOT launched a request for information entitled "Protecting America's Supply Chain from Cargo Theft."[240] Respondent feedback highlighted the sharp rise in both straight and strategic cargo theft, noted the multifaceted nature of the problem, and suggested four broad areas of action:

- Need to Know, Need to Share: Coordinated regulatory and law enforcement across multiple jurisdictions with reciprocal data-sharing across government at the Federal, State and local levels.
- Know Your Partner: Hardening of digital platforms and better vetting of supply chain partners on a continuous basis.
- Culture of Security: Development of guidance on best practices for everything from security technologies to due diligence recommendations (e.g., "Call Back" verification of carrier's phone number in FMCSA systems).
- Freight at Rest is Freight at Risk: Improving security for stationary cargo by expanding secure truck parking, enhancing rail yard and intermodal terminal access controls, deploying AI-driven monitoring (including drones for rail corridors), and strengthening coordination between local law enforcement and railroad police.

DOT is actively incorporating these findings in its efforts to combat cargo theft, while working with other government agencies and freight stakeholders.

Combatting Human Trafficking

Human traffickers use legitimate cargo movements and road, rail, air, and maritime access to recruit, transport, and control their victims. USDOT's Transportation Leaders Against Human Trafficking (TLAHT) initiative mobilizes the transportation industry across five focus areas: Industry leadership, training and education, policy development, public awareness, and information-sharing.[241]

Through TLAHT, USDOT encourages multimodal freight companies to:

1. Lead & Fund: Ensure a top-level commitment and dedicated funding to sustain counter-trafficking efforts.
2. Implement Policies: Adopt mode-specific counter-trafficking policies covering responsible sourcing, employee responsibilities and reporting protocols (integrate reporting steps into existing security standard operating procedures).
3. Partner: Sign the TLAHT pledge
4. Train Employees: Leverage the TLAHT multimodal awareness training to train employees and contractors. Over 600 TLAHT pledge signatories have trained more than 1.3 million transportation employees to recognize and report suspected human trafficking.
5. Raise Awareness: Deploy TLAHT's free public-awareness materials (posters, pocket or visor cards, social graphics, infographic, public service announcements, and comprehensive toolkits) at truck parking facilities, yard gates, break rooms, dispatch centers, and online.

Cybersecurity

Modern freight networks depend on digital systems across all modes. Disruptions can delay cargo, create safety risks, and impose significant costs. Cybersecurity ensures safe, seamless, and efficient transportation operations by preventing unauthorized access.

In 2024, the FBI's Internet Crime Complaint Center recorded 859,532 complaints and over $16 billion in reported losses across sectors. That included 4,878 complaints from organizations in critical infrastructure, which includes transportation - an increase of 9 percent from the previous year.[242] The DHS Cybersecurity and Infrastructure Security Agency (CISA) notes that the growth of digital freight management systems, AI operations systems, and connected and autonomous vehicles expands the "attack surface" for malicious actors and is among the most important concerns facing the transportation sector today. Transportation safety has become intertwined with cybersecurity and, as technology outpaces regulation, it is important to understand how to combat innovation when misused for nefarious purposes. Nefarious uses can include delivery drones used for spying, foreign software, and malicious tracking of sensitive cargo, among other activities.[243]

The public and private sectors must communicate and collaborate to effectively defend critical freight assets. The National Institute of Standards and Technology (NIST) and the International Standards Organization (ISO)[244] develop engineering standards, such as the NIST Cybersecurity Framework,[245] and systematic methods to assess security and manage risks for transportation technology and digital systems. The Transportation Security Administration (TSA) has issued and revised multiple security directives for pipelines and rail while moving to formal rulemaking to mandate cyber risk management and reporting.[246] The Bureau of Transportation Statistics is developing a Transportation Vulnerability and Resilience (TVAR)[247] data set, including cybersecurity vulnerability and resilience data to allow transportation industry stakeholders to understand and protect against cyber threats. The U.S. Coast Guard has similarly issued regulations and several other mandatory directives focused on maritime cybersecurity.

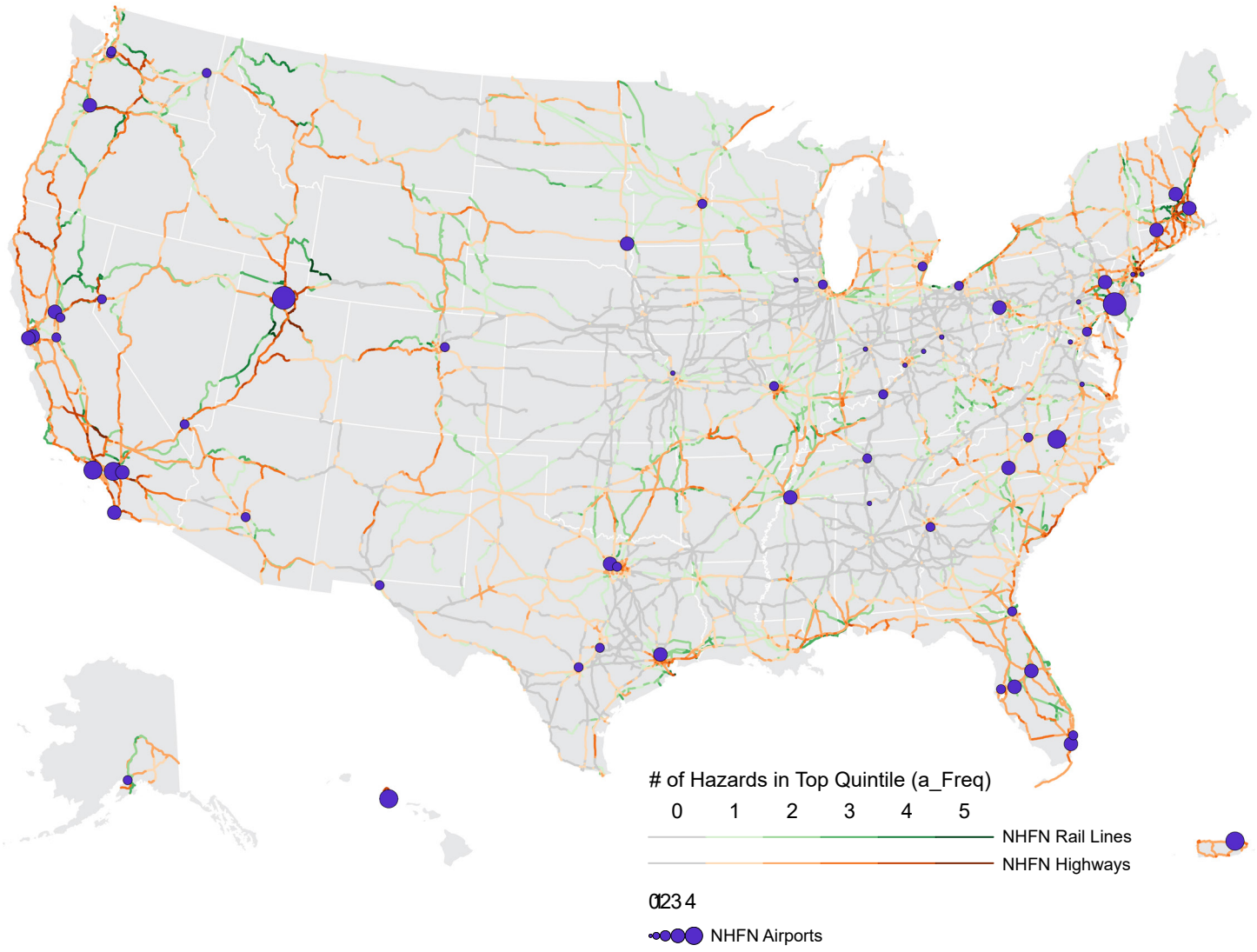
Natural Disasters and Disruptions

Freight operations face disruptions from a wide range of sources, both natural and man-made. Severe weather and natural hazards such as flooding, storms, wildfires, and earthquakes can close links or reduce capacity with little warning. The National Oceanic and Atmospheric Administration (NOAA) reports the U.S. experienced 28 billion-dollar weather disasters in 2023 and 27 in 2024, and a running total since 2015 of more than $1.4 trillion in damages.[248]

Freight flows to where people live, and Americans continue to live and move to regions where natural disaster risks are elevated. Major coastal cities like Houston, Miami, New York and Los Angeles continue to add residents.[249] Of the top ten fastest growing counties in 2024, five are exposed to coastal storms and flooding (Harris County and Montgomery County, Texas, Miami-Dade County and Broward County, Florida, and King County, Washington), heat and drought (Clark County, Nevada and Maricopa County, Arizona), or inland storms and tornadoes (Collin County and Tarrant County, Texas and Cook County, Illinois).[250] All ten of these counties have high ratings on the Federal Emergency Management Agency's National Risk Index for Natural Hazards.[251]

As shown in Figure 24, the Draft NMFN's highway, rail, and air freight infrastructure face extreme natural hazard exposures along the coasts. Avalanches, rockslides and other hazards also pose risks to mountainous regions, while extreme heat and storms threaten major freight hubs places like western Kentucky and Tennessee. Where exposure risks are high, States and local governments must consider resilience strategies to keep freight moving – whether hardening existing infrastructure, maintaining alternative routes to threatened links, and closely coordinating emergency response preparation with planning, operations, and infrastructure maintenance plans.

Figure 24. Highest Natural Hazard Exposures on Draft NMFN Highway, Rail, and Air Facilities[252]



Note: Exposure risk is calculated based on the number of highest-frequency events in the local census tract for each mode. Segments in the top 20 percent highest frequency locations for each hazard are shown on the map. The number labels on the legend indicate the number of hazards for which that location is in the top 20 percent most frequently occurring events. See Appendix A for full methodology.

Infrastructure Criticality and Redundance

Risk exposure concentrates along a limited set of corridors and nodes that already carry a large share of freight volumes. These concentrations make the system efficient under normal conditions but vulnerable to localized disruptions. Even temporary outages such as tarmac damage, air traffic delays, or equipment failures can have national consequences, especially for industries reliant on just-in-time inventory management.

While criticality analysis identifies the assets whose failure would cause the greatest disruption, redundancy planning emphasizes the availability of alternate routes, modes, and facilities that can absorb freight when disruptions occur. Even with scarce resources, targeted investments in redundancy can deliver outsized value when focused on the most critical corridors and bottlenecks in the freight system.

Yet redundancy is often challenging in practice, as building parallel facilities everywhere is neither affordable nor practical. Planners should use redundancy selectively and

focus on the most critical corridors and chokepoints where even modest investments in alternatives could avert major economic losses. This means balancing cost-efficiency with resilience value and targeting limited dollars where backup options are absent, fragile, or in critical need of modernization. In places where redundancy may be cost prohibitive or impractical, planners and asset managers should harden existing infrastructure against failure risks.

Emergency Preparedness, Continuity, and Recovery

Public agencies play a central role in supporting both planning for and recovering from emergencies by coordinating with private operators and ensuring critical freight routes remain accessible. Effective preparedness strategies include pre-designating emergency freight corridors, identifying staging areas for trucks and transloading, and maintaining stockpiles of supplies such as fuel or road salt. Coordination with emergency management agencies ensures freight priorities, such as food, fuel, and medical supplies, are embedded in broader disaster response plans. After each disruption, after-action reviews among public and private partners can provide valuable insights to refine emergency protocols, improve staging plans, address gaps in information sharing, and apply lessons learned about infrastructure performance to inform long-range planning efforts.

Automation and Autonomy

Existing automated systems such as automatic emergency braking have already improved safety on the roads and rails of the Nation by reducing collisions, injuries, and fatalities caused by human error. The benefits of automation may include higher handling speeds, better asset utilization, reduced dwell times, reduction of employee exposure to hazardous tasks, end-to-end tracking and real-time condition monitoring, and predictive planning and risk management. The deployment of automated systems should be intended to improve operations and make the workplace safer and more efficient, not to upend the labor market and displace jobs. Nevertheless, an evolving workforce and other uncertainties and challenges, such as cybersecurity and incident response, contribute to public concern over the speed of automation implementation.

Digitalization and Artificial Intelligence

Digital technologies are transforming how freight is organized, tracked, and optimized. Applications include optimizing routing and scheduling, managing inventories, and predicting demand, congestion, or maintenance needs. AI-enabled optimization could reduce logistics costs by 15 to 20 percent and improve inventory levels by 35 to 65 percent in certain supply chains.[253] Studies of blockchain-enabled supply chains estimate potential documentation processing time reductions of up to 40 percent, with enhanced fraud detection.[254] For public agencies, these same tools can improve demand forecasts and scenario planning, offering faster insights during emergencies or network interruptions.

The rapid pace of digitalization presents both opportunities and challenges for policymakers. Lack of standardized data formats and interoperability across platforms creates inefficiencies and limits broad adoption. Smaller carriers and ports risk being left behind if digital systems remain fragmented or costly. At the same time, digital tools raise issues of data governance, privacy, and security that require public oversight. Federal and State agencies can help advance progress by promoting common standards, investing in broadband and digital infrastructure, and encouraging pilot programs that demonstrate the benefits of integrated systems.

Emerging Modes and Business Models

Shifts in consumer demand, e-commerce growth, and new operating models are changing how freight moves in the United States. The rapid growth of e-commerce has accelerated demand for same-day and next-day delivery. Between 2019 and 2023, U.S. e-commerce sales increased by more than 80 percent, intensifying pressure on local delivery networks.[255] Reverse logistics flows, which includes returns, recycling, and reuse, now account for an estimated 30 percent of all e-commerce shipments.[256] This trend is changing warehouse design, distribution networks, and vehicle trip patterns, with implications for public planning around industrial land use and community interface.

HOW CAN THE PUBLIC SECTOR IMPROVE MULTIMODAL FREIGHT SYSTEM RESILIENCE?

1. Strengthen Redundancy and Network Flexibility

- Identify and preserve alternate freight routes in long-range planning, including parallel routes via highways, short line rail, and barge connectors, for key freight routes
- Designate and invest in emergency freight corridors so critical goods can flow when primary routes are disrupted by floods, labor actions, or cyberattacks.
- Promote modal balance by ensuring that shippers have access to rail, marine, and air options in addition to highways.

2. Harden and Modernize Critical Infrastructure

- Retrofit and elevate at-risk assets such as bridges, tunnels, port facilities, and airport runways in flood-prone or seismic areas.
- Incorporate hazard and threat assessments (natural disaster, cyber vulnerabilities, terrorism risk) into project design and capital programming.
- Ensure continuity of energy and communications infrastructure (fuel depots, pipelines, control systems) that support freight operations.

3. Enhance Real-Time Operations and Data Coordination

- Invest in Intelligent Transportation Systems (ITS) that provide real-time information to truckers, railroads, and air cargo carriers during emergencies.
- Develop integrated data platforms where public and private stakeholders can share closure, delay, and incident data.
- Adopt cyber resilience standards for State-owned or -managed systems such as traffic management centers and freight portals.

4. Expand Intermodal and Transfer Capacity

- Prioritize "last-mile" connector improvements to ports, rail yards, and airports that often fail during floods or winter storms. focus on the most critical corridors and chokepoints where even modest investments in alternatives
- Support inland port development so freight can shift modes when coastal trade gateways are compromised by hurricanes, labor strikes, or accidents.
- Ensure resilience of intermodal yards through redundancy in power supply, cyber protections, and storm hardening.

5. Coordinate with Emergency Responders to Plan for Surge and Rapid Recovery

- Pre-position resources such as snowplows, pumps, and heavy equipment near critical freight corridors.
- Develop coordinated recovery staging areas for freight operators, ensuring access to fuel and rest facilities.
- Incorporate freight into emergency response planning, ensuring supply chains for food, medical supplies, and fuel are prioritized.

6. Integrate Resilience into Policy and Investment Decisions

- Embed resilience metrics into project prioritization frameworks, so resilience is valued alongside safety, efficiency, and environmental performance.
- Use scenario planning to test how different shocks (natural hazards, labor strikes, cyberattacks, terrorist incidents) might disrupt freight and what mitigations would be most effective.
- Leverage Federal programs (INFRA, RAISE, PROTECT, Port Infrastructure Development Program) to fund resilience-oriented freight projects.

7. Strengthen Governance and Partnerships

- Engage freight advisory committees (FACs) to identify freight resilience needs that include carriers, shippers, labor representatives, and emergency managers.
- Promote cross-jurisdictional coordination between states and MPOs for freight routes that cross boundaries.
- Develop mutual aid agreements for rapid reopening of freight corridors after natural disasters, major accidents, or terrorist events.

USDOT's Advanced Research Projects Agency – Infrastructure (ARPA-I) launched an Ideas Challenge in August 2025 to solicit ideas for new and transformational approaches to improve safety, lower costs, and enhance national infrastructure from both the public and private sector.[257] In December 2025, USDOT selected fifteen projects for initial seed funding in stage one of the challenge and will provide further funds to project proposals selected by a judging panel in stage two. The challenge funded R&D proposals for digital twins, AI algorithms, agents, and performance metrics, rail sensors, AV testing, and other technical innovations which could be applied to improve the Nation's freight systems.[258]

Innovations in the first- and last-mile are expanding modal options and reshaping logistics networks. U.S. cities have experimented with short-range and last-mile freight delivery options to manage rising congestion, including cargo e-bikes,[259] microhubs or urban consolidation centers,[260] sidewalk robots, and drones.[261] Collaborative logistics models that allow carriers to combine freight shipments or warehouse space are emerging to improve equipment utilization and reduce empty miles. Consolidating shipments within a large freight provider or "load pooling" with multiple shippers using a single truck can reduce repositioning[262] and lower costs.[263] Shared warehousing to reduce fixed costs and increase flexibility is also gaining traction, particularly in high-cost metro areas where industrial land is scarce.[264]

While many of these developments are led by private firms, they have direct implications for public planning, particularly where infrastructure design and community interface are concerned.

Emerging Freight Data Sources

Freight operations generate more data today than at any point in the past, creating new opportunities to improve efficiency, safety, and reliability. The challenge for both public and private stakeholders is to manage, secure, and analyze data in ways that produce actionable results. The full value of freight data comes not only from technology but also from governance. Realizing the benefits at scale requires trusted standards for data sharing, robust security, and a workforce able to manage advanced analytics. Equally important are institutional frameworks that translate insights into coordinated action across carriers, shippers, and public authorities. With these elements in place, freight data can serve as a foundation for a more reliable, efficient, and resilient multimodal system.

Worker Recruitment and Retention

Employment in transportation and material moving occupations is projected to grow about as fast as the average for all occupations from 2024 to 2034, with approximately 1.8 million projected job openings annually.[265] However, the freight sector faces persistent challenges in attracting and retaining talent, including limited talent pools, an aging workforce, and barriers to hiring. Currently, over 24 percent of transportation workers are aged 55 or older, while only 16 percent are 24 or younger. Some freight occupations have as much as 37 percent of their workforce approaching retirement age. As experienced workers retire, it is essential for the industry to recruit and train new employees equipped with skills suited for evolving freight operations.

THE IMPACT OF E-COMMERCE ON THE NATIONAL MULTIMODAL FREIGHT NETWORK

How will e-commerce influence freight patterns over the next decade?

- More parceled freight and denser delivery networks. U.S. e-commerce now accounts for 15 percent of retail sales and is growing faster than overall retail, which drives higher parcel volumes and more frequent local deliveries. The number of U.S. parcel shipments reached about 22.4 billion in 2024 and is projected to keep rising this decade.[266]
- Greater pressure on first- and last-mile access. As parcel flows rise, curb space, loading zones, and industrial access roads become system constraints, especially near ports, rail ramps, and airports that connect to local streets.[267]
- Shift in facility siting and network design. There is a need for more near-customer micro-fulfillment, cross-docks, and return hubs in metro areas, with continued demand for large regional sortation centers. Public planning documents and Federal pilot programs (e.g., SMART grants) already fund micro-hubs and cargo bike trials that foreshadow this pattern.[268]
- Growth in reverse logistics. Returns account for a significant share of e-commerce flows, creating steady back-haul and re-processing demand that changes trip patterns and warehouse needs. The estimated range of online return rates is between 15 and 30 percent.[269]

How can the public sector respond?

- Plan for access and curb operations. Map freight loading zones, designate truck routes to and from intermodal connectors, and manage curb space by time of day where parcel demand is highest. These efforts can be tied to freight performance targets in MPO and local transportation plans.
- Protect and enable industrial land. Use zoning and site plan standards to preserve well-located logistics parcels near highways, rail ramps, airports, and ports. Allow micro-fulfillment and return hubs where appropriate. Reference Federal pilot experience to guide design for micro-hubs and small format vehicles.
- Invest in connectors and local bottlenecks. Prioritize NHS intermodal freight connectors and adjacent local links that handle parcel surges. Small projects on these links can yield outsized reliability gains for the full network.
- Update models and data. Incorporate parcel flows, reverse logistics, and time-of-day delivery profiles into freight demand models and performance dashboards. Leverage public data on e-commerce trends and private datasets where feasible.
- Coordinate with airports and express carriers. Expect more nighttime ground movements and higher-frequency belly and express operations at major cargo airports. Align surface access, signage, and staging with peak parcel windows.
- Support digital pilots. Use competitive grants and partnerships to test new technologies like curb management, appointment systems at busy freight districts, and data sharing with carriers to smooth peaks.
- Track systemwide parcel trends. Monitor Census e-commerce series and independent parcel indexes to anticipate capacity needs and budget cycles for local improvements.

