U.S. Department of Transportation
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Bureau of Transportation Statistics

Transportation Statistics Annual Report 2021

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Introduction

Transportation is fundamental to individuals, businesses, the economy, the environment, and the Nation. Recognizing the importance of transportation and the importance of objective statistics for transportation decision making, Congress requires the Director of the Bureau of Transportation Statistics (BTS) of the U.S. Department of Transportation (USDOT) to provide the *Transportation Statistics Annual Report* (TSAR) each year to Congress and the President. BTS published the first TSAR in 1994.

This 27th edition of TSAR focusses on a period of dramatic change as travelers, shippers, and providers of transportation services responded to the COVID-19 pandemic. While parts of the passenger transportation system are slowing approaching levels of use seen in the year prior to the pandemic, other parts of the system remain relatively empty. In contrast, the freight transportation system is struggling to keep up with high demands for goods movement and disruptions to freight capacity. This TSAR is a snapshot of changes to date as the "new normal" in transportation continues to evolve. In the concluding chapter on the state of transportation statistics, this TSAR documents lessons BTS has learned from measuring fast evolving events and highlights changing data needs in the post-pandemic world.

[1] 49 U.S. Code § 6302

The changes to the transportation system due to the pandemic are summarized with the most recent data available. BTS recognizes that new statistics will appear shortly after publication of this report, and encourages the reader to keep up to date through the website at https://www.bts.gov/covid-19. BTS also encourages the reader to examine previous editions of the TSAR at www.bts.gov/tsar for expanded detail on aspects of the transportation system before COVID-19 arrived.

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CHAPTER 1

Passenger Transportation

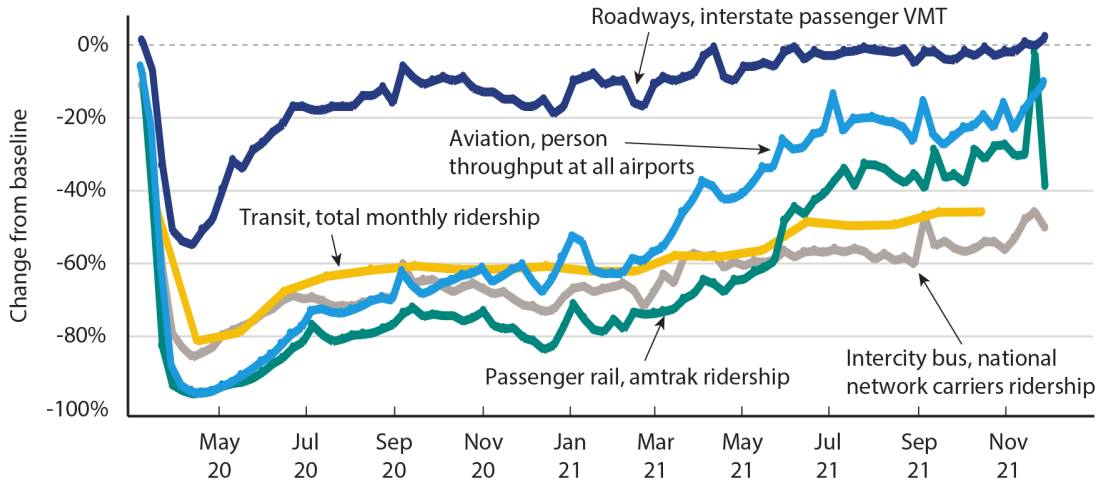
Passenger transportation includes typically recurring local trips with personal vehicles, public transit, shared ride services, bicycles and emerging micro-mobility options, and walking. Passenger transportation also includes typically infrequent long-distance trips by personal vehicles, commercial airlines, Amtrak, and intercity bus carriers.

COVID-19 caused immediate dramatic declines in both long-distance and local passenger travel (figure 1-1). While travel by personal vehicles has largely recovered, recovery lags for other modes of transportation.