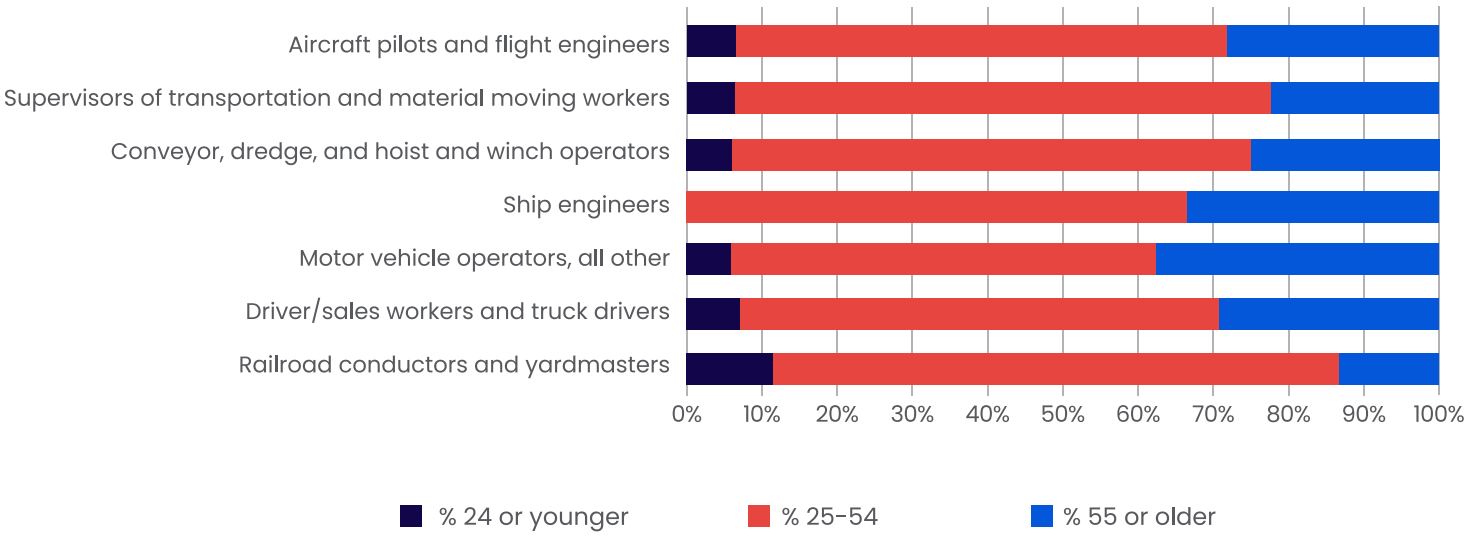
Figure 25. Annual Percent Change in Employment, 2000-2025 (Seasonally Adjusted)[270]

While demand for freight workers will continue to rise, the required skillsets are changing. Automation and advanced technologies are reducing demand for traditional roles such as inventory clerks and assembly workers, while increasing demand for logisticians, industrial machinery mechanics, and operations analysts. For example, truck drivers may need retraining to operate partially automated vehicles, and mechanics must learn digital diagnostic systems.

Enhanced strategies for recruitment, training, and retention are required to address these workforce needs. States can strengthen freight talent pipelines by expanding partnerships with academic institutions and State labor and economic development agencies, as well as promoting apprenticeships and workforce development initiatives.

At the Federal level, USDOT has training, plans and funding available in multiple modes that target or can be applied to the freight workforce. FMCSA has supported apprenticeships for truck drivers and funds State CDL programs to train new entrants into the workforce.[271, 272] FRA provides workforce development funds as part of CRISI grants, and piloted youth summer programs to engage high school and college students interested in developing professional rail skills.[273, 274] MARAD connects with veterans and cadets to capitalize on existing skillsets for careers in maritime transportation.[275, 276]

Figure 26. Aging Workforces in Freight, 2024[277]



Gig and Contracted Workers

The emergence of the gig economy in last-mile delivery is understudied but has the potential to significantly impact the freight industry as e-commerce continues to grow. Companies increasingly use gig workers to execute last-mile deliveries and meet increased demand for faster and more direct-to-consumer deliveries. Though BLS reported 330,000 workers transportation and warehousing industry in 2023, there is little reporting on the prevalence of gig work and its impacts on VMT, congestion, or vulnerability to cargo theft.[278]

Improving Freight Workers Quality of Life

Quality of life is a critical factor in recruiting and retaining the freight workforce, supporting both economic productivity and transportation system resilience. Many freight workers face long hours, irregular schedules, extended periods away from home, and physically demanding tasks. Industry injury rates in transportation and material moving occupations remain higher than the national average, and workers also face unique mental health stressors related to extended isolation and shift work.

For truck drivers in particular, access to safe parking, adequate rest facilities, and reliable services remains a top concern. Federal initiatives such as the Truck Parking Coalition are working to expand safe, secure parking facilities across key freight corridors. States and industry partners can complement these efforts by improving roadside amenities, enhancing employer-supported wellness programs, and ensuring access to training that enables career advancement into less physically demanding and higher-value roles. Prioritizing worker well-being not only improves retention but also strengthens the efficiency and safety of the entire freight transportation network.

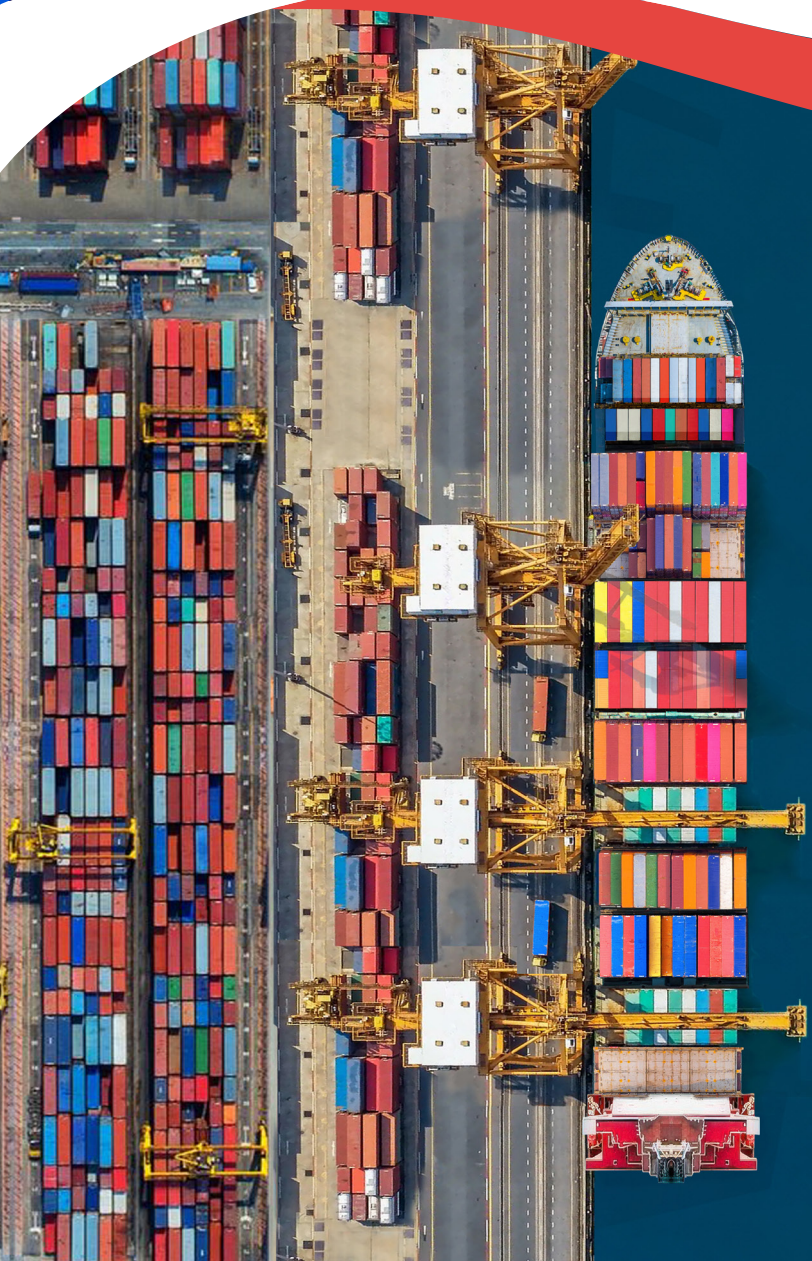
HOW CAN THE PUBLIC SECTOR ADDRESS LOCAL IMPACTS OF FREIGHT OPERATIONS?

Addressing local impacts of freight operations requires partnership with local and regional jurisdictions. USDOT's role is to provide technical assistance and incentives to support actions including those identified below to lessen freight operations impacts on local communities.

- Improve Safety at Rail Crossings. Prioritize grade separations where possible and add active warning devices, preemption, queue detectors, and turn pockets near crossings by terminals and schools.
- Manage Queues, Parking, and First/Last-Mile Access. Provide short stay staging and parking near freight facilities, ensure appropriate roadway geometry on connector roads so trucks can move safely and predictably, and provide basic services along key corridors so trucks do not stage in town centers.
- Reduce Neighborhood Nuisance and Roadway Wear. Apply site design standards for buffering, screening, lighting, and noise controls at freight sites, plan delivery windows when possible, prepare for seasonal surges with temporary traffic control and designated staging areas, and require maintenance of local pavements stressed by heavy vehicles (maintenance, pavement sweeping, dust control).
- Plan Land Use and Access Together. Identify freight corridors in local plans to identify where heavy truck traffic will travel and maintain that travel away from local streets where possible, require traffic impact studies and site access plans for major freight developments before permits are issued, and encourage cluster planning where impacts can be managed through shared infrastructure.
- Strengthen Communication and Workforce Benefits. Create a single point of contact for community concerns and set response timelines with facility owners, establish standing forums with community groups and freight industry to address issues early, promote hiring local, apprenticeships, outreach to transitioning service members through military installations, and commercial-driver or technician training tied to freight projects, provide information on construction or surge schedules, detours, and gate hours.

PART 2:

CRITICAL ECONOMIC SECTORS



At a national scale, freight volumes tend to aggregate on a relatively small number of corridors across all modes. These arteries of the U.S. economy carry an outsized proportion of freight and play a major role in ensuring the Nation's competitiveness.

Statutory requirements for this plan require USDOT to identify national corridors that provide access to major areas of agriculture production, energy exploration, manufacturing, and natural resource development.[374] Each of these sectors has distinct freight needs, yet all rely on the same multimodal network to remain productive and competitive. Understanding freight movements by these industries is essential for identifying where targeted investment can improve the freight system to ensure it continues to strengthen and grow the economy.

AGRICULTURAL SECTOR COMMODITIES

KEY INSIGHTS AND SECTORAL CHALLENGES

- U.S. agriculture relies heavily on export-oriented freight flows connecting rural production regions to global markets.
- Inland waterways, rail, and ports are critical for bulk agricultural exports and seasonal peak movements.
- Weather variability and river conditions increasingly affect agricultural freight reliability, timing, and costs.
- Rural first- and last-mile infrastructure constraints influence farm-to-market access and costs.
- Agricultural freight demand is highly seasonal, creating episodic pressure on transportation networks.

Agriculture is one of the largest users of the U.S. freight network. Agriculture, food, and related industries contributed about $1.54 trillion to U.S. GDP in 2023, or 5.5 percent of the total, with farms themselves accounting for $222.3 billion.[279] U.S. agricultural exports were worth $175.5 billion in 2023 and generated total economic output of about $362.4 billion when indirect and induced activity are included.[280] Export values declined from a 2022 peak but rose again in 2024, reaching the third-highest level on record, underscoring the continued importance of trade-oriented agricultural supply chains.[281] Corn, soybeans, and wheat dominate agriculture freight volumes in the U.S. (Table 14).

TABLE 14. USDA BULK AGRICULTURE COMMODITY PRODUCTION PROJECTIONS (MILLIONS OF BUSHELS)[282]

COMMODITY	2023/24	2034/35	% CHANGE
Corn	15,341	16,120	5.1%
Soybeans	4,162	4,880	17.3%
Wheat	1,804	1,994	10.5%
Sorghum	318	378	18.9%
Barley	186	158	-15.1%
Oats	57	50	-12.3%

Between 2014 and 2024, the value of U.S. agricultural exports grew about 1 percent per year while imports grew about 6 percent.[283] More than 20 percent of all agriculture grown in the U.S. is exported—and for every dollar of agriculture exported, the U.S. is returned $2.06 in economic activity.[284]

In 2024, the United States exported about $176 billion in agricultural products to 189 countries and territories, with 75 percent of value going to just 10 markets and nearly half (47 percent) going to Mexico, Canada, and China. Mexico was America's top trading partner for agriculture, accounting for 17.1 percent of U.S. agricultural exports and 22.8 percent of U.S. agricultural imports in 2024.[285]

Over the next two decades, agricultural freight is expected to grow steadily. Agriculture-related tonnage across all trade types is projected to increase about 1.5 percent annually from 2025 to 2050 (Tables 15, 16). These projections assume continued growth in domestic consumption and export demand, driven by population growth, income growth, and productivity gains in U.S. farming and processing. Forecasts also reflect sustained reliance on long-distance bulk and containerized movements connecting production regions to domestic processors and trade gateways, with variability driven primarily by trade conditions, weather, global market , and domestic and international freight costs relative to other exporters, rather than structural shifts in production geography.

TABLE 15. AGRICULTURE FREIGHT FLOWS BY MODE, 2025-2050, TOTAL TONS (THOUSANDS)[286]

AGRICULTURE	2025	2030	2035	2040	2045	2050	% CHANGE, 2025-2050
Air (include truck-air)	492	574	658	760	877	1,018	107%
Multiple modes & mail	79,374	85,745	92,866	100,616	109,200	118,634	49%
Rail	265,367	287,313	311,919	338,630	367,119	398,666	50%
Truck	2,220,345	2,376,795	2,553,159	2,748,863	2,961,381	3,190,218	44%
Water	126,623	135,797	147,261	160,184	174,018	189,297	49%
Other and unknown	65	70	78	87	96	104	60%
Grand Total	2,692,267	2,886,295	3,105,941	3,349,140	3,612,692	3,897,938	45%

TABLE 16. AGRICULTURE FREIGHT FLOWS BY MODE, 2025-2050, TOTAL VALUE (MILLIONS OF DOLLARS)[287]

AGRICULTURE	2025	2030	2035	2040	2045	2050	% CHANGE, 2025-2050
Air (include truck-air)	4,200	4,793	5,493	6,314	7,265	8,469	102%
Multiple modes & mail	41,177	45,318	49,708	54,740	60,286	66,615	62%
Rail	60,490	66,290	72,523	79,455	86,896	95,500	58%
Truck	1,224,911	1,314,695	1,424,419	1,546,327	1,680,413	1,827,742	49%
Water	32,915	35,665	38,927	42,620	46,635	51,186	56%
Other and unknown	126	133	147	163	180	195	55%
Grand Total	1,363,819	1,466,895	1,591,216	1,729,619	1,881,675	2,049,707	50%

Multimodal Corridors and Trade Gateways

U.S. agricultural freight is concentrated on a relatively small set of high-volume corridors and gateways that connect producing regions to domestic users and export markets. Trucks handle most local and regional moves from farms to country elevators, feed mills, processing plants, and distribution centers, while railroads and barges carry the bulk of long-haul grain and oilseed flows from the the Pacific Northwest, Midwest and Plains to coastal terminals. Recent modal-share estimates indicate that barges moved about 44 percent of U.S. grain exports in 2022, railroads moved about 45 percent, and trucks moved the remainder, highlighting how export supply chains depend on both rail–water corridors and the highway network for first- and last-mile access (Figure 27).[288]

Figure 27. Agricultural Highway and Waterway Tonnage, 2022[289]

Export of bulk commodities is especially dependent on the Mississippi River System, the Illinois Waterway, and the Columbia–Snake River System. Together these river systems link the Corn Belt and Northern Plains to Gulf Coast and Pacific Northwest export regions.[290] Close to 60 percent of U.S. grain exports travel by barge on the Mississippi system to Gulf elevators, while 60 percent of U.S. wheat export pass through the Columbia-Snake River System in the Pacific Northwest. The New Orleans port region at the southernmost reaches of the Mississippi River handled 56.2 million tons of grain and oilseeds in 2023 and accounts for the largest share of U.S. agricultural exports by tonnage, including about 60 percent of soybeans and 78 percent of corn exports.[291] Additional information about the benefits and challenges of shipping on the Nation's inland waterways is covered earlier in this plan.

Meanwhile, barge traffic in the Pacific Northwest, which intakes agricultural and other bulk products from regional farms and cross-country trains traffic, is growing slightly faster than the rest of the system; waterborne forecasts for the Columbia–Snake River system predict a 2 percent annual growth rate—twice the pace of the recent historical rate—driven in part by agricultural exports. This highlights the ongoing importance of Pacific Northwest grain and oilseed corridors over the next decade.[292]

After New Orleans, the top ports for bulk agricultural exports in 2022 were Kalama, Tacoma, Norfolk, and Los Angeles, while the top containerized agricultural export ports were Los Angeles, Long Beach, Oakland, Norfolk, and Savannah.[293] On the import side, New York, Philadelphia, Houston, Savannah, and Los Angeles handled the largest shares of bulk and containerized agricultural imports in 2022.

Laredo is the highest-volume land border port by total trade value, with more than $300 billion in trade in 2023 and about $339 billion in 2024. Both trucks and rail handle large volumes of avocados, tomatoes, peppers, berries, leafy greens, and bulk grains and oilseeds.[294] Additional significant fresh produce flows through Nogales, Arizona, and Otay Mesa, California.[295] Publicly available forecasts are limited, but regional planning and ongoing private investment around Laredo and other Texas border trade gateways suggest these lanes are expected to remain among the fastest-growing freight corridors serving agricultural and food trade within the United States-Mexico-Canada (USMCA) region.[296]

Rail remains a parallel backbone for agricultural movements. Class I railroads originate roughly one quarter of U.S. grain shipments and about 39 percent of grain export movements, with key origin clusters in the Midwest and Northern Plains feeding Gulf and Pacific Northwest ports.[297] Export elevators and terminals on the Lower Mississippi, Texas Gulf, and Pacific Northwest, along with selected Atlantic and Pacific Coast ports, serve as primary transfer points between truck, rail, barge, oceangoing vessels for grains, oilseeds, and other bulk agricultural products.

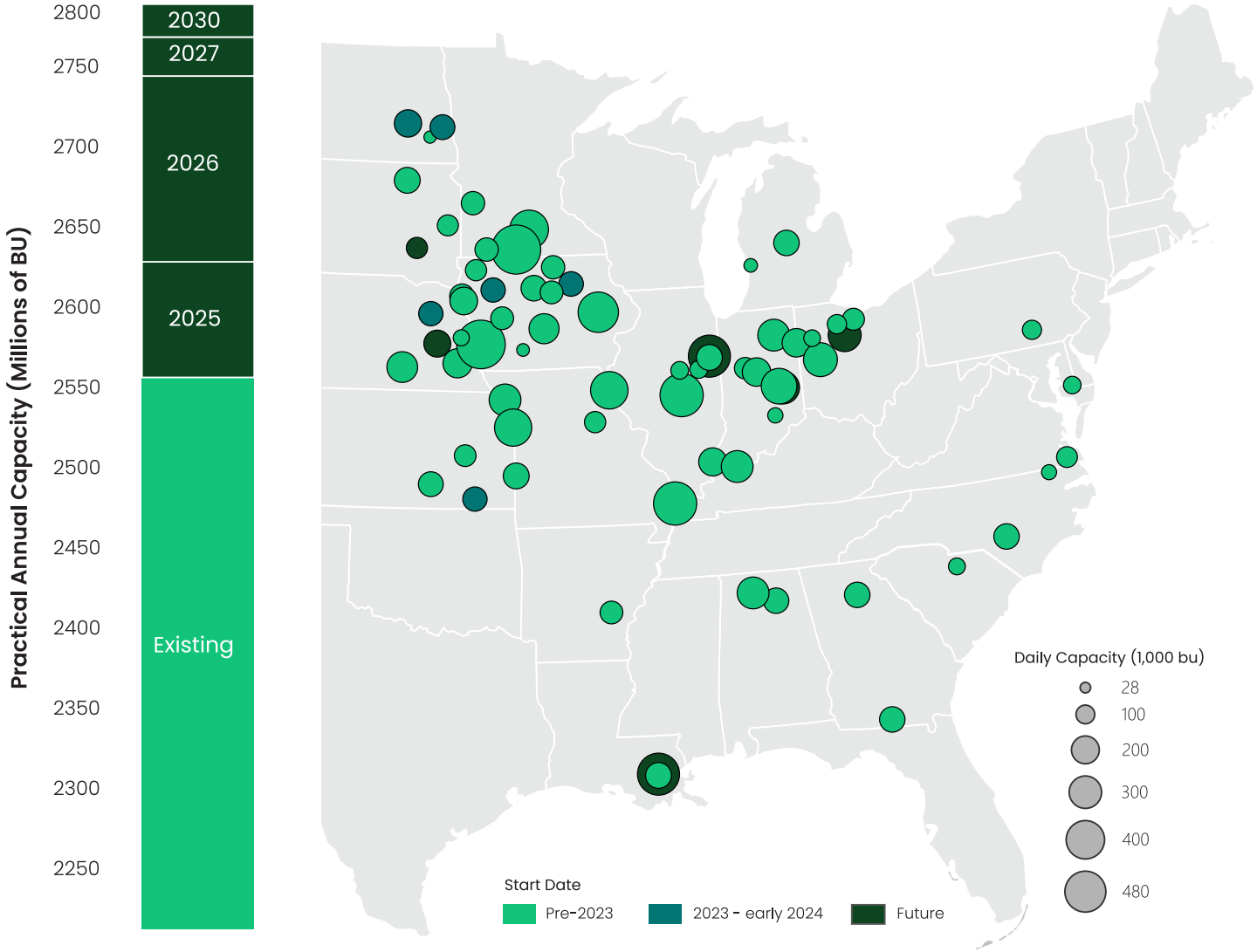
Changing Agricultural Freight Patterns

Agricultural freight patterns are shifting as more processing occurs domestically and closer to demand centers. Since 2023, at least nine new or expanded soybean crush plants, which process soybeans into meal and oil, began operations in the United States, with another group of projects announced or under development, raising expected domestic crush capacity from roughly 2.4 billion bushels in 2024 toward nearly 2.9 billion bushels by 2027 (Figure 28).

Current investments reflect continued demand for soybean oil and meals for food, feed, and fuel markets. Projected increases in volumes likely mean more inbound truck and rail movements of soybeans into Midwestern and Plains processing clusters and more outbound shipments of meal, oil, and co-products from those clusters to domestic feed mills, food manufacturers, and export terminals, rather than direct farm-to-elevator export flows.

These investments will also help support inland waterway traffic volumes. Soybeans account for about 10.9 percent of all ton-miles traveled on the inland waterway system, and about 85 percent of all soybeans moved via inland waterways are destined for export.[298] Volumes of international export of soybeans and other significant commodities that travel long distances on inland waterways, like grains and oilseed, directly affect the funding available to maintain the waterways through their contributions to the Inland Waterways Trust Fund. A prolonged softening of bulk agricultural product demand would cause barge movements and associated fuel use to fall, posing a measurable decrease in Federal revenues used to support inland waterway infrastructure. Coordinated, multistate investments by groups such as the Corn Belt Port Authority and others support growth in waterborne agricultural commodities like soy and corn and underscore the waterways' importance to their export which, in turn, helps to generate revenues that contribute to inland waterway quality.[299]

Figure 28. U.S. Soybean Solvent Processing Plants & Near-Term Crush Capacity Additions[300]



Similar changes are also occurring in meat, poultry, and dairy supply chains. New and expanded plants are increasingly sited near major livestock production regions—such as the High Plains beef and dairy belt (Texas, Kansas, and Nebraska), the Corn Belt hog corridor (Iowa and neighboring States), and the Southeast 'Broiler Belt' (Georgia, Alabama, Arkansas, and Mississippi), and within trucking range of large population centers including the Northeast Corridor, Chicago, the Texas Triangle, Atlanta, and Southern California. These locations concentrate inbound truck flows of feed and animals and outbound refrigerated shipments of higher-value products such as boxed beef and pork, poultry cuts, cheese, and processed dairy foods. There are also growing outbound movements of processed foods, meat, and dairy from grain-producing regions in the Midwest into domestic distribution centers and export gateways, as well as increasing shipments of cotton, peanuts, and processed foods from the Southeast and Texas–Southwest. As these processing and packaging clusters mature, a larger share of agricultural freight will originate in major inland production and processing nodes rather than moving directly from farms to export elevators.

GROWTH IN AGRICULTURAL COLD CHAIN & CONTAINERIZATION

Higher-value, temperature-sensitive agricultural products are growing faster than bulk agriculture commodities and are expected to remain a key driver of agricultural freight demand. The U.S. food cold chain market was estimated at roughly $13.6 billion in 2024, with multiple forecasts suggesting it could more than triple by the early 2030s.[301] Increasing demand for fresh and healthier foods such as meat and poultry, dairy, frozen fruits and vegetables, as well as prepared foods and the rapid expansion of e-commerce grocery[302] are expected to increase demand for cold chain infrastructure.[303]

Containerization of agricultural products is growing rapidly. Waterborne containers carry roughly a quarter of U.S. agricultural export volume but close to half of export value.[304] Meats, tree nuts, and oil seeds are significant users of containerization, while refrigerated exports like pork, dairy, and beef use them almost exclusively. A variety of ports handle these containers, but are especially concentrated at ports such as Los Angeles, Long Beach, Oakland, New York, Norfolk, Savannah, Charleston, and Jacksonville.[305] Cross-border refrigerated meat and produce primarily moves through Laredo, Nogales, and San Diego/Otay Mesa.[306]

Continued growth in refrigerated and containerized agricultural products will depend on infrastructure that supports refrigerated trucks and containers along highways and at ports, intermodal terminals, cold storage warehouses. This will be especially true in major food distribution and warehousing hubs such as Chicago, Dallas-Fort Worth, Atlanta, Central Florida, and southern California's Inland Empire.[307] In these locations, reliable highway and rail access, staging and parking for trucks, and adequate reefer plugs and power will be critical concerns for the agricultural sector. As discussed earlier in this plan, container availability has been a persistent issue for intermodal freight; maintaining OSRA's transparency and enforcement mechanisms will also be key to ensuring containers are in position and more available where they are needed across the freight system.

SEASONALITY CHALLENGES

Seasonal agricultural peaks often coincide with weather, traffic, and demand patterns that compound supply chain stress on the system. Corn and soybean harvests in the Midwest and Plains generally occur from roughly September through November, driving higher grain truck use and heavy barge movements on the Mississippi River system and its tributaries. USDA grain transportation and trucking indicators show that grain truck use indexes and barge movements rise with seasonal and export demand. Recent years have seen historically low water levels on the Mississippi during harvest, which stymied barge transportation from late September into early winter and pushed barge rates sharply higher. State and local agencies report elevated crash risk and congestion on rural roads during harvest as grain trucks, farm machinery, and other traffic share narrow two-lane highways and approaches to elevators, with hundreds of farm-equipment-related crashes recorded in individual States over recent years.[308] In wet years, saturated fields and unpaved access roads can limit truck loading and force detours, while winter storms, ice, and fog periodically disrupt late-season grain and livestock movements in the Upper Midwest and Northern Plains.

Seasonal surge demand combined with unique equipment needs and issues associated with shipping on our inland waterways, as covered in more depth elsewhere in this plan, underscores the importance of targeted investments to support efficient and reliable transportation for agricultural exports.

FIRST MILE ACCESS AND RURAL INFRASTRUCTURE CONDITIONS

Rural roads and small bridges provide the first- and last-mile between farms, elevators, processing plants, and the higher-order highway and rail networks. Many of these links were not designed for today's heavier trucks and higher volumes. Recent national analyses on highways and agriculture find that narrow or weight-restricted rural roads and bridges often force trucks onto longer detours, adding cost and time for fertilizer, grain, and livestock movements.[309,310,311] USDOT's Rural Opportunities to Use Transportation for Economic Success (ROUTES) program addresses rural transportation needs via technical assistance and tools that help connect rural communities with funding, financing, and outreach resources that support infrastructure improvements in their area.[312]

ENERGY SECTOR COMMODITIES

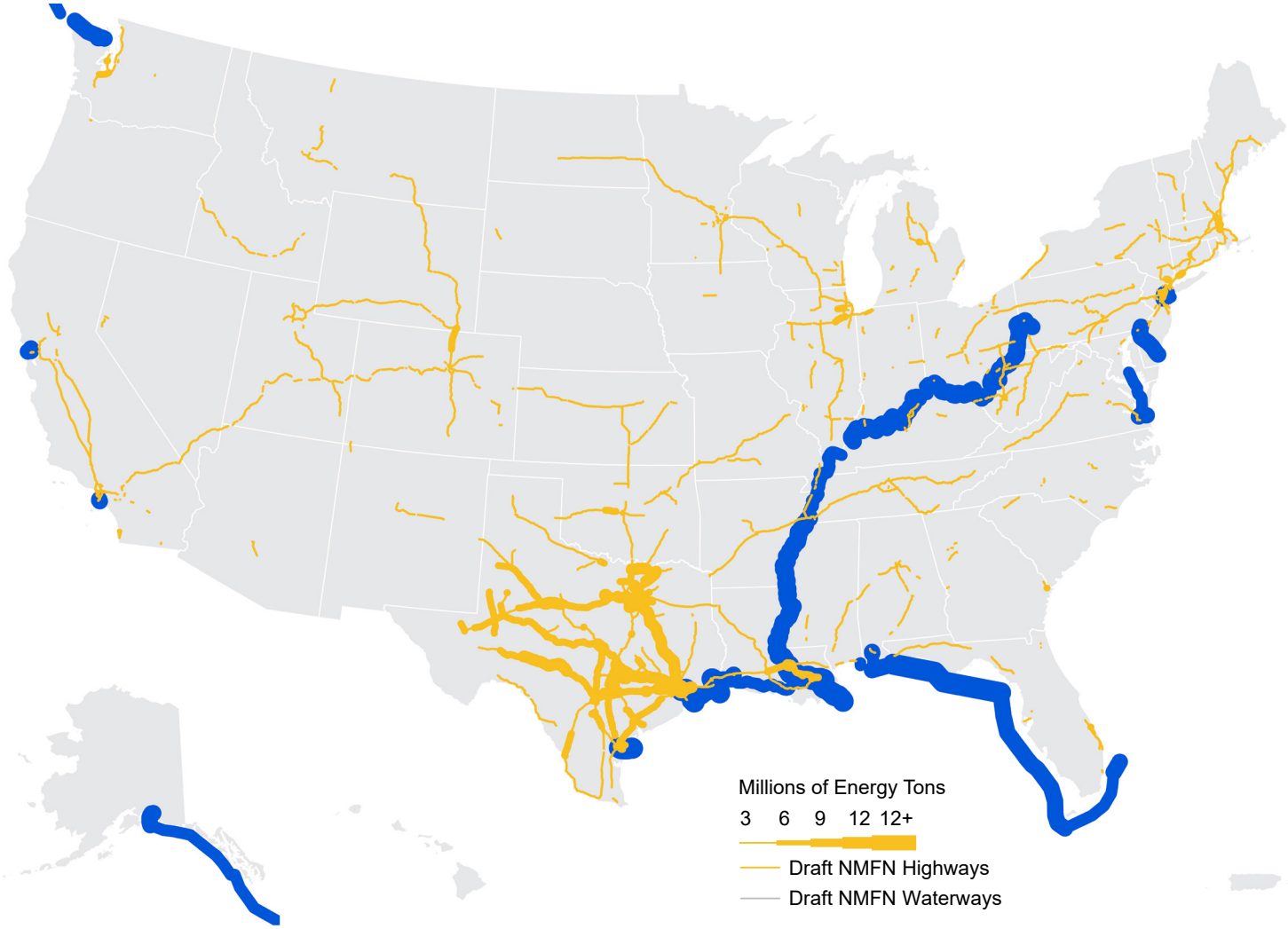
KEY INSIGHTS AND SECTORAL CHALLENGES

- U.S. energy production growth is increasing freight demand across pipelines, rail, highways, and ports.
- Expanding LNG export capacity is reshaping freight flows and increasing reliance on Gulf Coast trade gateways.
- Energy exports play a growing role in U.S. economic performance and global energy markets.
- Oversize and overweight equipment movements are critical for energy production and infrastructure development.
- Energy freight disruptions can have outsized economic and national implications.

The energy sector relies primarily on pipelines, rail, and marine transport to move crude oil, natural gas and liquid natural gas (LNG), coal, and refined products. An efficient freight network ensures consistent fuel supply, affordable power, and is crucial for the Nation's security and economic growth.

Energy commodity flows are anchored by freight infrastructure along the Texas and Louisiana Gulf Coast, particularly the Port of Corpus Christi, Port of Houston, and Sabine Pass LNG terminal at the Texas-Louisiana border(Figure 29).[313] Coal, oil, and petrochemicals move from production areas through the inland waterway system to these ports. Pipeline corridors from the Permian Basin (West Texas and southeastern New Mexico) and Bakken region (North Dakota and Montana) move crude oil and gas to refineries and export hubs, which trucks carry water, drilling fluids, and other drilling or frac materials to oil and gas fields and finished gasoline products to gas stations and other commercial stores around the country. Rail service provides oil transport from production areas lacking pipeline access.

Figure 29 Draft NMFN Segments Carrying Top 20% Tonnage Flows for Energy Commodities, Highway and Waterway (2022)[314]



Advances in drilling and energy production technology allow the U.S. to meet demand more efficiently[315] and, since 2019, the amount of energy produced in the United States has been higher than the amount consumed domestically. In 2024, energy exports peaked as the U.S. exported about one third of the domestic energy produced, much of which included petroleum, natural gas, and coal. This trend is expected to continue, driven primarily by gas production.[316] Foreign markets are increasingly central to the outlook for U.S. energy, not just an add-on to domestic demand. In the first 9 months of 2025, exports reached nearly one-third of domestic energy production (29 percent), including significant volumes of petroleum, natural gas, and coal.[317] This level of export allows the U.S. to fully utilize its resource base, sustain high levels of investment and employment in production regions, and provide reliable fuel supplies to allies and trading partners.

Energy product-related freight is expected to continue growing in the coming decade (Tables 17, 18). Energy freight forecasts reflect assumptions about long-term domestic energy demand, infrastructure investment cycles, and evolving production and processing patterns across oil, natural gas, refined products, and related inputs. Projections assume continued movement of large volumes of energy commodities and equipment across highway, rail, pipeline, and waterway networks, shaped by regional production growth, replacement of aging infrastructure, and export market dynamics rather than short-term price volatility.

TABLE 17. ENERGY FREIGHT FLOWS BY MODE, 2025-2050, TOTAL TONS (THOUSANDS)[318]

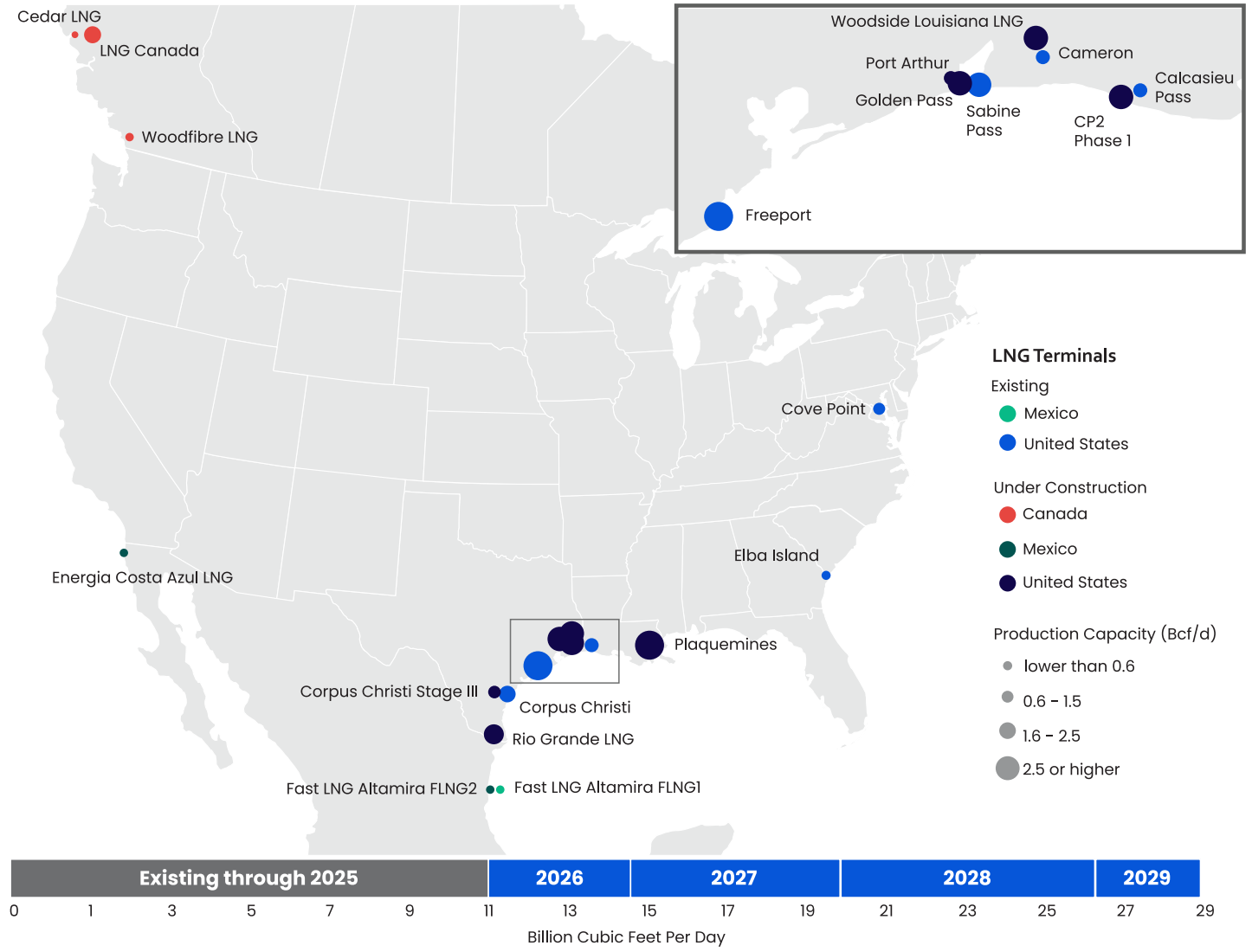
ENERGY	2025	2030	2035	2040	2045	2050	% CHANGE, 2025-2050
Air (include truck-air)	10	11	12	14	16	19	90%
Multiple modes & mail	97,169	102,888	108,032	112,463	122,367	134,747	39%
Pipeline	4,293,822	4,457,974	4,550,720	4,622,542	4,755,448	4,932,606	15%
Rail	710,508	771,459	786,085	805,819	839,426	876,914	23%
Truck	2,224,303	2,206,136	2,168,973	2,139,157	2,143,516	2,167,269	-3%
Water	457,785	466,126	467,860	469,614	484,726	504,880	10%
Other and unknown	64,373	65,920	63,611	61,510	59,604	57,404	-11%
Grand Total	7,953,461	8,175,426	8,254,814	8,332,301	8,538,311	8,820,138	11%

TABLE 18. ENERGY FREIGHT FLOWS BY MODE, 2025-2050, TOTAL VALUE (MILLIONS)[319]

ENERGY	2025	2030	2035	2040	2045	2050	% CHANGE, 2025-2050
Air (include truck-air)	28	29	31	34	39	45	61%
Multiple modes & mail	35,872	38,265	41,594	44,717	49,415	55,064	54%
Rail	100,432	134,254	134,080	136,380	140,563	151,819	51%
Pipeline	1,172,389	1,204,197	1,202,027	1,190,868	1,195,297	1,213,777	4%
Truck	1,127,411	1,117,894	1,093,205	1,071,714	1,061,427	1,060,818	-6%
Water	145,395	148,569	150,241	151,688	157,418	165,309	14%
Other and unknown	1,580	1,598	1,526	1,464	1,405	1,343	-15%
Grand Total	2,583,107	2,644,806	2,622,704	2,596,865	2,605,564	2,648,175	3%

North American LNG export capacity is projected to more than double between 2024 and 2029 supported by investments along the Texas-Louisiana Gulf Coast (Figure 30).[320] Natural gas exports (pipeline and LNG) reached a record 20.9 billion cubic feet per day in 2024.[321] About one-third of all gas that year was produced in the Appalachia region. Meanwhile, the Permian region has experienced increases in the production of natural gas during oil production and higher marker prices.[322] DOE forecasts that natural gas production will rise fastest in the Permian region through the 2030s and then begin to fall. However, steady increases in the Appalachia region production through at least 2050 are projected to keep natural gas the dominant production region in the country.[323]

Figure 30. North American LNG Export Facilities, Existing and Under Construction (2016-2029)[324]



U.S. crude oil output averaged an all-time high of 13.6 million barrels per day in 2025, [325] with the Permian Basin in Texas and New Mexico producing more than half of all U.S. crude oil. [326] Alaska and the Gulf of America are also significant crude oil production zones. [327] DOE's near-term forecasts indicate a leveling of production around 2025 levels.[328]

Meanwhile, coal consumption has declined over time as electricity demand shifts toward gas and, to a much smaller degree, renewables. Coal production in 2023 was less than half of its 2008 long term peak. However, coal remains a critical baseload fuel for U.S. electricity and heavy industry, and there is substantial untapped potential in federally managed reserves that

can support expanded production. Guided by presidential directives to promote American energy dominance, the Department of the Interior has moved to open more coal resources on Federal lands by streamlining leasing and permitting and revisiting royalty terms, helping domestic producers stay competitive and sustain highwage jobs in mining regions.[329] Continued investment in coal production and the rail, barge, and terminal infrastructure that moves it to power plants and export terminals will reinforce coal's role in the national energy mix and strengthen U.S. energy security. Wyoming is consistently the leading U.S. coal producer, along with West Virginia, Pennsylvania, and Illinois. A large portion of coal is transported by rail.[330]

AMERICAN ENERGY DOMINANCE

Energy dominance means ensuring that domestic production and distribution systems are sufficient to meet national needs without reliance on external suppliers. The nation's freight system plays a vital role in ensuring the United States can produce, distribute, and deliver enough energy to meet the demands of a growing population, expanding industries, and new power-intensive technologies such as AI and advanced computing.