Passenger Transportation Before the Pandemic

Whether for local or long-distance trips, most passenger travel in the United States occurs on highways, which carried nearly 5.6 trillion

FIGURE 1-1 Percent Change in Passenger Travel from 2019 by Mode



SOURCE: **Roadways**—U.S. Department of Transportation, Office of Highway Policy Information, available at https://www.fhwa.dot.gov/policyinformation/weeklyreports/; **Aviation**—Transportation Security Administration (TSA) Customer Throughput provided to BTS (similar to https://www.tsa.gov/coronavirus/passenger-throughput); **Transit**—Unlinked passenger trips from Monthly Module Adjusted Data Release at https://www.transit.dot.gov/ntd/ntd-data; **Intercity Bus Greyhound Lines** Incorporated and Interline Partners; **Amtrak**; tabulations for BTS

passenger miles[1] in 2019.[2] Commercial airlines carried 730 billion passenger miles, all forms of public transit carried 54 billion passenger miles, and Amtrak carried 6 billion passenger miles in that pre-pandemic year.[3] These miles are racked up in over 3,000 trips made by each household in a year (table 1-1), particularly by households in the largest metropolitan areas, according the measure of person trips in the National Household Travel Survey (NHTS).[4] Households outside metropolitan areas take fewer trips, especially the walk trips, than those inside metropolitan areas. For local travel, trips to and from work are the longest and trips for social and recreational purposes are not far behind (figure 1-2).

TABLE 1-1 Average Annual Person-Trips per Household by Mode and Metropolitan Area Size: 2017 NHTS

Population size	All	Private vehicle	Public transit	Walk
All	**3,140**	**2,592**	**80**	**329**
Outside an MSA	2,966	2,623	6	204
MSA less than 250,000	2,984	2,620	33	217
MSA 250,000 - 499,000	3,103	2,718	34	228
MSA 500,000 - 999,999	3,141	2,698	42	274
MSA 1 million - 2,999,999	3,178	2,678	50	303
MSA 3 million or more	3,246	2,446	170	479

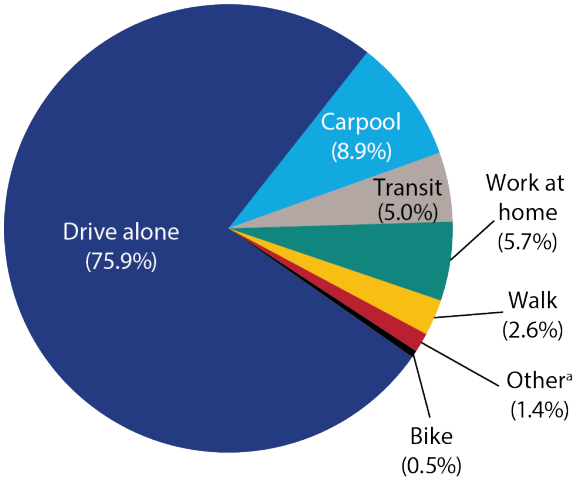
NOTE: A person trip is a trip by one or more persons in any mode of transportation

KEY: MSA = Metropolitan Statistical Area; NHTS = National Household Travel Survey

SOURCE: U.S. Department of Transportation, Federal Highway Administration, *National Household Travel Survey, Summary of Travel Trends, 2017*, table 7. Available at https://nhts.ornl.gov/ as of June 2020.

FIGURE 1-2 Commute Share by Mode in 2019 from BTS Analysis of the American Community Survey Data

percent of workers age 16 and older



[a] Includes motorcycle, taxi, and other means.

NOTES: Percents may not add to 100 due to rounding. *The American Community Survey* asks for the mode usually used by the respondent to get to work. For more than one mode of transportation, respondents select the mode used for most of the distance traveled.

SOURCE: As cited in U.S. Department of Transportation, Bureau of Transportation Statistics, *National Transportation Statistics*, table 1-41, available at www.bts.gov as of September 2020.

While trips to and from work account for less than a third of local travel, the pre-pandemic concentration of work trips in morning and evening peaks make commuting a major element of urban transportation.[5] The most notable change in pre-pandemic commuting was the growth in full-time work at home as a share of commuting by 2019 (figure 1-2) after 4 decades of steady growth (figure 1-3). These statistics do not include workers who telecommute from home part of the week.

The only pre-pandemic data on long-distance travel are the enplanements on commercial airlines. More than 811 million passengers boarded domestic

[1] One passenger-mile is equal to one passenger carried one mile. For example, 10 passengers carried 10 miles would equal 100 passenger miles.