Pipelines, railroads, and highways are essential for moving these increasing volumes of petroleum, natural gas, coal, uranium, and refined fuels from production basins to power plants, processing facilities, and export terminals. Transmission and distribution infrastructure for electricity itself depends on freight to deliver components such as turbines, transformers, generators, and high-voltage switchgear. Meeting future energy demand, including electricity-intensive growth from data centers and semiconductor facilities, will require freight systems capable of handling oversized, overweight equipment and ensuring last-mile access to large-scale industrial sites.

Infrastructure readiness varies by region. The Gulf Coast ports already handle significant energy traffic, but recent investments will see greatly expanded LNG capacity in Port Arthur and Corpus Christi, Texas, and in Plaquemines, Louisiana, among other export locations. These projects will add construction modules, large equipment, and outbound cargo, which raises short-term pressure on roads and channels serving Texas and Louisiana terminals.[331] In Appalachia, 2024 projects such as the Mountain Valley line added pipeline capacity. However, winter pipeline limits in New England and the difficulty of building new Northeast routes still steer much of the gas toward Mid-Atlantic and Gulf markets.[332]

Several States have begun to address energy needs in their freight and transportation planning. For example, Ohio, Pennsylvania, and West Virginia are investing in vehicle and roadway access to natural gas resources, pipeline development, and truck traffic management near well sites. These State-level efforts underscore how freight planning intersects directly with the Nation's ability to achieve energy dominance.

EQUIPMENT LOGISTICS

Energy infrastructure construction and maintenance frequently require movement of oversized and overweight (OSOW) inputs such as large-diameter pipe, pressure vessels, transformers, and modular components. For pipelines specifically, PHMSA notes that fabricated pipe sections are commonly 40 to 80 feet long, which often necessitates specialized handling, staging, and routing when transitioning from long-haul movements to jobsite delivery.[333] These moves routinely involve rail service to a regional yard or transload location, followed by truck delivery under OSOW permits because standard Interstate limits (e.g., 80,000 pounds gross vehicle weight) are exceeded. Because these loads are both time-sensitive and operationally complex, delays in securing permits, escorts, or workable routes can disrupt project schedules and create spillover effects on nearby freight corridors and terminal operations.

Effective delivery of these loads depends on streamlined, multi-jurisdictional coordination. States are the primary permitting authorities and their practices vary, reinforcing the importance of clear protocols among State and local agencies, utilities, and law enforcement for route reviews, work zone accommodation, and temporary traffic controls. FHWA best-practice guidance highlights approaches such as automated route identification and "one-stop-shop" permitting to reduce permit turnaround time and allow permitting staff to focus on the most complex moves, which is especially relevant for specialized energy equipment that may require detailed engineering review.[334]

NATURAL RESOURCES SECTOR COMMODITIES

KEY INSIGHTS AND SECTORAL CHALLENGES

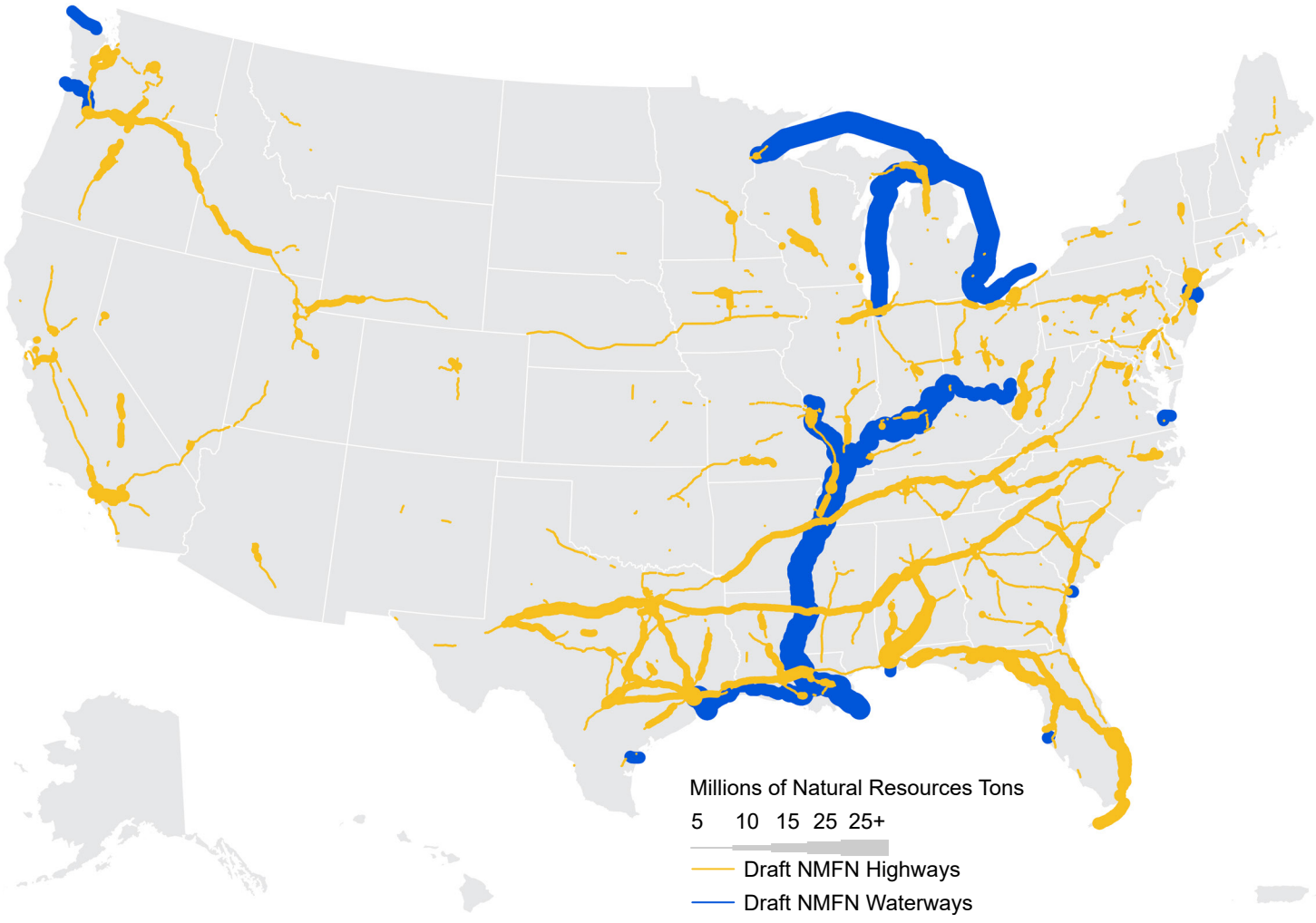
- Domestic production of critical minerals and metals is increasing freight demand in resource-producing regions.
- Construction activity is driving sustained demand for bulk materials such as aggregates and timber.
- Natural resource freight relies on heavy-haul, bulk movements using highways, rail, and waterways.
- Seasonal access restrictions affect freight reliability in resource-producing and rural areas.
- Natural resource supply chains are sensitive to infrastructure availability and modal connectivity.

Natural resource related freight is dominated by a handful of high-volume bulk commodities connecting key production regions with industrial and export hubs. Regional production of coal, metal ores such as iron ore in the Lake Superior region of Minnesota and Michigan and copper in the Southwest and Intermountain West and industrial minerals such as phosphate rock, potash, and limestone moves largely by rail and barge from mines and concentrators to power plants, steel mills and smelters, cement plants, and fertilizer and chemical complexes in the Midwest, Gulf Coast, and Southeast. These commodities are exported in bulk via export terminals on the Atlantic, Gulf, Pacific coast, and through the Great Lakes systems.

Meanwhile, most timber harvests occur in the South and Pacific Northwest, with additional volumes from the Lake States and Northeast. Logs and chips move by truck over rural and regional roads to sawmills and pulp and paper mills. Finished lumber, panel products, and paper move via truck and rail to domestic building markets and large population centers and through major export ports in the Pacific Northwest, Gulf Coast, and South Atlantic.

Lumber, steel, minerals, and other raw materials industries depend on bulk shipping by barge, rail, and truck (Figure 31). Reliable natural resource freight movement supports downstream construction, infrastructure, and manufacturing. These industries rely on a mix of short line rail, rural highways, and inland ports (e.g., Duluth-Superior, Coos Bay, and Mobile), along with long-haul Class I railroads. Marine movements underpin bulk logistics. On the Mississippi–Ohio river system, barges carry a large share of bulk resources to ports of export, while the Great Lakes–St. Lawrence Seaway moves substantial iron ore, steel, and other mine products each season, complementing rail and truck shipments to Midwest export gateways.[335]

Figure 31. Draft NMFN Segments Carrying Top 20% Tonnage Flows for Natural Resource Commodities, Highway and Waterway (2022)[336]



Natural resource product-related freight is expected to continue growing in the coming decade (Tables 19, 20). Natural resource freight projections are driven by assumptions about construction activity, infrastructure investment, and industrial demand for aggregates, timber, and other bulk materials. Forecasts reflect the inherently local and regional nature of many natural resource movements, with long-term growth tied more closely to economic activity and capital investment trends than to international trade or technological substitution.

TABLE 19. NATURAL RESOURCE FREIGHT FLOWS BY MODE, 2025-2050, TOTAL TONS (THOUSANDS)[337]

NATURAL RESOURCES	2025	2030	2035	2040	2045	2050	% CHANGE, 2025-2050
Air (include truck-air)	1,134	1,307	1,504	1,734	2,032	2,368	109%
Multiple modes & mail	172,526	183,892	196,358	213,140	231,978	252,843	47%
Pipeline	49,355	53,897	58,543	63,757	69,243	74,830	52%
Rail	365,653	394,200	423,586	460,818	503,127	553,083	51%
Truck	3,537,070	3,857,691	4,115,220	4,427,192	4,753,798	5,104,875	44%
Water	185,186	197,704	209,803	226,427	244,325	264,533	43%
Other and unknown	14,563	15,907	17,166	18,527	20,043	21,626	48%
Grand Total	4,325,487	4,704,598	5,022,181	5,411,594	5,824,546	6,274,158	45%

TABLE 20. NATURAL RESOURCE FREIGHT FLOWS BY MODE, 2025-2050, TOTAL VALUE (MILLIONS)[338]

NATURAL RESOURCES	2025	2030	2035	2040	2045	2050	% CHANGE, 2025-2050
Air (include truck-air)	91,180	108,433	129,000	153,398	183,641	219,416	141%
Multiple modes & mail	677,786	777,436	874,671	988,144	1,123,552	1,262,255	86%
Rail	58,028	63,277	69,597	76,836	85,573	95,202	64%
Pipeline	16,208	17,636	19,172	20,908	22,766	24,617	52%
Truck	1,270,744	1,453,752	1,636,581	1,846,557	2,094,043	2,361,227	86%
Water	35,546	38,600	42,144	46,226	50,808	55,836	57%
Other and unknown	112	124	137	151	166	183	63%
Grand Total	2,149,604	2,459,257	2,771,302	3,132,219	3,560,549	4,018,735	87%

CASE STUDY: THACKER PASS, NEVADA: PREPARING FOR NEW LITHIUM PRODUCTION

Thacker Pass in Humboldt County, Nevada, is a large lithium project advancing under a Federal Record of Decision issued in January 2021. The site connects to the national highway system via U.S. 95 and Nevada SR-293, which the project identifies as the primary access routes. Project documents anticipate round-the-clock operations and between 60 and 100 one-way truck trips per day in Phase 1. Phase 2 increases to roughly 120 to 200 one-way truck trips per day, mostly between transload facilities near Winnemucca and the plant. Enabling infrastructure is already in place. The developer commissioned a water-supply system in July 2023 and installed a 6.6-mile underground pipeline from a permitted well in the Quinn River Basin to the plant site. The company also constructed acceleration and deceleration lanes on SR-293 to Nevada DOT specifications to improve safety and traffic flow at the site entrance. Earlier NEPA documents note these SR-293 upgrades were planned in coordination with NDOT. These actions illustrate how domestic mineral projects reshape freight in rural settings. Construction and operations concentrate heavy-haul deliveries, superloads, workforce movements, and outbound product on a small set of connectors. Linear utilities advance in parallel with road access. Coordination with state and local partners focuses on site access, junction geometry, and safe operations rather than on creating new corridors. Thacker Pass shows how targeted upgrades on existing routes can support nationally significant mineral production that strengthens U.S. supply chains.

Domestic Production of Critical Minerals

The Nation remains import reliant for many critical minerals. As of 2024, the United States was 100 percent dependent on imports for 12 of the 50 critical minerals identified by the U.S. Geological Survey and more than 50 percent dependent for 28 others.[339] Foreign reliance remains especially high for lithium (over 50 percent), cobalt (about 76 percent), and rare earth elements (about 80 percent).[340] These minerals are essential inputs for defense systems, electronics, pharmaceuticals, and advanced manufacturing. America's dependence on other nations for these critical minerals is a national security concern. The freight system plays a vital role in supporting the domestication of critical mineral production by ensuring strong access to potential mining sites and strengthening connections to existing resource basins and industrial centers where minerals are processed and refined.

Continuous, coordinated efforts among government and industry are critical to ensure adequate freight access to new facilities, secure transport of bulk materials, and maintain oversized cargo routes. For example, new mining projects like those in the Mountain West and Alaska will require highway and rail corridors with heavy-axle-rated pavement and high-clearance bridges, while pharmaceutical manufacturing campuses depend on reliable cold-chain trucking and air cargo service.

METALS PRODUCTION

Iron ore and metals supply chains in the U.S. are anchored in a few high-volume production and processing corridors that depend heavily on bulk rail and waterborne freight. U.S. iron ore production is concentrated in the Lake Superior region of Minnesota and Michigan, where taconite is processed into pellets and moved by rail to Lake Superior ports, then by Great Lakes vessels to integrated steel mills around the

One of Nucor's circular EAF steel mills. Source: https://nucor.com/

lower lakes and along the Great Lakes–St. Lawrence Seaway, which identifies iron ore and related products as one of its dominant cargoes.[341] These flows, together with metallurgical coal from Appalachia and the Illinois Basin moved largely by rail and barge, feed blast furnace/basic oxygen furnace (BF/BOF) mills that produce the high-quality products required by automotive, machinery, energy, and potential future shipbuilding activity.[342]

At the same time, electric arc furnace (EAF) production has grown to represent the majority of U.S. steel output, increasing demand for high-purity ore-based metallics—direct reduced iron (DRI) and hot-briquetted iron (HBI)—in addition to prime scrap.[343] DRI/HBI moves predominantly as a bulk commodity by water for long-haul movements, complemented by rail and truck for regional distribution to EAF mills. For example, Nucor's DRI facility in Louisiana is sited on the lower Mississippi River specifically to ship DRI by barge and oceangoing vessels to its EAF mills along the Mississippi–Ohio corridor and the Gulf Coast, [344] while Cleveland-Cliffs' HBI plant in Toledo, Ohio, is positioned to serve Great Lakes-region EAFs by vessel, rail, and truck.[345]

These patterns point to a freight system in which a relatively small number of ore mines, river and lake terminals, and steelmaking clusters linked by heavy-haul rail, Great Lakes shipping, and inland waterways form the backbone of domestic metals supply. Maintaining and selectively expanding capacity and reliability on ore and metallics corridors throughout the Great Lakes–St. Lawrence and Mississippi systems, key bulk terminals, heavy-axle rail routes, and last-mile road and rail access to mills and DRI/HBI plants will serve as critical investments toward bringing back America's automotive, shipbuilding, and other heavy industries.

CONSTRUCTION MATERIALS DEMAND

Domestic demand for construction materials and forestry products is very high.[346] Continued population shifts toward the south and west will influence demand patterns as those regions grow, holding construction materials like lumber, sand, and gravel consumption near or above recent highs.[347]

Construction and infrastructure investment drive some of the largest bulk commodity flows in the U.S. freight system, particularly aggregates. Crushed stone, sand, and gravel are high-volume, low unit-value materials that must move in very large quantities to support the construction of bridges, highways, buildings, and utility projects. In 2024, the United State produced an estimated 1.5 billion tons of crushed stone[348] and about 890 million tons of construction sand and gravel.[349] Because these materials are heavy and typically sourced from regionally distributed quarries and pits, most movements are shorthaul truck trips from extraction sites to asphalt and concrete plants and construction staging areas, creating intense, recurring demand on local roads and highways. However, where major projects or fast-growing markets are distant from high quality aggregate sources, large volumes often move by rail to temporary or permanent transload sites and then by truck to jobsites, concentrating traffic at a small number of terminals, access roads, and junctions and requiring close coordination among State and local agencies, railroads, and project sponsors. Boom-bust cycles of the construction industry in particular regions can cause aggregate flows to surge quickly during high construction times, stressing truck availability and pavement conditions on last-mile routes.

Timber and wood products are similarly influenced by construction patterns. Logs grown primarily in forests in the southeastern U.S. and Pacific Northwest feed regional sawmills and engineered wood facilities. Finished lumber and panels move to distribution yards and job sites in response to housing and building construction. Housing construction is the primary demand driver for wood products, accounting for about one-third of U.S. wood products consumption on average[350], indicating that high-growth States in the south and west should expect increased construction-related traffic.

OSOW movements are fundamental to the timber and logging industry, from hauling loaded log trucks at or near maximum legal weights to moving specialized equipment such as harvesters, loaders, and chippers between cutting sites and mills. These loads move across a patchwork of Federal lands, private forest roads, county routes, and State highways. Inconsistent permits, weight limits, and route designations within each jurisdiction can drive costly detours and bottlenecks onto a few overstressed links. State and local authorities can materially improve timber logistics by coordinating OSOW policies and routing by identifying and designating primary forest to mill corridors; harmonizing permits and seasonal restrictions across jurisdictions where feasible; and prioritizing targeted upgrades to critical bridges, intersections, and segments that carry recurring heavy loads. Aligning OSOW planning with timber harvest patterns and mill locations ensures that limited infrastructure dollars and enforcement resources are focused on the routes that most directly support the competitiveness and reliability of the forest products supply chain.

SEASONAL FREIGHT ACCESS RESTRICTIONS

In major timber-producing regions, log trucks and chip vans typically rely on a patchwork of private forest roads, county routes, and lower-class State highways that were not originally designed for sustained, high-frequency heavy truck traffic. State DOTs and local road agencies frequently impose seasonal weight restrictions—especially during the spring thaw in the Great Lakes, northeast, and Pacific Northwest—to protect weakened pavements and subgrades, and unpaved forest roads can become impassable after heavy rain. These seasonal and structural limits directly shape when and how wood can be moved where harvests and hauling are concentrated into windows when roads can carry legal loads, and truckers often divert to a small number of "all-season" routes and bridges that can support higher axle weights.

This dependence on constrained rural networks means that a relatively small set of corridors and structures carry disproportionate importance for the timber economy. Public agencies can address this by identifying the primary forest-to-mill and mill-to-market routes in their regions using harvest data, truck counts, and industry input, then prioritizing targeted upgrades such as strengthening critical bridges and culverts, improving drainage and surfacing on designated heavy-haul segments, and formalizing "all-season" routes. Incorporating these timber corridors into statewide freight plans and asset management programs helps ensure that limited funding is directed to the rural links where road performance most directly affects forest product logistics and related manufacturing activity (e.g., pulp, paper, lumber, panel products).

MANUFACTURING SECTOR COMMODITIES

KEY INSIGHTS AND SECTORAL CHALLENGES

- Manufacturing freight depends on reliable, high-frequency movements supporting just-in-time production systems.
- Growth in domestic manufacturing is increasing demand on key highway, rail, and intermodal corridors.
- Ports and intermodal trade gateways are critical for imported inputs and exported finished goods.
- Congestion and reliability challenges disrupt tightly synchronized manufacturing supply chains.
- Manufacturing competitiveness is closely linked to freight system performance and reliability.

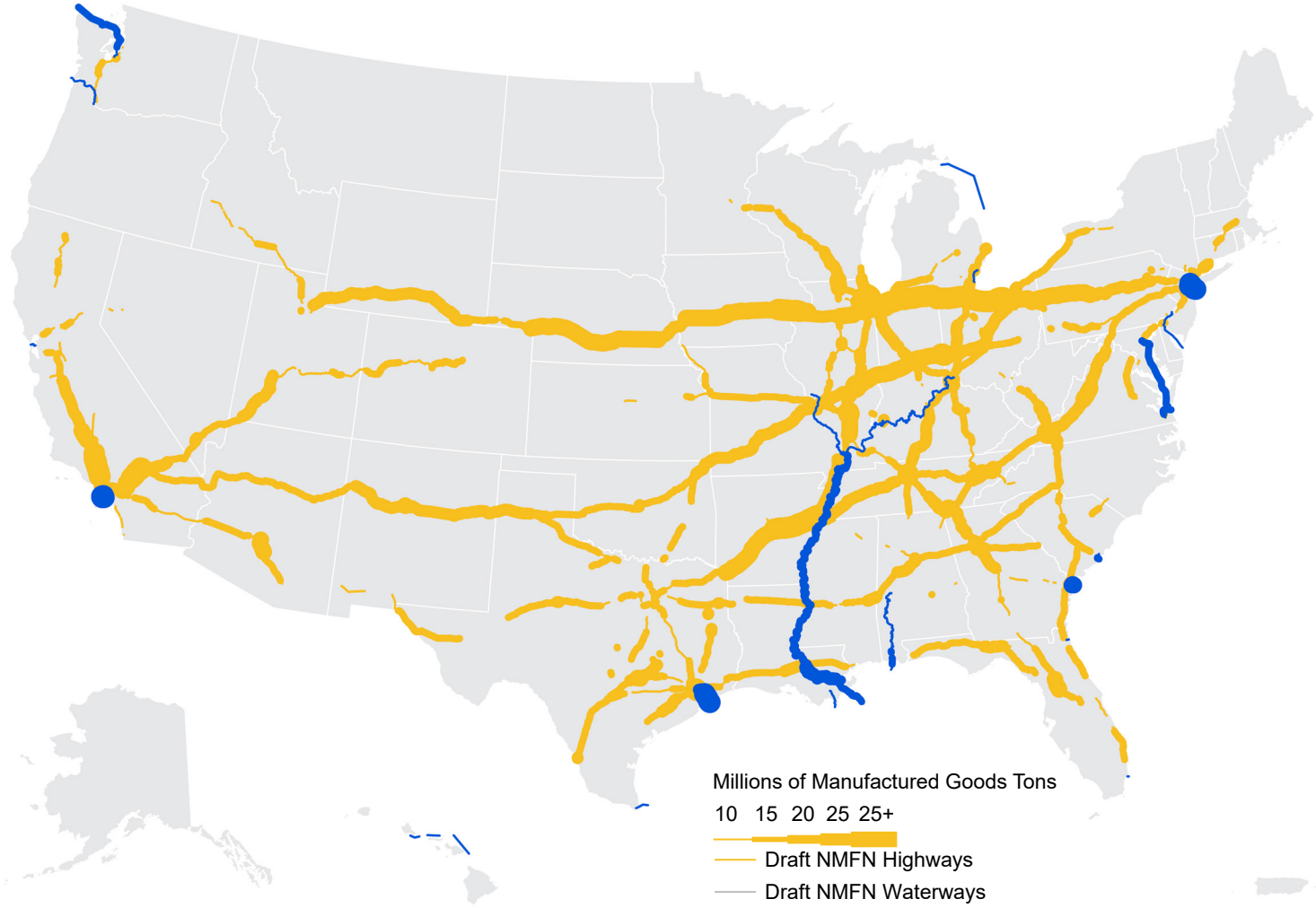
Manufacturing freight in the U.S. includes transport of both high-value intermediate and finished goods, such as chemicals, machinery, motor vehicles and parts, electronics, and consumer products. Freight system performance directly affects productivity, supply chain efficiency, and the ability of U.S. manufacturers to compete both at home and abroad.

Internationally, manufactured goods dominate U.S. merchandise trade by value, and this shapes where the most intensive manufacturing related export and import flows occur. Key manufactured exports include transportation equipment, machinery, electrical equipment, computers and electronics, chemicals, and pharmaceuticals. These goods are shipped largely from States with significant manufacturing bases toward partners such as Canada, Mexico, East Asia and India, and the European Union. These exports, along with imported components and finished goods, are funneled through major container ports on the Pacific, Atlantic, and Gulf coasts and a relatively small number of high-volume land ports with Canada and Mexico, creating dense corridors that link inland manufacturing clusters with seaports, intermodal rail terminals, and border crossings.

Trucks carry by far the largest share of those domestic shipments by both value and tonnage, with rail and multimodal rail–truck playing important supporting roles for heavier and longer-haul moves (Figure 32). Manufacturing output is especially dense in the industrial Midwest and Great Lakes region (automobiles, machinery, steel-related products), in the Southeast (vehicles, appliances, general manufacturing), throughout California (aerospace, semiconductors, and pharmaceuticals), and along the Gulf Coast and Texas (chemicals, refined products, equipment).

Both intermediate good and finished parts rely on major highway corridors and cross-border infrastructure connecting with Mexican supply chains at Laredo, El Paso, and Otay Mesa. Rail hubs like Chicago, Atlanta, Fort Worth, and Kansas City provide inland intermodal access, while air cargo facilities at Memphis (FedEx), Louisville (UPS), and Dallas-Fort Worth serve high-value time-sensitive shipments. Rising truck and rail demand in these regions has led to growing pressure on intermodal yards, border crossings, and urban freight corridors,[351] highlighting the importance of targeted capacity improvements.[352]

Figure 32. Draft NMFN Segments Carrying Top 20% Tonnage Flows for Manufacturing Commodities, Highway and Waterway (2022)[353]



Real manufacturing output has grown modestly (0.7 percent annually from 2018–2023),[354] while construction of manufacturing facilities has surged—about doubling since late 2021 to record levels,[355] signaling a wave of new reshoring and nearshoring investments. Much of this growth is concentrated in automotive clusters in Southeast U.S. (Tennessee, Alabama, Georgia),[356] semiconductors (Arizona, Texas, New York),[357] and aerospace (Washington, Kansas).[358]

Manufactured product-related freight is expected to continue growing in the coming decade (Tables 21, 22). Manufacturing freight projections assume steady growth in domestic production and cross-border supply chains, supported by population growth, income growth, and continued integration of North American manufacturing networks. Forecasts reflect increasing movement of intermediate and finished goods across highway and rail corridors, with growth shaped by industrial output trends, logistics efficiency, and trade patterns rather than a return to pre-2020 global sourcing structures.

TABLE 21. MANUFACTURING FREIGHT FLOWS BY MODE, 2025-2050, TOTAL TONS (THOUSANDS)[359]

MANUFACTURING	2025	2030	2035	2040	2045	2050	% CHANGE, 2025-2050
Air (include truck-air)	4,395	4,873	5,355	5,969	6,706	7,566	72%
Multiple modes & mail	230,937	249,480	266,281	285,720	308,376	333,401	44%
Pipeline	271	244	218	194	181	163	-40%
Rail	196,798	211,664	226,910	244,393	264,709	288,617	47%
Truck	3,524,538	3,829,738	4,059,788	4,305,993	4,592,486	4,904,120	39%
Water	29,973	32,317	34,703	37,455	40,635	44,290	48%
Other and unknown	7,335	8,154	9,039	9,968	11,021	12,171	66%
Grand Total	3,994,247	4,336,469	4,602,294	4,889,691	5,224,113	5,590,328	40%

TABLE 22. MANUFACTURING FREIGHT FLOWS BY MODE, 2025-2050, TOTAL VALUE (MILLIONS)[360]

MANUFACTURING	2025	2030	2035	2040	2045	2050	% CHANGE, 2025-2050
Air (include truck-air)	510,833	576,722	645,516	738,503	850,248	979,691	92%
Multiple modes & mail	1,891,840	2,138,192	2,362,374	2,635,138	2,958,351	3,295,629	74%
Rail	313,065	334,819	361,800	395,775	434,471	481,398	54%
Pipeline	98	88	78	69	64	57	-42%
Truck	9,168,865	10,153,880	11,095,112	12,248,292	13,595,547	15,057,270	64%
Water	43,620	46,306	49,908	54,568	59,929	66,269	52%
Other and unknown	26,253	29,785	33,559	37,900	43,062	48,749	86%
Grand Total	11,954,575	13,279,792	14,548,347	16,110,246	17,941,672	19,929,065	67%

RESHORING, NEARSHORING, AND DOMESTICATION OF THE MANUFACTURING BASE

Reshoring and nearshoring are driving a broader regionalization of manufacturing within North America, shifting freight flows away from a pure reliance on east–west trans-Pacific routes toward denser overland movements with Mexico and Canada.[361] As more intermediate and finished goods production is sited in the U.S. and near-shore locations, a growing share of freight moves by truck and rail across land borders rather than solely through coastal container trade gateways. These dynamics are gradually reshaping the backbone of the U.S. freight network from predominantly east–west to a more balanced system in which a limited number of high-volume north–south highway and rail corridors and key trade gateways such as Laredo and other land ports carry an outsized share of manufacturing trade.

Reshoring rarely involves a single facility. It typically creates or expands ecosystems of suppliers, processors, assemblers, and distribution centers spread across multiple regions. That means fewer containerized imports into some seaports are being replaced by more frequent inbound and outbound shipments among North American locations, with dense flows of intermediate goods moving between clusters and across borders. Supporting this shift will require freight plans and investment programs to place greater emphasis on north–south trade routes by expanding capacity and reliability on key highway and rail spines between Mexican production zones, the U.S. industrial heartland, and Canadian markets; modernizing high-throughput border crossings; and strengthening last-mile connections to inland manufacturing clusters and intermodal terminals that serve as critical junctions in these regionalized supply chains.

As these ecosystems grow, both truck and rail capacity become strategic constraints. Without a more aggressive effort at all levels of government to address recurring highway bottlenecks, especially around major urban centers that function as national freight hubs, truckload capacity is likely to be increasingly challenged. Conversely, a more stable and efficient truck network enables carriers to reinvest in newer, safer equipment and sustain competitive wages. On the rail side, short line and regional railroads can play a pivotal role for rail-oriented reshored industries because they are often more nimble and able to tailor service to smaller shippers, but an estimated 48 percent of short line track miles and 53 percent of short line bridges still cannot handle modern 286,000-pound railcars.[362] Targeted support to upgrade these segments and improve connectivity to the Class I network will be essential to let manufacturers fully benefit from rail economics and to relieve pressure on heavily used truck corridors.

RISE IN JUST-IN-CASE SUPPLY CHAIN STRATEGIES

As global trade flows rebalance, inventory strategies have also changed. Many firms are moving away from "just-in-time" inventory replenishment and toward a "just-in-case" strategy of stocking. U.S. Census Bureau data on business inventories show the ratio between units sold and units in stock remains higher in 2025 than pre-2020, implying more companies are holding buffer stock of their goods.[363] Industry analyses describe a structural shift toward more demand for logistics real estate like warehouses and depots that support this model of storing products in one or more regional distribution centers.[364],[365] State-of-logistics reporting similarly highlights these inventory strategy changes and the operational need for warehousing, intermodal access, and yard efficiency.[366]

This shift has direct implications for freight capacity and investment needs. More inventory nodes like regional distribution centers, supplier parks near plants, and specialized storage for critical inputs mean more frequent short and medium haul truck moves between ports, rail ramps, warehouses, and factories. These movements often occur over the same set of expressways, beltways, and industrial arterials. Public agencies will increasingly need to focus on the efficiency and reliability of these connectors by improving access to major warehouse and manufacturing clusters, addressing recurring bottlenecks at key interchanges and freight intensive arterials, and ensuring that intermodal terminals and yards can handle higher throughput with minimal dwell. Well targeted operational improvements and capacity projects on these critical links can support firms' just-in-case resilience strategies while maintaining overall freight system efficiency.

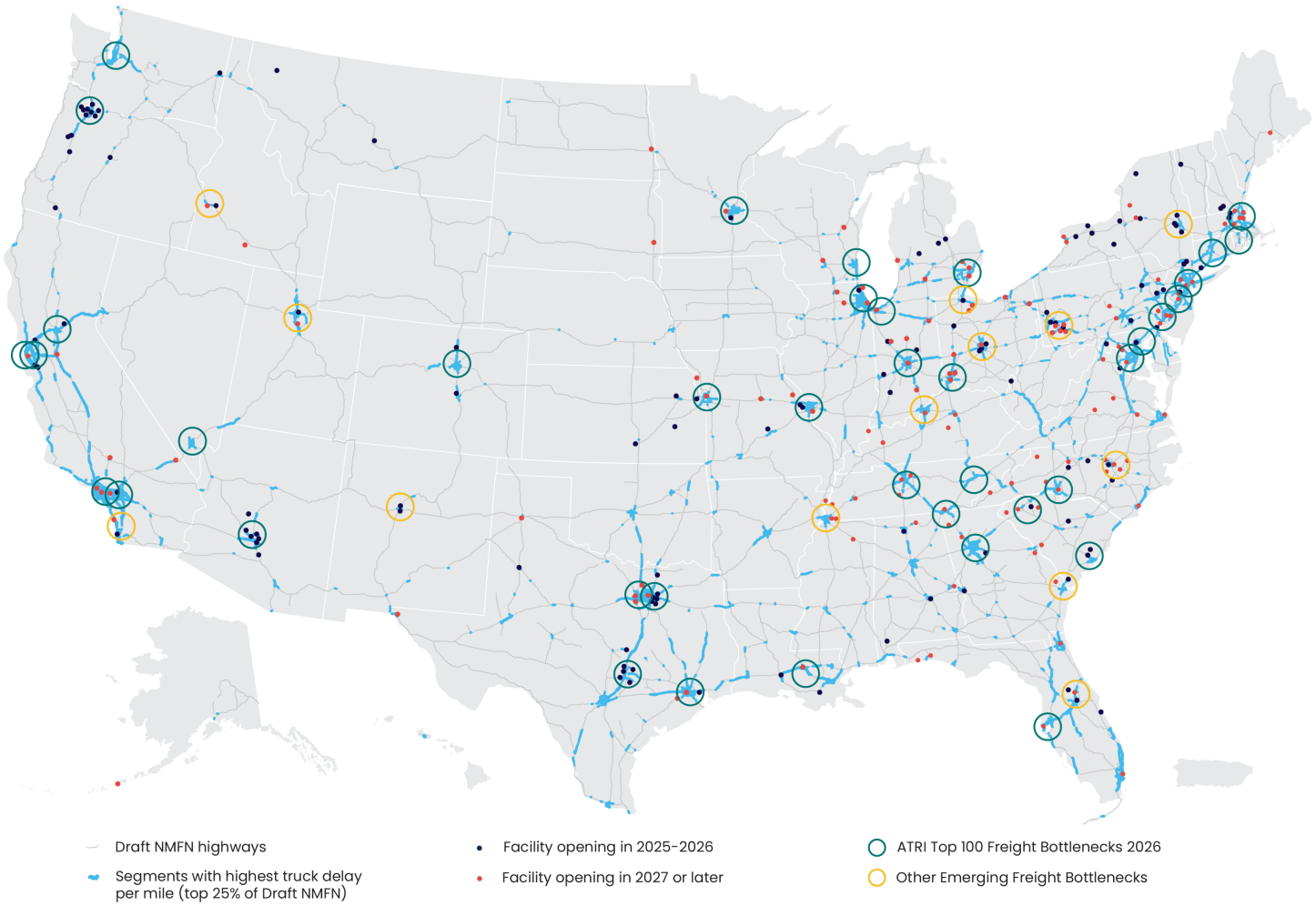
National Strategy for Freight in Critical Economic Sectors

Recent trends in agriculture, energy, natural resources, and manufacturing highlight a pivotal change in the country's economic landscape. Shifts in global trade dynamics, significant domestic industrial investments, and an increasingly regionalized North American production system are reshaping freight movement patterns across the U.S. Concurrently, national policies emphasize expanding America's industrial base, strengthening domestic supply chains, and boosting energy and agricultural export capacities. Together, these factors necessitate a more strategically aligned freight system.

The geography of U.S. freight demand becomes more distributed as freight-producing industries expand, and new regions are emerging as nationally significant freight nodes. These include Houston and Baton Rouge along the Gulf Coast, which are critical nodes for energy production, refining, and exports. Elsewhere, Midwestern and Southeastern cities like Nashville, Detroit, and Greenville anchor automotive and advanced manufacturing supply chains, while major logistics crossroads such as Atlanta, Cincinnati, Indianapolis, and Tampa serve multiple industries simultaneously and function as national consolidation, distribution, and intermodal hubs.

Each of these locations contain significant trucking bottlenecks along their highway corridors. In major metro areas like Dallas, Los Angeles and Chicago, the bottlenecks are well documented and growing worse over time. However, in regions like Raleigh, North Carolina, or Pittsburgh, Pennsylvania – where significant investments in manufacturing and goods producing industries are underway – the relatively low mileage of bottlenecked corridors may grow rapidly as those investments become operational. Addressing highway bottlenecks, including existing and emerging, is essential to ensure that domestic production can scale and remain globally competitive.

Figure 33. Trucking Delay Per Mile (2022) in Relation to Newly Announced Freight Generating Manufacturing Locations



Note: manufacturing locations are based on USDOT analysis of private investments announced and tracked by the White House through December 2025. These locations are not meant to be exhaustive of all freight generating investments since 2025, but illustrative of reshoring trends and manufacturing sector growth.

The Nation's legacy coastal and inland trade gateways such as Los Angeles, New York–New Jersey, Chicago, Seattle, and others, are primary anchors of trade and logistics. However, diversification of national freight activity toward fast-growing Midwestern and Sun Belt regions will continue to be driven by sustained population growth, greater availability of developable land, competitive labor conditions, and lower energy costs. As reshoring accelerates and domestic production intensifies, these regions are expected to expand their share of national freight activity, creating a more balanced and resilient network of inland freight centers.

Supporting these shifts requires an integrated national freight strategy focused on bottleneck relief, corridor capacity, industrial access, and gateway performance. First, reducing congestion at the most critical freight bottlenecks is essential. Increased domestic production will place additional pressure on already strained highway links in the Southeast, Midwest, and Gulf Coast. Increasing short and medium haul truck volumes associated with just-in-case inventories and supplier part operations will elevate system demands around growing industrial centers. Without targeted investment to address these bottlenecks, the efficiency and cost competitiveness of domestic industries could erode.

Second, strengthening multimodal freight corridors will be essential to support each sector's unique needs. Agriculture requires continued investment in inland waterways, rail, and rural truck routes to ensure efficient export flows and reliable seasonal movements. Energy depends on safe, efficient pipeline corridors; reliable rail capacity; OSOW truck access; and resilient Gulf Coast port and channel infrastructure. Natural resources require continued focus on heavy-haul rail, inland waterways, and timber region road networks that connect remote production areas with domestic manufacturing and export hubs. Manufacturing requires reliable highway corridors, improved intermodal access, and modernized land ports of entry to support the increasingly integrated North American production system.

Finally, ports and other international trade gateways will need to become more agile and data-driven as domestic production increases and import–export flows become more balanced. As more U.S. goods flow outward—particularly agricultural commodities, energy products, and manufactured goods—ports must effectively manage landside container positioning, chassis supply, cold chain access, and multimodal connectivity. Initiatives such as USDOT's FLOW program will help improve supply chain visibility, allowing ports and inland hubs to better anticipate volumes, optimize gate and yard operations, and align equipment positioning with evolving trade patterns.

USDOT'S FREIGHT LOGISTICS OPTIMIZATION WORKS (FLOW)

FLOW is a public-private data partnership hosted by USDOT that increases visibility across the containerized import supply chain by giving participants a forward-looking view of demand and resource needs.[367] Participants access a secure dashboard that contrasts near-term demand with available logistics assets across regions, enabling earlier decisions on routings, appointments, staging, and labor. Any supply chain actor may join by contributing demand, supply, or throughput data. This shared data foundation supports actions such as adjusting shipping orders, rerouting carriers, redistributing chassis, and extending port hours to accommodate anticipated peaks.[368] USDOT aggregates and anonymizes participant submissions and returns a consolidated dataset to FLOW members, preserving confidentiality while enabling near real time insight.