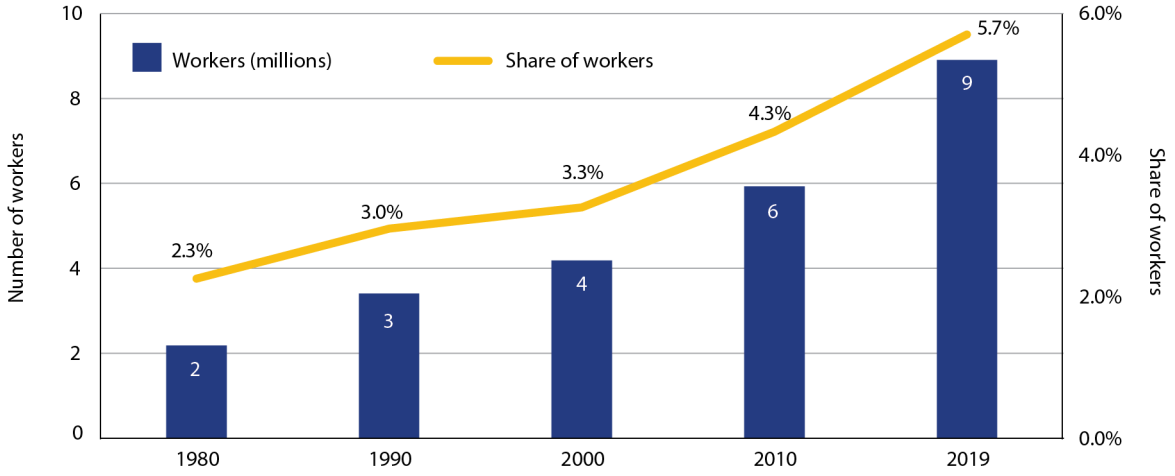
[2] U.S. Department of Transportation, Bureau of Transportation Statistics, National Transportation Statistics, table 1-40, available at http://www.bts.gov/nts as of September 2021

[3] Ibid.

[4] A person trip is a trip by one or more persons in any mode of transportation and is described https://nhts.ornl.gov/2009/pub/usersguideglossary.pdf.

[5] U.S. Department of Transportation, Federal Highway Administration, Summary of Travel Trends: 2017 National Household Travel Survey, June 2018, Table 5b, available at https://nhts.ornl.gov/ as of November 2021

FIGURE 1-3 Pre-Pandemic Trends in Working from Home: 1980, 1990, 2000, 2010, and 2019



SOURCE: U.S. Department of Commerce, Census Bureau, Decennial Census 1980–2000 and 2010 and 2018 American Community Survey, Table S0801, available at https://data.census.gov/cedsci/ as of November 2021.

flights and another 241 million passengers boarded international flights to and from the United States—totaling more than a billion airline passengers in 2019.[6] This represents a 30 percent increase over the decade since 2009.

Passenger Transportation Trends During the Pandemic

Number of People Staying at Home

The world of passenger travel changed dramatically with the arrival of COVID-19 in March 2020. The daily average number of Americans staying at home, normally between 58 and 68 million in 2019, jumped to 94.5 million in March 2020 and has remained high above the 2019 levels. It peaked at over 100 million during the 2020 holiday season (figure 1-4). The difference in the percentages of people staying at home varies greatly from county to county and from state to state (figure 1-5)

[6] BTS T-100 tabulation, https://www.transtats.bts.gov/Data_Elements.aspx?Data=1, as of Sept. 18, 2021