FLOW provides an impartial, data-driven forum where participants can share supply chain data and information and align their actions without sacrificing privacy or competitive concerns. In practice, it creates a top-down view of the supply chain, offering up to 90 days of demand visibility. Without this partnership, thousands of independent actors must make siloed, best-guess decisions about where to place chassis, how to move imported cargo, and where to invest in capacity, all without a centralized view of overall activity.

FLOW's aim is to increase visibility, reduce uncertainty, and align incentives across the supply chain by combining secure data sharing with a collaborative environment, mirroring the centralized coordination that transformed air travel and infrastructure decades ago. FLOW currently focuses on containerized imports, with plans to expand to exports, domestic movements, and bulk cargo in the future.[369]

PART 3:

BARRIERS AND LIMITATIONS ON FREIGHT SYSTEM PERFORMANCE

USDOT strives to foster a freight system that is as safe, efficient, secure, and resilient as possible. The performance of the multimodal freight system is dependent on a complex web of private and public stakeholders, jurisdictions, funding priorities, and influenced by constant technological and operational innovation. As these factors evolve, it is necessary to evaluate their real-world impacts and look for opportunities where Federal programs and policies can be helpful.

This section defines major statutory, technological, institutional, financial, and cross-cutting barriers to improved system performance. These barriers were defined from a combination of public input, stakeholder and expert interviews, and national, State, and local research and freight plans. These barriers reflect the complexity of a freight system that is national in scale and locally experienced. While many of these challenges arise from rules and practices that serve important purposes, they also present opportunities to modernize processes, strengthen coordination, and make more efficient use of resources.

STATUTORY AND REGULATORY CONSTRAINTS AND LIMITATIONS

Several legal and regulatory frameworks, while essential for safety, environment, and fairness, also present constraints on freight efficiency and throughput. This section describes commonly cited barriers with national implications and rules that affect specific sectors or States.

Project Permitting and Environmental Review

Freight infrastructure projects such as port expansions, highway and bridge improvements, and intermodal terminal upgrades are all subject to multiple environmental and resource protection statutes like the National Environmental Policy Act (NEPA), the Clean Water Act, and the Endangered Species Act. These laws play important roles in safeguarding public health, environmental quality, and community welfare. At the same time, stakeholders report that coordination among agencies, duration of reviews, and uncertainty about required mitigation measures can delay projects by years, which increases costs and reduces predictability. USDOT issued updated Procedures for Considering Environmental Impacts (DOT NEPA Order 5610.1D), aligning Department-wide NEPA practices and consolidating procedures for OST, FMCSA, MARAD, PHMSA, GLS, and NHTSA. Modal procedures for FHWA, FRA, and the Federal Transit Administration (FTA) remain in 23 CFR part 771, and FAA procedures are contained in FAA Order 1050.1G.[370] These updates are intended to promote efficient, cost-effective project delivery while maintaining compliance with statutory requirements.

Truck Size, Weight, and Hours of Service

Federal law limits most heavy trucks on the Interstate System to 80,000-pound gross vehicle weight. Some States operate under exemptions, grandfathered allowances for longer combination vehicles, or pilot programs, and there is interest among shippers for higher weight limits and additional axle configurations to improve productivity and reduce unit costs. These factors must also be balanced with maintaining rigorous vehicle safety standards and managing wear on roadway pavement and bridges. Meanwhile, commercial motor vehicle operator Hours of Service (HOS) regulations designed to reduce fatigue, set maximum driving and minimum rest periods. While safety benefits are clear, operators often cite inflexible HOS rules as constraining efficiency, especially when delays, congestion, or loading times reduce usable driving hours. In June 2025, FMCSA announced plans to conduct two pilot programs to study increased flexibility in HOS regulations. The goal for each pilot is to gather data on whether giving drivers more control over their schedules can improve rest and enhance safety.

- Flexible Sleeper Berth: This pilot will allow participating drivers to split their 10-hour off-duty period into more flexible combinations, including 6/4 and 5/5 splits.
- Split Duty Periods: This pilot will allow participating drivers to pause their 14-hour on-duty period for no less than 30 minutes and no more than 3 hours.

Customs, Border Procedures, and Trade Compliance

Freight crossing U.S. borders must comply with inspection, documentation, and security requirements administered by agencies such as U.S. Customs and Border Protection. These regulations help protect public safety and national security. However, variation in resource availability, staffing, and technology at ports of entry can result in congestion and inconsistent wait times, undermining the reliability of international supply chains.

Rail Preemption & State and Local Authority

Federal authority over safety, operations, and certain land use aspects of railroads (through FRA and the Surface Transportation Board) ensures consistency and avoids patchwork regulation. At the same time, local governments and States often report limited ability to address rail impacts such as blocked crossings, noise, or environmental exposure. Enhancing partnership mechanisms that respect Federal primacy but allow greater local input or mitigation may help improve outcomes for communities without undermining national safety standards.

Buy America and Procurement-Related Rules

Requirements that federally funded projects use U.S.-made materials (Buy America) and that maritime transport between U.S. points be carried by U.S.-built and crewed vessels (Jones Act) support domestic manufacturing and workforce. However, both public and private stakeholders identify these requirements as increasing cost or delaying investments in freight infrastructure and maritime operations. This is especially true for certain commodities or products that are not widely available in the United States or have less reliable or more strained capacities in their supply chains.

Opportunity: Policies like those undertaken by The Trump administration to support U.S. manufacturing competitiveness and to bolster U.S. maritime dominance, including investments in the underlying transportation infrastructure that supports them, is important to mitigating these impacts.

Ban on Commercialization of Public Rights-of-Way

Federal law generally prohibits the commercialization of public interstate highway rights-of-way, including the development of services such as fuel stations, restaurants, or retail at rest areas. This restriction limits the ability of States to provide additional driver amenities at rest stops or use revenues to subsidize expanded truck parking spaces. As a result, opportunities to add safe, convenient parking facilities on public rights-of-way are constrained, even as truck parking shortages have been identified by drivers, fleets, and State DOTs as a critical safety and efficiency issue. The ban complicates efforts by States to partner with private providers or to integrate parking with existing rest areas, reducing flexibility in addressing this longstanding national challenge.

Other Regulatory Limitations

Other often-cited regulations or statutes include State-specific taxes or fees that vary across jurisdictions, emissions standards for locomotives that affect equipment replacement timing, and cargo-screening and security mandates at airports that can slow handling of time-sensitive freight. While these are narrower in scope, addressing them may yield improvements in reliability, cost, or capacity in critical parts of the freight network.

TECHNOLOGICAL BARRIERS

Technology has the potential to greatly improve freight performance, but adoption is uneven and fragmented. Technological barriers are both nationally impactful and sector-specific, shaping how effectively freight carriers, facilities, and public agencies can plan and operate.

Data Fragmentation and Limited Integration

Freight data is collected by many public and private entities, but in different formats and with varying levels of accessibility. Privacy and proprietary concerns often limit sharing, leaving planners without a full picture of freight activity. This makes it difficult to evaluate multimodal performance, identify bottlenecks, or anticipate disruptions.

Opportunity: Developing common formats, protocols, and data-sharing frameworks would improve interoperability among Federal, State, and private systems. Clearer standards could help agencies and carriers share information on freight flows, performance, crash data and bottlenecks without compromising proprietary concerns.

Lack of Interoperability Among Digital Freight Platforms

Proprietary systems for load matching, chassis tracking, and supply chain visibility often operate in isolation, limiting the ability of carriers and shippers to see and manage

freight activity across platforms. The absence of common interoperability standards means users must juggle multiple systems to track equipment and shipments, reducing transparency and adding cost.

Opportunity: Federal leadership on interoperability guidelines for load matching, chassis tracking, and visibility platforms could reduce duplication and lower barriers for smaller carriers and shippers. Creating pathways for broader participation would promote more equitable access to efficiency gains.

Lagging Adoption of Integrated Community and Corridor Systems

Internationally, many ports use centralized platforms that allow carriers, shippers, terminal operators, and regulators to share information in real time. In the United States, cargo visibility is often fragmented across multiple systems or dependent on ad hoc exchanges, slowing throughput and reducing transparency.

Opportunity: Supporting the development of port community systems or similar corridor-wide platforms would allow multiple stakeholders to share data in real time, improving transparency and reducing delays. Piloting such systems in U.S. trade gateways could demonstrate benefits observed at ports abroad.

Uneven Deployment of Freight-Related Technologies

At ports and terminals, some facilities have adopted advanced tools such as appointment systems, automated handling, and digital gate management, while others rely on manual processes. In trucking, larger carriers often use connected vehicle technologies and advanced fleet management systems, but smaller operators face higher barriers to entry. This creates inconsistent performance across the national freight system.

Opportunity: Targeted investment and technical support could help facilities adopt proven tools such as appointment systems, gate automation, and digital yard management. Expanding these technologies would reduce congestion and improve predictability in cargo handling.

Gaps in Digital Infrastructure and Equipment Standards

Many rural freight corridors still do not have reliable broadband or cellular coverage, constraining the use of GPS tracking, electronic logging, and real-time routing tools. Carriers pursuing alternative-fuel trucks face uncertainty because standardized charging connectors, fueling protocols, and nationwide network availability are still developing. Similarly, inland waterways and short line railroads often depend on aging communication and control systems that cannot integrate with modern technologies. Without this enabling environment, adoption remains limited even among operators prepared to invest.

Opportunity: Closing rural broadband gaps would support modern logistics tools along agricultural and energy corridors. Similarly, advancing consistent standards for charging and fueling alternative-fuel trucks would reduce uncertainty and promote broader adoption.

INSTITUTIONAL BARRIERS

Freight performance depends not only on infrastructure and technology, but also on the institutions that plan, fund, and manage the system. Institutional barriers emerge when responsibilities are fragmented, coordination is limited, or capacity is uneven across levels of government. These challenges can slow decision-making and reduce the effectiveness of investments, even when resources are available.

Fragmented Governance

Freight responsibilities are distributed across Federal agencies, State DOTs, MPOs, port authorities, and local governments. While this ensures diverse input, it can also create duplication and difficulty in aligning priorities. For example, Federal programs may set broad freight goals, but implementation varies widely across States, leading to inconsistent outcomes.

Opportunity: State DOTs are encouraged to create State Freight Advisory Committees, with participation from local government and independent transportation authorities, as well as private sector stakeholders including shippers and carriers, to facilitate alignment on freight strategies and investments.

Multistate and Regional Coordination Gaps

Freight corridors cross multiple jurisdictions, yet most planning processes remain State- or region-specific. Without formal mechanisms for coordination, important corridors may be underfunded or inconsistently managed. Coalitions such as the I-95 Corridor Coalition demonstrate the benefits of multistate collaboration, but coverage is uneven and largely voluntary.

Opportunity: Creating or expanding formal multistate freight coalitions can improve planning for key corridors that cross State lines. Federal support for regional compacts and corridor studies can help ensure that rural and energy-exporting States are better integrated into national freight strategies. USDOT's Multimodal Freight Office will leverage the efforts of existing freight-focused and freight eligible technical assistance programs across the Department, such as the FHWA's Freight Peer-to-Peer Program MARAD Maritime Environmental and Technical Assistance Program, PHMSA Technical Assistance Grants, and the Build America Bureau's Regional Infrastructure Accelerators Program and Rural and Tribal Assistance Pilot Program, in order to support multistate planning efforts.

Short-Term Planning and Funding Horizons

Freight projects often require sustained investment over many years, but public-sector planning cycles are tied to surface reauthorization bills or annual appropriations. This misalignment discourages pursuit of complex, multimodal strategies. For instance, freight rail or intermodal projects that require a decade of planning can be difficult to advance when funding certainty is measured in just a few years.

Opportunity: Extending planning and funding cycles beyond short-term reauthorization periods would allow agencies to pursue complex, multimodal projects with more confidence. Encouraging States and MPOs to incorporate 10- 20-year freight performance goals into their long-range plans can help improve alignment.

Inconsistent Federal–State–Local Coordination Mechanisms

While Federal programs provide flexibility, the absence of clear frameworks for translating national freight priorities into State and local action leads to uneven implementation. The FAST Act's requirement for SFPs improved consistency, but differences in scope and quality across States show the limits of current coordination mechanisms.

Opportunity: Establishing clearer frameworks for how national freight objectives translate into State and regional implementation could reduce uneven outcomes. Regular Federal guidance updates and performance reporting can help ensure consistency without reducing flexibility.

Gaps in Multimodal Integration

Federal and State funding streams remain largely mode-specific, creating barriers to holistic planning. For example, highway and port improvements are often advanced separately, even when they serve the same freight flows. This separation reduces opportunities to design and finance integrated solutions at intermodal hubs.

Opportunity: Federal programs can encourage freight projects that span multiple modes by supporting planning grants, corridor studies, and pilot projects that explicitly integrate highway, rail, port, and air freight solutions. This can help break down institutional silos and encourage more comprehensive approaches.

Challenges Financing Multimodal Projects

As with gaps in planning for multi-modal projects, mode-specific funding can also make it difficult to pursue integrated highway, rail, maritime, and air freight projects. As a result, multimodal projects often lack clear financing pathways, requiring sponsors to piece together multiple programs with different eligibility requirements.

Opportunity: Clarifying or expanding program eligibility and providing technical assistance to maximize existing multimodal funding opportunities can help project sponsors combine resources across modes more effectively.

Unequal Institutional Capacity

Larger States and metropolitan areas often maintain dedicated freight offices and advanced analytic capabilities, while smaller or rural jurisdictions may lack staff or technical expertise to compete for competitive grants. This uneven capacity can disadvantage projects that are nationally important but locally under-resourced.

Opportunity: Technical assistance, peer exchanges, and targeted planning grants can help smaller States and MPOs develop freight expertise. Ensuring that all regions have access to resources and knowledge improves fairness and provides greater opportunity for delivering freight investments where they are most impactful.

Limited Freight Representation in Planning Processes

Private freight stakeholders such as carriers, shippers, and terminal operators are not always well represented in MPO or State decision-making. Passenger mobility needs often dominate, even in regions where freight drives the economy. Without structured engagement, freight perspectives can be underweighted in long-range plans and project selection.

Opportunity: Formal mechanisms to involve freight carriers, shippers, and terminal operators in State and regional planning can improve project selection and outcomes. Regular engagement platforms such as freight advisory committees or industry forums ensure that public institutions remain responsive to evolving private-sector needs.

Fragmented Stakeholder Engagement

Public engagement with freight operators is often episodic, tied to individual projects or planning cycles. The absence of sustained forums for dialogue makes it difficult for agencies to anticipate industry needs or adapt to shifting supply chain trends.

Opportunity: State DOTs are encouraged to create State Freight Advisory Committees, with participation from private sector freight carriers and major freight reliant industries. State Freight Advisory Committees can be engaged regularly by the public sector in support of coordinated and future-focused freight investment planning.

FINANCIAL BARRIERS

Financing freight projects presents persistent challenges across all modes. While Federal programs provide important resources, many stakeholders and analysts have noted that existing approaches to funding are not sufficient to meet national freight needs. These barriers are both nationally impactful and sector-specific, shaping how freight projects are planned, delivered, and maintained.

State and Local Match Requirements

Federal grants typically require non-Federal match contributions, which can be difficult for small ports, rural States, and local governments with limited fiscal capacity. While intended to ensure sponsors are committed to project success, this requirement can reduce the ability of resource-constrained entities to utilize Federal funding, even when projects otherwise contribute to national freight policy goals.

Opportunity: Reduced match requirements for rural States, small ports, or disadvantaged communities already help expand access to Federal funding across programs, yet sometimes financing may be necessary to meet immediate capital needs. Increasing awareness and application of innovative financing such as credit assistance, public-private partnerships (P3s), grant anticipation revenue vehicle (GARVEE) bonds, and others may support small and rural states, ports, and communities to raise matching capital. This shift enables public agencies to bridge funding gaps that traditional grants or local revenues might not cover.

Unpredictable and Fragmented Funding Streams

Significant sums of freight funding are delivered through competitive awards rather than stable, formula-based programs. This funding approach can be a challenge for long-term or multimodal projects that require sustained investment. In the past, GAO has noted that freight projects face growing demand but are constrained by funding sources that are often short-term and uncertain.[371]

Opportunity: Expanding access to information and training regarding the diverse range of Federal funding sources and their various flexibilities can empower States and regions to better prioritize and fully fund their freight projects. Technical assistance, training, and development of reference materials will help States maximize the value of their Federal formula funding for freight.

Underinvestment in First- and Last-Mile Connectors

Ports, airports, and intermodal facilities consistently identify intermodal freight connectors such as local access roads, rail spurs, and pipelines as bottlenecks. These facilities are essential to overall system performance but often fall outside the scope of major Federal and State programs. GAO recently highlighted that "landside connectors" at U.S. ports are particularly vulnerable, with gaps in funding and resilience planning limiting throughput and exposing communities to risk.[372]

Opportunity: Clarifying eligibility for connector projects in major freight and non-freight specific programs or creating dedicated funding streams could help address chronic bottlenecks at ports, airports, and intermodal facilities.

Limited Participation of Private Capital

Many freight projects generate broad public benefits but direct revenue streams are limited, which constrains opportunities for public-private partnerships and the ability to leverage private capital for investments such as grade separations, rural connectors, or port access roads, leaving such projects heavily dependent on scarce public funds.

Opportunity: Public-private partnerships can supplement limited public funds, especially for projects with clear revenue streams such as terminals, warehouses, or value-added services. The Transportation Research Board (TRB) has noted that while many freight projects may not attract private investment, targeted opportunities exist where benefits align with potential revenue.[373]

OTHER BARRIERS

Some barriers to freight performance do not fall neatly into statutory, technological, institutional, or financial categories. These issues often emerge in local contexts but have regional or systemwide consequences, as they influence where freight can operate, how efficiently it moves, and how communities and industries adapt to growth in demand.

Alignment of Investment with Emissions Reduction Standards

Standards designed to reduce emissions affect freight fleets, facilities, and infrastructure planning. While these requirements serve important public purposes, uncertainty about implementation timelines, fuel availability, and supporting infrastructure can delay private investment and reduce predictability for shippers and carriers.

Opportunity: Coordinated Federal and State guidance on the timing of emissions standards would reduce uncertainty for carriers and facility operators. This can help align private investment with regulatory expectations.

Industrial Land Use and Siting Constraints

In many metropolitan regions, limited availability of appropriately zoned industrial land restricts opportunities to expand or modernize freight facilities. When ports, rail yards, and airports are surrounded by competing land uses, congestion and higher logistics costs can ripple across national supply chains. Freight-related development provides economic opportunities, including job access for communities.

Opportunity: States and metropolitan regions can work with local governments on zoning, land banking, and freight-specific planning tools to preserve scarce industrial land near ports, rail yards, and airports. Incorporating freight needs into

local community comprehensive plans reduces conflicts and ensures space for future logistics growth in a manner that is compatible with land use planning.

Navigation and Channel Management Constraints

Inland and coastal waterways require regular dredging and channel maintenance to maintain reliable navigation. When schedules or funding for maintenance are misaligned with demand, shippers face delays and higher costs that can shift freight to less efficient modes, affecting system performance.

Opportunity: Closer coordination among the U.S. Army Corps of Engineers, port authorities, and State agencies can help align dredging and maintenance schedules with peak shipping periods, improving reliability for shippers while maintaining environmental and operational standards.

Geographic Disparities and Market Thinness

Rural and smaller markets often lack intermodal terminals, warehousing, or cold chain facilities. This reduces modal choices and increases costs for shippers, particularly in agriculture and energy sectors that serve national and international markets. These gaps limit efficiency in large portions of the network despite high demand.

Opportunity: Technical assistance, planning grants, or targeted investments in rural and smaller-market regions can help fill gaps in intermodal access, cold storage, or warehousing. These measures ensure more balanced freight performance across geographies.

Freight and Community Interface

Freight often intersects directly with neighborhoods through truck routes, staging areas, and local access roads. Where truck networks and staging facilities are inadequate, freight trips are pushed into local streets, creating inefficiencies and raising safety and congestion concerns. These local challenges aggregate into national bottlenecks, especially at major ports and trade gateways.

Opportunity: Expanding designated truck networks, providing off-street staging, exploration and pilot testing of truck express lanes in key areas, and using off-hour delivery strategies can reduce conflicts between freight and local traffic during last-mile deliveries. These measures improve safety and reduce community opposition while keeping freight flows efficient.

Housing and Land Price Pressures Near Freight Hubs

Rapid residential and mixed-use development near freight corridors and terminals has increased land prices and intensified land-use conflicts. Over time, displacement or fragmentation of logistics clusters can lengthen truck trips, increase vehicle miles traveled, and undermine the efficiency of established freight hubs.

Opportunity: Local governments can use buffer zones, noise and traffic mitigation, industrial zoning overlays, and corridor preservation strategies to reduce conflicts as housing and mixed-use development expand near freight hubs. Proactive planning can help freight and communities coexist without undermining long-term logistics efficiency.

Land Use Conflicts and Encroachment

Freight corridors and rights-of-way are increasingly affected by nearby development. Encroachment can limit opportunities for expansion, complicate operations, and slow project delivery. When key corridors lose capacity or flexibility, the result is diminished reliability for national freight movements.

Opportunity: Policies that preserve rights-of-way and discourage incompatible land uses adjacent to major freight facilities or corridors can help protect capacity for future freight expansion. Early coordination between transportation agencies and land-use authorities can reduce costly delays and conflicts. Exploring opportunities such as truck only express lanes and other strategies to preserve freight access and fluidity, even as encroaching development from urban sprawl creates new highway access points.

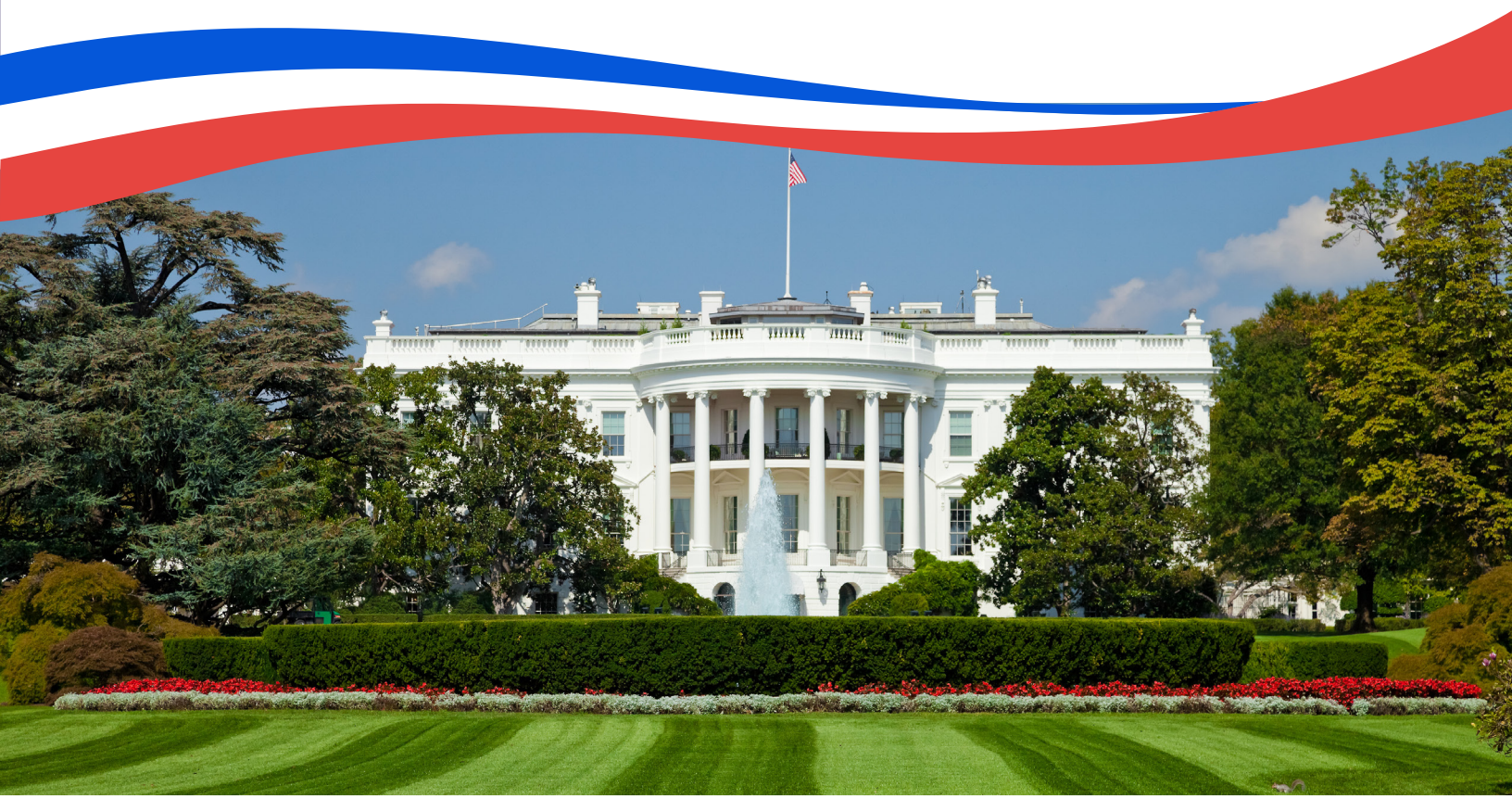
PART 4:

STRATEGIC FRAMEWORK

VISION

A modern, resilient U.S. freight system driving America's economic growth by seamlessly connecting producers, shippers, and consumers worldwide, grounded in safety, reliability, security, and advanced data-driven innovation.

FEDERAL ROLE



Today's supply chains rely on interstate and international freight to support economic growth. The Federal Government has an important role in supporting and overseeing the freight system that underpins these supply chains, derived from the commerce clause of the U.S. Constitution.

The Federal Government provides significant funding and financing for freight-supporting projects, such as building and rehabilitating highways and bridges, dredging coastal and inland waterways, repairing locks and improving rail safety. However, most decisions about how to spend Federal dollars are made at the local level with oversight from Federal agencies. Freight projects are often large, complex, multimodal, and multijurisdictional, making them difficult to fund through traditional highway-focused formula programs. As a result of new and growing competitive programs for freight, the Federal Government can now support more effective State and local decision-making by identifying and funding nationally important freight-supporting infrastructure and facilitating multistate collaborations.

USDOT uses the following principles to support a safe, strong, and reliable American freight system:

1. Modernize or eliminate unnecessary or duplicative regulations that inhibit supply chain efficiency, reduce incentives to innovation, delay project delivery, or raise costs to shippers and consumers, while protecting safety and environmental outcomes.
2. Improve cross-sector, multijurisdictional, and multimodal collaboration to enhance multimodal connectivity and first- and last-mile connections, streamline interstate policies and regulations, and support multistate investment.
3. Provide targeted Federal resources and financial assistance to support freight projects that provide significant benefits to the national economy.
4. Invest in freight data, analytical tools, and research to enhance the abilities of State, regional, and local agencies to evaluate and address freight issues.

STRATEGIC GOALS

To achieve our vision for the Nation's freight system, USDOT has identified the following six Strategic Goals that anchor this National Freight Strategic Plan (Table 23), which are in alignment with the USDOT's Department-wide strategic goals. Together, these goals define the core outcomes this plan seeks to advance over the next five years and reflect the most significant freight system challenges and opportunities identified through analysis, stakeholder engagement, and prior planning efforts. Each goal is further defined by a set of strategic objectives which define more specific actions USDOT will undertake to meet its defined freight goals. Because the freight system functions as a connected national network where disruptions, delays, or improvements in one location can affect supply chains far beyond their point of origin, the goals and objectives in this section emphasize system-level, end-to-end outcomes rather than isolated facilities or projects.

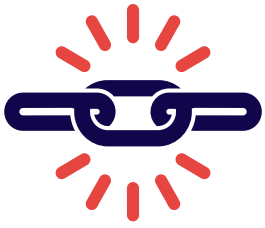
The goals are intentionally high-level and outcome-oriented, consistent with the Federal role in freight transportation. The focus on national coordination, targeted investment, data and analytical support, research, and regulatory alignment, while allowing States, metropolitan regions, Tribal governments, and industry partners to determine how best to implement solutions within their respective contexts.

The goals are not intended to prescribe specific projects or policies, but to guide alignment of freight-related decisions, investments, and coordination efforts across the national freight system.

Safety

Efficiency

Security



Resiliency

Innovation

Capability

TABLE 23. NATIONAL FREIGHT STRATEGIC PLAN GOALS AND STRATEGIC OBJECTIVES

GOAL	STRATEGIC OBJECTIVES
A Safe Freight System Reduce or eliminate serious injuries and fatalities of the freight system.	1. Focus Federal safety resources on the highest-severity freight risks 2. Accelerate deployment of proven safety technologies in freight operations and infrastructure 3. Strengthen freight-specific hazardous materials safety and emergency preparedness 4. Improve safety outcomes through targeted freight safety data and risk analysis
An Efficient Freight System Improve system reliability and streamline government regulation.	1. Reduce delay and unreliability at nationally significant freight bottlenecks 2. Better utilize existing freight infrastructure through improved supply chain visibility 3. Streamline Federal processes affecting freight project delivery and operations 4. Promote integrated, multimodal freight planning and investment
A Secure Freight System Ensure the integrity of our Nation's supply chains in support of national defense and economic prosperity.	1. Protect and enhance freight assets critical to national defense mobility 2. Reduce cargo theft, fraud, and physical security risks in freight supply chains 3. Strengthen cybersecurity and operational security of freight systems 4. Support secure freight corridors for strategic energy, industrial, and resource supply chains
A Resilient Freight System Reduce risks to the freight system and improve our response approaches.	1. Identify and mitigate single points of failure in the National Multimodal Freight Network 2. Increase redundancy and rerouting capability on critical freight corridors 3. Integrate risk and criticality analysis into freight planning and investment decisions 4. Strengthen freight-focused preparedness, response, and recovery practices
An Innovative Freight System Modernize freight infrastructure and foster game changing technologies.	1. Support safe testing and deployment of advanced freight technologies 2. Promote interoperable digital standards for freight data and operations 3. Direct Federal research and pilots toward high-impact freight use cases 4. Lower adoption barriers of proven innovations across the freight network
A Capable Freight Workforce Build a skilled workforce for the 21st Century and improve quality of life.	1. Strengthen workforce entry pathways into core freight concentrations 2. Support upskilling and reskilling for a technology-enabled freight system 3. Improve freight working conditions to support retention and safety 4. Improve freight workforce data and planning

Goal: A Safe Freight System

Reduce or eliminate serious injuries and fatalities on the freight system and increase operational and infrastructure safety.

Freight safety is a core Federal responsibility and a prerequisite for a reliable and efficient national freight system. While safety outcomes have improved over time, serious crashes and incidents remain concentrated on specific corridors, facilities, and operations. USDOT's safety strategy emphasizes risk-based prioritization, deployment of proven countermeasures, strengthened preparedness for high-consequence events, and effective use of existing safety data to guide investment, oversight, and coordination.

Strategic Objective 1: Focus Federal Safety Resources on the Highest-Severity Freight Risks

USDOT will prioritize safety programs, data analysis, and grant investments on freight corridors, nodes, and operations associated with the most severe and highest concentration of crashes and incidents. These include high-risk truck corridors on the Interstate and the Draft NMFN, rail–highway grade crossings near terminals and industrial facilities, bridge and tunnel strikes, inland waterway lock incidents, and corridors with significant hazardous materials movements.

Using multimodal safety data from FMCSA, FHWA, FRA, PHMSA, the Coast Guard, and the National Transportation Safety Board, the Department will identify locations and risk factors associated with disproportionate safety consequences. USDOT will align competitive grant criteria, formula program guidance, and technical assistance to support projects and strategies that directly address these risks such as grade separations, geometric and clearance improvements, work zone planning for freight routes, and targeted operational changes. This risk-based approach ensures that Federal safety resources are directed where they can deliver the greatest reduction in fatalities, injuries, and catastrophic incidents.

Strategic Objective 2: Accelerate Deployment of Proven Safety Technologies

USDOT will promote faster and broader deployment of safety technologies that have demonstrated effectiveness in reducing freight-related crashes and incidents. Across freight modes, these include advanced driver assistance systems and automated braking for trucks, positive train control and wayside detection systems in rail, low-clearance detection and warning systems for bridges and tunnels, and advanced navigation and collision-avoidance technologies for marine operations.

The Department will use a combination of research, pilot programs, guidance, and incentive-based program design to encourage adoption of these technologies, while supporting coordination on standards, performance metrics, and interoperability. By focusing on technologies with established safety benefits, USDOT will help accelerate real-world safety improvements.

Strategic Objective 3: Strengthen Hazardous Materials Safety and Emergency Preparedness

USDOT will enhance the safety of hazardous materials movements by supporting States and local governments to strengthen routing analysis, preparedness planning, and emergency response capabilities along major freight corridors. Hazardous materials are essential to the U.S. economy, but incidents involving these commodities can have severe consequences for communities, responders, and the environment.

The Department will improve data on hazardous materials flows, support integration of hazmat considerations into freight planning and corridor studies, and target preparedness and training resources—particularly in rural areas and regions with limited responder capacity. USDOT will also work with State, local, Tribal, and industry partners to promote coordination among transportation agencies, emergency managers, and responders so that planning, response, and recovery efforts are aligned with real-world freight movement patterns.

Strategic Objective 4: Improve Safety Outcomes Through Targeted Freight Safety Data and Risk Analysis

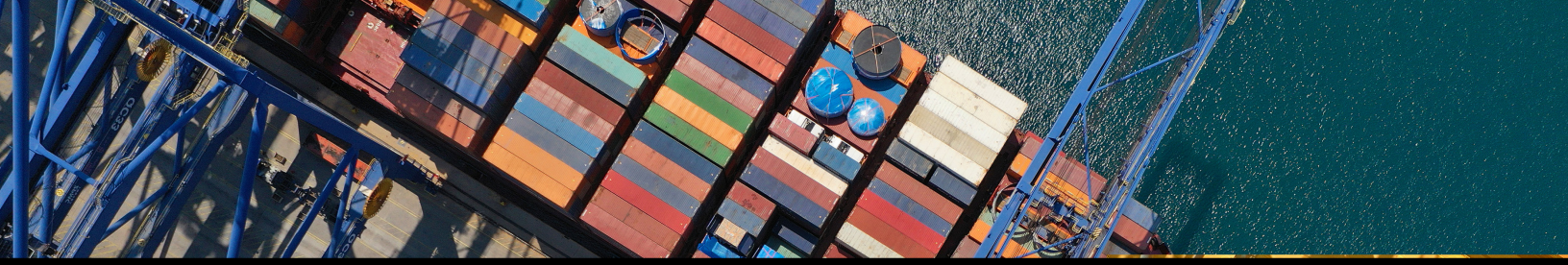
USDOT will strengthen the use of freight-specific safety data and analytical tools to better identify, monitor, and address safety risks across the national freight system. While significant safety data already exist, gaps in coverage, consistency in reporting incidents across jurisdictions, and integration across modes can limit their usefulness for planning and investment decisions.

The Department will continue to improve multimodal safety datasets, support analytical approaches that link infrastructure condition, operational characteristics, and crash outcomes, and provide tools and technical assistance that help public agencies translate safety data into actionable priorities. By improving how safety risks are measured and communicated, USDOT will enable more precise targeting of Federal investments and more effective collaboration with State, regional, and local partners to improve freight safety outcomes nationwide.

INDICATORS OF SUCCESS

Progress toward a safer national freight system will be assessed using a small set of long-standing Federal safety outcome measures that reflect the most severe freight-related risks across modes.

- Trend in fatalities involving large trucks on public roadways
- Trend in serious freight-related transportation accidents across modes
- Trend in highway–rail grade crossing incidents
- Trend in hazardous materials transportation incidents with severe consequences
- Safety performance trends at nationally significant freight corridors and nodes



Goal: An Efficient Freight System

Improve system reliability and streamline government regulation.

An efficient freight system enables predictable, reliable movement of goods that supports economic growth and competitiveness. Congestion, unreliable travel times, and fragmented planning increase logistics costs and disrupt production and distribution. Many of these inefficiencies are concentrated at specific bottlenecks, connectors, and trade gateways. Because congestion and unreliability at key nodes can create cascading delays across regions and modes, USDOT's efficiency strategy emphasizes network-level performance rather than isolated bottleneck relief. USDOT's efficiency strategy focuses on relieving the most consequential constraints, improving system visibility, streamlining Federal processes, and promoting integrated multimodal planning.

Strategic Objective 1: Reduce Delay and Unreliability at Nationally Significant Freight Bottlenecks

USDOT will prioritize efforts to reduce congestion and variability at freight bottlenecks that impose the greatest systemwide economic costs. These include heavily congested Interstate segments, constrained intermodal connectors, port and terminal access routes, inland waterway locks, rail junctions, and land border crossings that carry disproportionate shares of freight value and volume.

Using existing performance data, SFPs, and corridor studies, the Department will focus competitive funding, formula program guidance, and technical assistance on projects that demonstrably improve travel time reliability, reduce queuing and dwell, and restore predictable freight movement. Emphasis will be placed on improvements that deliver benefits beyond a single jurisdiction or mode, recognizing that delays at key nodes often cascade across regional and national supply chains.

Strategic Objective 2: Better utilize existing freight infrastructure through improved supply chain visibility

USDOT will strengthen the ability of public agencies and industry to make more efficient use of existing freight infrastructure by improving visibility into freight demand, performance, and constraints. While substantial data already exist, gaps in integration and accessibility can limit their usefulness for planning and operational decision-making.

The Department will continue to invest in and maintain core freight datasets and tools, support secure data-sharing initiatives, and provide analytical resources that help translate data into actionable insights. By improving understanding of origin–destination flows, bottleneck severity, and reliability trends, USDOT will enable more informed investment decisions and operational strategies that reduce inefficiency without requiring significant new infrastructure.

Strategic Objective 3: Streamline Federal Processes Affecting Freight Project Delivery and Operations

USDOT will work across the Federal Government to improve coordination, clarity, and predictability in processes that affect freight infrastructure delivery and operations. Freight projects are often large, multimodal, and multijurisdictional, making them particularly sensitive to delays caused by overlapping reviews, inconsistent requirements, or unclear guidance.

The Department will identify opportunities to better align Federal processes, provide clearer guidance for freight-relevant projects, and offer technical assistance to help project sponsors navigate requirements efficiently. These efforts are intended to reduce delay and uncertainty while maintaining safety, environmental protection, and fiscal accountability.

Strategic Objective 4: Promote Integrated, Multimodal Freight Planning and Investment

USDOT will encourage planning and investment approaches that evaluate freight needs and solutions across modes rather than in isolation. Many persistent efficiency challenges arise at modal interfaces such as ports, rail terminals, inland ports, and border crossings where capacity, access, and operational issues intersect.

Through SFP guidance, support for multistate corridor initiatives, and grant criteria that reward multimodal connectivity, USDOT will promote investments that improve end-to-end freight performance. This approach helps ensure that public resources are directed toward solutions that maximize overall system efficiency, rather than shifting congestion or delay from one mode or location to another.

INDICATORS OF SUCCESS

Progress toward a more efficient national freight system will be assessed using a small set of existing Federal performance measures and datasets that reflect reliability, delay, and throughput at key freight locations.

- Trend in truck travel time reliability on major freight corridors
- Trend in truck delay at nationally significant highway bottlenecks
- Trend in dwell time and delay at key freight nodes
- Trend in systemwide freight reliability across modes
- Demonstrated efficiency benefits from federally supported freight projects

Goal: A Secure Freight System

Ensure the integrity of our nation's supply chains in support of national defense and economic prosperity.

The national freight system is critical to military readiness, industrial production, and access to global markets, while facing risks from cargo theft, physical intrusion, and cyber threats. USDOT's security strategy focuses on protecting critical freight assets, strengthening coordination with Federal partners and industry, and improving the security of physical and digital freight systems.

Strategic Objective 1: Protect and Enhance Freight Assets Critical to National Defense Mobility

USDOT will work with the Department of War and other Federal, State, and local partners to ensure that freight infrastructure essential to military readiness and surge capacity remains reliable and accessible. These assets include designated strategic highway and rail networks, ports that support military sealift, cargo-capable airports, and their associated first- and last-mile connections.

The Department will support incorporation of defense mobility considerations into freight planning, project prioritization, and infrastructure investment decisions. By aligning freight investments with national defense requirements, USDOT will help ensure that the transportation system can support both routine commercial activity and military mobilization when needed.

Strategic Objective 2: Reduce Cargo Theft, Fraud, and Physical Security Risks

USDOT will support coordinated efforts to address cargo theft, fraud, and other physical security risks that disrupt freight movements and increase costs for shippers and carriers. Available reporting indicates that cargo theft incidents are not evenly distributed across the freight network, but tend to cluster near major freight corridors, logistics facilities, and high-volume regions. These incidents often exploit predictable freight operations such as scheduled pickups, dwell times, and staging locations, as well as coordination challenges across carriers, facilities, and enforcement jurisdictions.

The Department will work with Federal partners, States, local law enforcement, and industry to improve information sharing, highlight effective prevention practices, and encourage investments and operational changes that reduce theft risk. These efforts will focus on known hotspots such as major distribution hubs, freight corridors, truck parking and staging areas, and border regions.