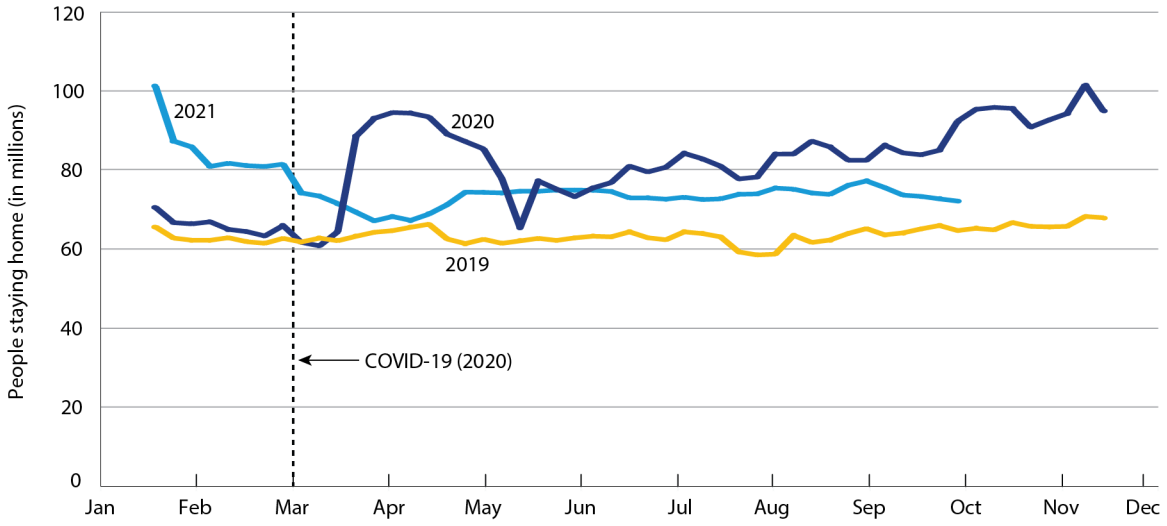
Highway Travel by Vehicles

Most passenger travel is in personally owned motor vehicles. The dramatic drop in driving in March 2020 was followed by a recovery to roughly 10 to 20 percent below pre-pandemic levels in the summer and autumn of 2020 and a return to near pre-pandemic levels in the summer of 2021 (figure 1-6).

Air Travel

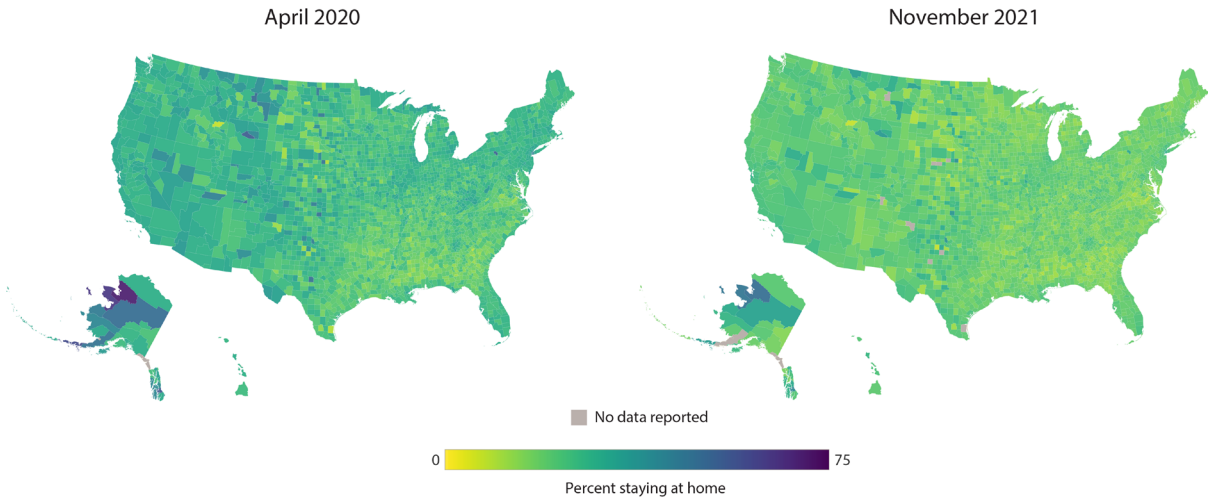
Travel by air has yet to recover fully from its initial drop to pre-pandemic levels (figure 1-7). The initial drop was not as dramatic as the decline in 2001 when the entire air traffic system was shut down in response to the terrorist attack on September 11, but the recovery in 2001 started within days and the brief shutdown had less effect on the monthly enplanement totals than the restrictions on air travel caused by COVID-19 (figure 1-8). Air travel did not recover to August 2001 levels until March 2004.

FIGURE 1-4 Daily Average Number of People Staying at Home: 2019–2021



SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, *The Week in Transportation*, www.bts.gov/twit, accessed November 2021.