Strategic Objective 3: Strengthen Cybersecurity and Operational Security

As freight operations increasingly rely on digital platforms and automated systems, cybersecurity has become integral to transportation security. Disruptions to terminal systems, dispatch platforms, navigation systems, or industrial control systems can have cascading impacts across supply chains.

USDOT will collaborate with Federal partners and industry to promote cybersecurity awareness and risk management practices across freight modes. This includes encouraging consideration of cyber and operational security in freight planning, infrastructure investment, and technology deployment, and supporting the use of established guidance and best practices to reduce vulnerabilities in critical freight systems.

Strategic Objective 4: Support Secure Freight Corridors for Strategic Energy, Industrial, and Resource Supply Chains

USDOT will identify and support multimodal freight corridors that are especially important for moving energy products, industrial inputs, and critical resources between production areas, processing facilities, manufacturing centers, and export trade gateways. Disruptions along these corridors can have outsized consequences for economic stability and industrial operations.

Through corridor-focused planning, coordination with other Federal agencies, and targeted investments, the Department will help ensure that these routes maintain reliable access, adequate capacity, and secure operations. Emphasis will be placed on protecting key nodes and intermodal transfer points where disruptions or malicious actions could significantly impair national supply chains.

Indicators of Success

Progress toward a more secure national freight system will be assessed using a small set of existing Federal indicators and reporting mechanisms that reflect the protection and continuity of critical freight networks.

- Condition and accessibility of freight infrastructure critical to defense mobility
- Trend in reported cargo theft incidents and losses
- Trend in security-related freight disruptions
- Adoption of established cybersecurity and security practices

Goal: A Resilient Freight System

Reduce risks to the freight system and improve our response approaches.

Freight disruptions can cascade across supply chains, affecting operations far beyond the location where the disruption occurs. Resilience requires identifying critical vulnerabilities, strengthening redundancy, embedding risk into planning and investment, and improving preparedness and recovery. Resilience in a networked freight system depends not only on individual asset strength, but on redundancy, interconnections, and the ability to reroute flows when disruptions occur. USDOT's resiliency strategy focuses on these systemwide capabilities using existing planning, funding, and coordination frameworks.

Strategic Objective 1: Identify and Mitigate Single Points of Failure on the National Multimodal Freight Network

USDOT will work with Federal partners, State, regional, Tribal, and industry partners to identify freight infrastructure assets and systems whose failure would cause severe and widespread disruption. These include critical bridges and tunnels, inland waterway locks, port channels and terminals, rail junctions, border crossings, and other high-criticality nodes on major freight corridors.

Using existing national datasets, SFPs, and corridor studies, the Department will support risk and criticality assessments that help prioritize attention on these locations. Federal funding, technical assistance, and planning guidance will emphasize actions that reduce the likelihood or consequences of failure such as asset modernization, operational improvements, or practical workarounds that maintain freight movement during disruptions.

Strategic Objective 2: Increase Redundancy and Rerouting Capability on Critical Freight Corridors

Recognizing that not all disruptions can be prevented, USDOT will promote freight network designs and investments that provide practical alternatives when primary routes or facilities are constrained. Redundancy may include parallel highway or rail routes, alternate port or terminal access, inland ports and intermodal facilities, or the ability to shift freight between modes when conditions require.

Through guidance, support for multistate corridor coordination, and competitive program criteria, the Department will encourage investments that strengthen network flexibility and reduce reliance on single routes or facilities. These efforts help limit cascading impacts and enable freight to continue moving during disruptions, maintenance outages, or emergency conditions.

Strategic Objective 3: Integrate Risk and Criticality Analysis into Freight Planning and Investment Decisions

USDOT will continue to integrate hazard exposure, infrastructure condition, freight volumes, and economic importance into freight planning and investment processes. Understanding how risks intersect with freight criticality allows public agencies to prioritize projects that deliver the greatest resilience benefits for the national economy.

The Department will embed these considerations into SFP guidance, corridor studies, and competitive grant evaluation, using established analytical approaches rather than new reporting requirements. This integration helps ensure that resilience is considered alongside safety and efficiency when directing Federal freight resources.

Strategic Objective 4 Strengthen Freight-Focused Preparedness, Response, and Recovery Practices

USDOT will work with Federal partners, States, and local agencies to ensure that freight movements—particularly for essential goods such as fuel, food, and key industrial inputs—are explicitly addressed in emergency preparedness, response, and recovery efforts.

This includes promoting designation and use of emergency freight corridors, sharing best practices for rapid rerouting and clearance, and incorporating freight considerations into emergency planning and after-action reviews. By strengthening coordination and preparedness using existing emergency management structures, USDOT will help reduce downtime and speed recovery following disruptive events.

INDICATORS OF SUCCESS

Progress toward a more resilient national freight system will be assessed using a small set of existing Federal indicators and reporting practices that reflect risk reduction, continuity, and recovery.

- Trend in unscheduled closures at critical freight infrastructure
- Recovery time following major freight disruptions
- Condition trends for freight-critical infrastructure
- Demonstrated use of redundancy during disruptions
- Integration of resilience considerations into freight planning

Goal: An Innovative Freight System

Modernize freight infrastructure and foster game changing technologies.

Innovation is reshaping freight transportation through advances in automation, digital systems, data analytics, and new operational models. These developments offer opportunities to improve safety, reliability, and system performance, but they also present challenges for public agencies responsible for infrastructure, regulation, and oversight. USDOT's role is to ensure that promising innovations can be tested safely, evaluated rigorously, and deployed at scale where they demonstrate clear public benefit. The Department's innovation strategy therefore focuses on enabling experimentation, promoting interoperability, directing research toward high-impact use cases, and lowering barriers to adoption across the national freight network.

Strategic Objective 1: Support Safe Testing and Deployment of Advanced Freight Technologies

USDOT will support the structured testing, evaluation, and phased deployment of advanced freight technologies that demonstrate potential to improve safety, reliability, and system performance. These include automation in trucking, rail, ports, and terminals; advanced inspection and monitoring systems; and emerging freight applications of unmanned or remotely operated technologies.

The Department will use existing research programs, pilot authorities, and guidance to help assess real-world impacts, share lessons learned, and ensure that infrastructure design, standards, and policies remain aligned with evolving freight technologies. Emphasis will be placed on safety, interoperability, and readiness for broader deployment, rather than on early-stage experimentation alone.

Strategic Objective 2: Promote Interoperable Digital Standards for Freight Data and Operations

USDOT will promote the use of interoperable digital and data standards that allow freight technologies and platforms to scale efficiently across modes, regions, and facilities. Fragmented or proprietary systems can limit the benefits of innovation by increasing integration costs and creating barriers to participation, particularly for smaller operators and public agencies.

The Department will work with industry, standards organizations, and Federal partners to encourage alignment around common approaches for key freight information flows, such as terminal and gate operations, shipment visibility, work zone and restriction data, and system-to-system communications. By supporting interoperability, USDOT will help ensure that digital freight innovations can be broadly adopted and integrated into existing operations.

Strategic Objective 3: Direct Federal Research and Pilots Toward High-Impact Freight Use Cases

USDOT will focus its freight-related research, demonstration, and advanced development efforts on use cases with strong potential to deliver measurable public benefits. These include applications that improve infrastructure reliability, support predictive maintenance, enhance operational decision-making, and provide better system-level understanding of freight performance.

Through existing research programs and advanced R&D initiatives, the Department will help test promising concepts, evaluate benefits and risks, and develop implementation guidance that States, MPOs, and industry can adapt. This approach ensures that Federal research investments are closely tied to real-world freight challenges and decision-making needs.

Strategic Objective 4: Lower Barriers to Adoption of Proven Innovations Across the Freight Network

USDOT will support broader adoption of effective freight innovations by pairing technology development with practical implementation support. Many public agencies and freight operators face constraints related to procurement, technical capacity, or workforce readiness that can slow uptake even when technologies are proven.

The Department will provide guidance, technical assistance, and reference materials to help agencies and operators deploy new tools and practices using existing authorities and funding programs. By reducing implementation barriers, USDOT will help ensure that the benefits of freight innovation are realized across the national multimodal freight system.

INDICATORS OF SUCCESS

Progress toward a more innovative national freight system will be assessed using a small set of existing Federal indicators and program outputs that reflect experimentation, adoption, and readiness for scale.

- Use of Federal research and pilot programs for freight innovation
- Transition of freight technologies from pilots to broader deployment
- Integration of advanced technologies into freight infrastructure projects
- Adoption of interoperable digital approaches

Goal: A Capable Freight Workforce

Build a skilled workforce for the 21st century and improve quality of life.

The performance of the national freight system depends not only on physical infrastructure and technology, but also on the people who operate, maintain, and manage it. Freight occupations span trucking, rail, maritime, air cargo, pipeline, logistics, and public-sector planning and oversight, and many of these roles face persistent recruitment, retention, and skills challenges. At the same time, evolving technologies and operational practices are changing the skills required across the freight workforce. USDOT's workforce strategy focuses on strengthening entry pathways, supporting skills development, improving working conditions, and improving the data used to align workforce needs with freight system demands.

Strategic Objective 1: Strengthen Workforce Entry Pathways into Core Freight Occupations

USDOT will support efforts to strengthen recruitment and entry pathways into freight occupations critical to the functioning of the national freight system. These include operational, technical, and maintenance roles across all freight modes, as well as related logistics and support functions.

The Department will work with Federal partners, State DOTs, MPOs, educational institutions, State and local boards, labor organizations, and industry to encourage use of established workforce development approaches such as apprenticeships, earn-while-you-learn models, and partnerships with community and technical colleges offering career technical education courses. USDOT will also use guidance and technical assistance to highlight workforce pipeline considerations as a valued component of freight planning and federally supported projects.

Strategic Objective 2: Support Upskilling and Reskilling for a Technology-Enabled Freight System

USDOT will promote training and credentialing that help freight workers adapt to increasingly technology-enabled operations and infrastructure. Automation, advanced safety systems, digital platforms, and new maintenance practices are changing skill requirements across freight modes.

Through research, pilot programs, and workforce-related components of existing grant programs, the Department will support development and dissemination of standardized training approaches and industry-recognized credentials. These efforts will help existing workers transition into higher-skill roles and ensure that new entrants are prepared for modern freight workplaces, while supporting safety, productivity, and system reliability.

Strategic Objective 3: Improve Freight Working Conditions to Support Retention and Safety

USDOT will focus on practical improvements to working conditions that affect retention, safety, and quality of life for freight workers. For many freight occupations—particularly in trucking—challenges such as limited access to safe parking and staging, unpredictable schedules, and constrained access to facilities contribute to turnover and safety risks.

The Department will use its funding programs, regulatory authorities, and technical assistance to support improvements such as expanded truck parking and staging, better integration of worker needs into infrastructure and facility design, and modernization of information systems that help workers access services and resources. These efforts support a more stable and safety-focused freight workforce.

Strategic Objective 4: Improve Freight Workforce Data and Planning

USDOT will improve the availability and use of workforce data to better understand freight labor supply, demand, skills needs, and regional variation. While workforce data exists across Federal agencies, gaps and inconsistencies can limit their usefulness for freight planning and investment decisions.

The Department will work with existing Federal statistical and labor data partners (e.g., Census Bureau, BLS, etc.) and State workforce agencies to improve interpretation and application of available data and will support incorporation of workforce considerations into SFPs and corridor studies. By improving how workforce information is used, rather than creating new reporting requirements, USDOT will help align freight investments with the human capital needed to operate and sustain the national freight system.

INDICATORS OF SUCCESS

Progress toward a more capable freight workforce will be assessed using a small set of existing Federal workforce and program indicators that reflect participation, retention, and alignment of skills with freight system needs.

- Participation in freight-related workforce training programs
- Trends in employment and vacancy rates in key freight occupations
- Retention trends in freight occupations
- Incorporation of workforce considerations into freight plans and projects Strengthening

STRENGTHENING THE FOUNDATIONS FOR THE NEXT NFSP

The development of this Plan highlighted several cross-cutting challenges that limited the ability to fully anticipate future conditions, evaluate systemwide risks, and consistently assess freight needs at a national scale. Addressing these challenges is essential to improving the analytical foundation, flexibility, and usefulness of future national freight planning efforts. Over the next five years, USDOT will pursue a focused set of cross-cutting strategic initiatives aimed at strengthening national freight planning capabilities in advance of the next NFSP update.

Planning for Uncertainty and Systemwide Risk

INCORPORATE NATIONAL SCENARIO PLANNING INTO FREIGHT PLANNING

The NFSP development process underscored the limitations of relying primarily on baseline forecasts and historical trends to assess future freight system needs. To better account for uncertainty, USDOT will incorporate national-scale scenario planning into future freight planning efforts. These exercises will explore alternative futures such as shifts in global trade patterns, changes in domestic production and sourcing, technological disruption, or prolonged infrastructure outages and assess their implications for freight corridors, trade gateways, and modes. Scenario planning will support more resilient and flexible national strategies while providing a shared analytical reference for State, regional, and industry partners.

CONDUCT A CRITICALITY ASSESSMENT OF THE DRAFT NMFN

The planning process also revealed gaps in the ability to consistently identify which elements of the Draft NMFN are most critical to national freight movement and least able to absorb disruption. USDOT will advance a national freight infrastructure criticality and risk assessment that integrates freight volumes, commodity values, modal dependencies, infrastructure condition, and availability of alternatives. This effort will help identify high-consequence corridors, nodes, and assets whose disruption would have outsized national impacts, strengthening the analytical foundation for resilience, security, and investment prioritization in future freight plans.

Modernizing Freight Data and Analytical Capabilities

IMPROVING FREIGHT MODELING CAPABILITIES TO SUPPORT PLANNING AND DECISION-MAKING

The NFSP development process highlighted constraints in existing freight modeling tools, particularly in representing multimodal interactions, operational dynamics, and non-routine conditions. USDOT has already begun strengthening its national freight modeling capabilities by modernizing analytical approaches and leveraging advances in computation, digitalization of infrastructure and assets, and emerging analytical techniques. The Department will also support approaches that allow greater experimentation and "sandboxing" at the State and metropolitan level, enabling partners to test assumptions, explore scenarios, and better align regional analyses with national freight planning.

IMPROVE INTEGRATION AND DOCUMENTATION OF EXISTING FREIGHT DATA SETS

While USDOT maintains a wide range of freight-related datasets, the planning process revealed challenges related to data integration, documentation, and consistent use across modes and geographies. USDOT will improve stewardship of existing freight datasets by strengthening integration across data sources, clarifying appropriate use cases, and improving documentation and metadata. These

efforts will enhance transparency, consistency, and usability of national freight data for planners and analysts, supporting more robust and comparable analysis without introducing new reporting requirements.

Improving Freight Coordination and Decision Support

SUPPORT MULTISTATE AND MULTIJURISDICTIONAL FREIGHT COORDINATION

The planning process underscored many high-impact freight challenges such as port access, border crossings, inland corridors, and shared infrastructure span multiple jurisdictions and modes, yet existing planning structures often remain fragmented. USDOT will expand its role as a convener and technical resource by supporting multistate and multijurisdictional freight coordination efforts. This includes facilitating corridor-level planning, promoting shared analytical approaches, and providing technical assistance to help partners align priorities, data, and strategies where freight impacts extend beyond individual State or regional boundaries.

STRENGTHEN LINKS BETWEEN FREIGHT PLANNING AND INVESTMENT DECISION-MAKING

The NFSP development process revealed gaps between freight planning analyses and how projects are ultimately prioritized and funded across Federal, State, and regional programs. USDOT will use technical assistance, guidance, and program alignment to strengthen the connection between freight planning outputs such as SFPs, corridor studies, and national analyses and investment decision-making. These efforts will help clarify how freight significance, national impacts, and systemwide benefits can be reflected more consistently in project development, evaluation, and funding decisions.

ADVANCE RISK, CRITICALITY, AND SYSTEM-LEVEL ANALYSIS IN FREIGHT PLANNING PRACTICE

While individual asset condition and performance data are widely available, the planning process highlighted challenges in translating this information into system-level insights about freight risk, criticality, and cascading impacts. USDOT will support technical assistance and analytical guidance that help planning partners apply risk- and criticality-based approaches in freight planning. This includes promoting consistent methods for assessing exposure, consequences, and alternatives across corridors and modes, improving the ability of planners to identify high-consequence freight vulnerabilities and prioritize actions accordingly.

FEDERAL COORDINATION

Beyond the States, the Department will continue to build and strengthen partnerships with the Department of Homeland Security to focus on preventing cargo theft; the Department of War to prioritize strategic security networks; the Department of Commerce to support supply and demand forecasting associated with major industrial investments; and Federal workforce and labor agencies to coordinate workforce development initiatives critical to freight

transportation and logistics.

USING THE FREIGHT STRATEGIC FRAMEWORK

The Freight Strategic Framework is intended to serve as a practical tool for guiding freight decision-making across Federal, State, regional, and private-sector partners. Rather than prescribing specific projects or investments, the framework provides a shared set of goals and strategic objectives that can be applied flexibly across planning, policy, funding, and coordination activities. The framework is designed to help partners evaluate freight challenges and investments through a network lens—considering how actions at individual corridors, nodes, or facilities affect end-to-end system performance, reliability, and risk.

USDOT Internal Alignment

USDOT will use the Freight Strategic Framework to align freight-related activities across modal administrations and offices, ensuring greater consistency in planning, investment, research, and technical assistance. The framework will inform development of guidance, competitive grant program criteria, research agendas, and interagency coordination efforts, helping the Department focus its limited resources on actions that advance national freight priorities. It will also support internal coordination by providing a common reference point for evaluating how programs and initiatives contribute to shared freight goals.

USDOT will use the framework to help assess progress toward national freight goals using existing performance measures and reporting mechanisms. Over time, insights from implementation, performance trends, and stakeholder engagement will inform future updates to the National Freight Strategic Plan. By providing continuity across planning cycles, the framework supports an iterative approach to national freight planning that reflects evolving conditions, emerging risks, and lessons learned.

For States and MPOs

State DOTs, MPOs, and regional planning organizations can use the framework to help prioritize freight needs and investments within SFPs, metropolitan transportation plans, and freight studies. The strategic goals and objectives offer a lens for identifying high-impact corridors, nodes, and system needs, and for aligning regional priorities with national freight objectives. The framework is not intended to replace local decision-making, but to support clearer articulation of how State and regional actions contribute to broader freight system performance.

Public agencies and project sponsors can use the framework to guide development and evaluation of freight projects across modes. By linking proposed investments to one or more strategic goals, such as safety, efficiency, resiliency, or workforce development, the framework supports clearer justification of freight benefits and tradeoffs. This approach encourages consideration of systemwide outcomes, multimodal impacts, and long-term performance rather than focusing solely on individual facilities or jurisdictions.

For Industry and Modal Partners

Industry stakeholders including carriers, terminal operators, shippers, and logistics providers can use the framework as a reference for engaging with public agencies on shared freight challenges and opportunities. The framework clarifies Federal freight priorities and provides a common vocabulary for discussing issues such as bottlenecks, security risks, resilience, innovation, and workforce needs. This shared understanding can support more productive collaboration, data sharing, and alignment of public investments with private-sector operations.

CONCLUSION

America's prosperity depends on a freight system that is safe, efficient, resilient, and reliable. Consumers and businesses count on it every day, across every mode. Built from extensive input across the public and private sectors, this National Freight Strategic Plan sets a unified direction and a practical roadmap to modernize critical infrastructure, improve reliability, support a skilled workforce, and accelerate beneficial innovation. Over the next five years, the Plan will guide USDOT's actions to focus investments where they deliver the greatest system benefits; streamline planning, coordination, and delivery; enhance data, tools, and performance management; and improve permitting predictability. USDOT will periodically report on progress against the Plan's performance priorities.

Implementation is a shared endeavor. USDOT will work with States, MPOs, local governments, Tribes, ports, railroads, airports, pipelines, and private logistics partners to improve multimodal operations and corridor performance, including cross-border and interstate connections. USDOT encourages States, MPOs, and other public agencies to use this Plan to inform local actions and to contextualize their role within the larger national freight picture. By aligning policies, projects, and operations, and by measuring results transparently, we will deliver a multimodal freight system that reduces avoidable delays and costs, strengthens U.S. competitiveness, and serves the people and businesses who rely on it every day.

This document was prepared by the Office of Multimodal Freight Infrastructure and Policy within the U.S. Department of Transportation. As the lead entity for national freight strategy, the Office is responsible for overseeing the implementation of the National Freight Strategic Plan and ensuring the continued efficiency, safety, and resilience of the American supply chain. Led by its first Assistant Secretary, the Multimodal Freight Office is responsible for coordinating freight policy across operating administrations within USDOT, serving as a liaison to other Federal agencies on supply chain matters, overseeing freight research, and providing technical assistance to State and local governments on freight planning. The Multimodal Freight Office also works directly with private sector shippers, carriers, and infrastructure owners to facilitate information exchange and monitor supply chain activity in real time.

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