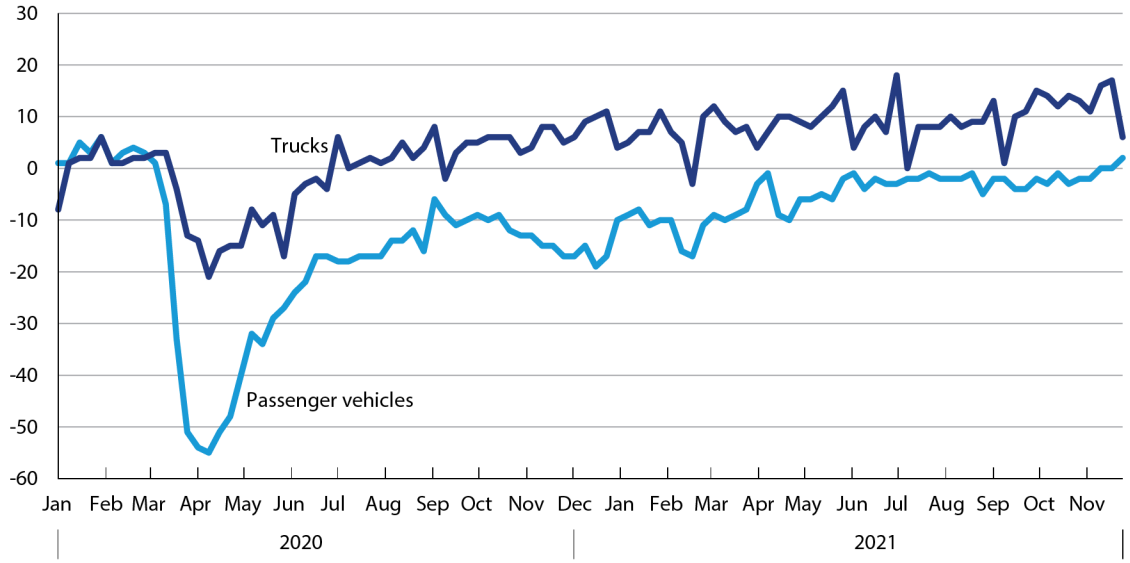
FIGURE 1-5 Daily Average Number of People Staying at Home by County



NOTES: A person is classified as staying at home if they make no trips with a trip end more than one mile away from home. Trips are movements that include a stay of longer than 10 minutes at an anonymized location away from home.

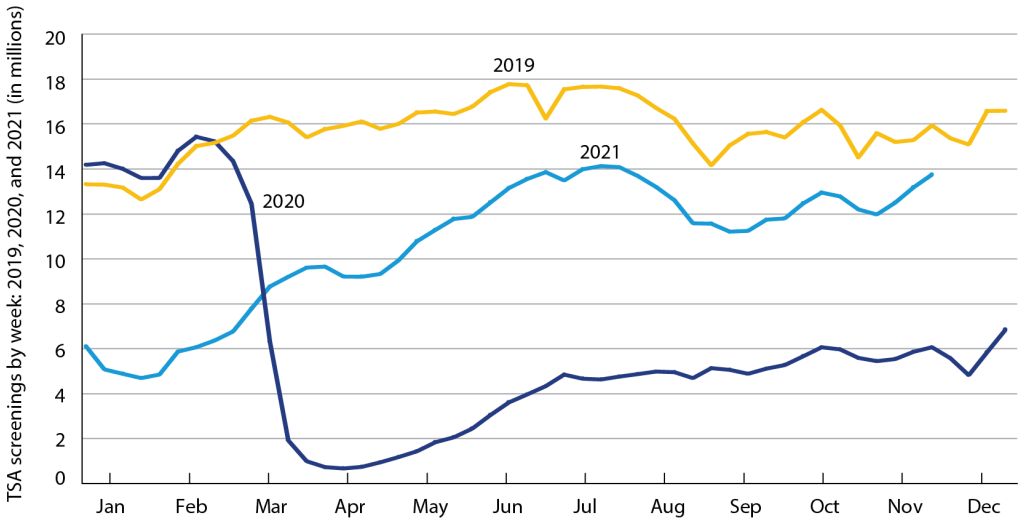
SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, *Daily Travel during the COVID-19 Public Health Emergency*, www.bts.gov/daily-travel, accessed November 2021

FIGURE 1-6 Percent Change in Vehicle Miles Traveled from 2019



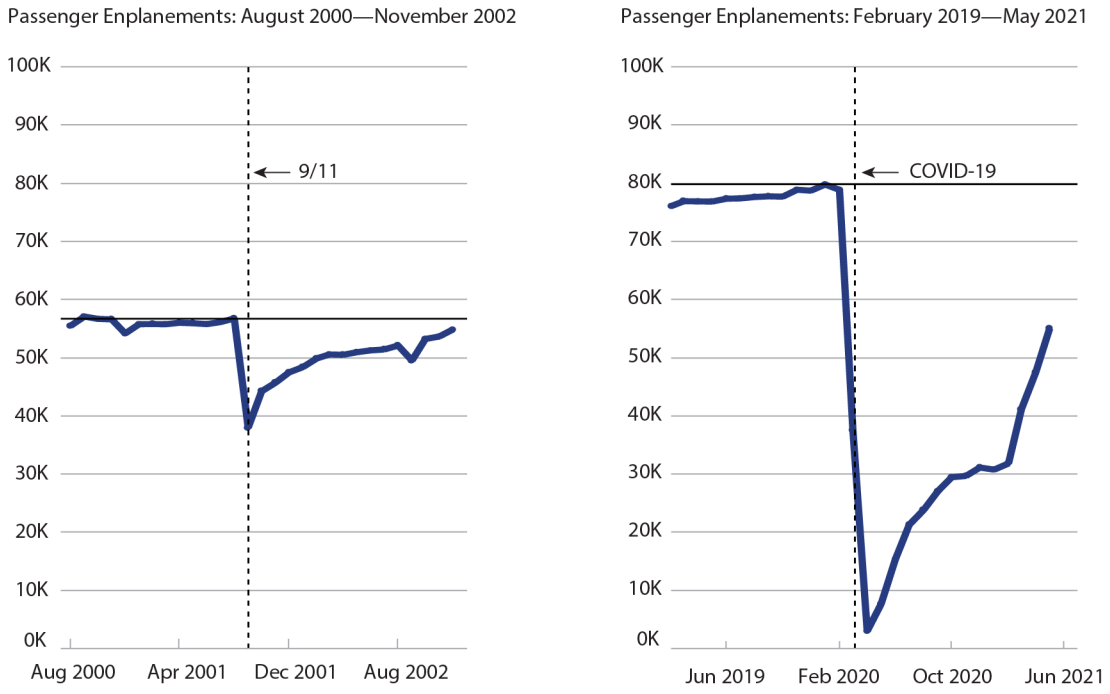
SOURCE: U.S. Department of Transportation, Federal Highway Administration, *Weekly Travel Volume Report*, https://www.fhwa.dot.gov/policyinformation/weeklyreports/, accessed November, 2021.

FIGURE 1-7 Airline Travel as Measured by Airport Screenings as a Proxy: 2019–2021



SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, *The Week in Transportation*, www.bts.gov/twit, accessed November, 2021.

Figure 1-8 Monthly Changes in Air Travel for Equivalent Periods between 9/11 and COVID-19



SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics *Twenty Years Later, How Does Post-9/11 Air Travel Compare to the Disruptions of COVID-19?* https://www.bts.gov/data-spotlight/twenty-years-later-how-does-post-911-air-travel-compare-disruptions-covid-19, accessed November, 2021.

Personal Travel by Other Modes

Compared to travel by personal vehicles, passenger travel by commercial aviation, Amtrak, rail and bus transit, and regularly scheduled intercity bus carriers remains significantly lower than the pre-pandemic levels (figure 1-1). Passenger travel by all modes plummeted at the onset of the pandemic. While aviation and Amtrak have made steady gains throughout 2021, the monthly transit ridership remains 44 percent below the pre-pandemic level and intercity bus ridership is 56 percent below.

COVID-19 also affected the pre-pandemic growth in micro-mobility options. The number of docked bikeshare systems in the U.S. declined from a high of 103 in 2019 to 66 in 2021 as 37 docked bikeshare systems closed permanently following a temporary suspension of operations at the onset of COVID-19. In June 2021, 60 dockless bikeshare systems and 214 e-scooter systems were open (not counting systems limited to college or employer campuses); that's down from a 2019 high of 71 and 239.[7]

The Growth of Telework

The growth in telework is a key element in the slow recovery of transit usage because commuting to and from work and work-related travel has accounted for 40 percent of usage.[8] In the Census Household Pulse Surveys conducted from August to December of 2020, more than a third of U.S. households reported working from home more frequently than before

[7] U.S. Department of Transportation, Bureau of Transportation Statistics, COVID-Affected Micromobility Changes Differ by City, https://www.bts.gov/data-spotlight/covid-affected-micromobility-changes-differ-city, accessed November 2021

[8] U.S. Department of Transportation, Federal Highway Administration, Summary of Travel Trends: 2017 National Household Travel Survey, June 2018, Table 9a, available at https://nhts.ornl.gov/ as of November 2021

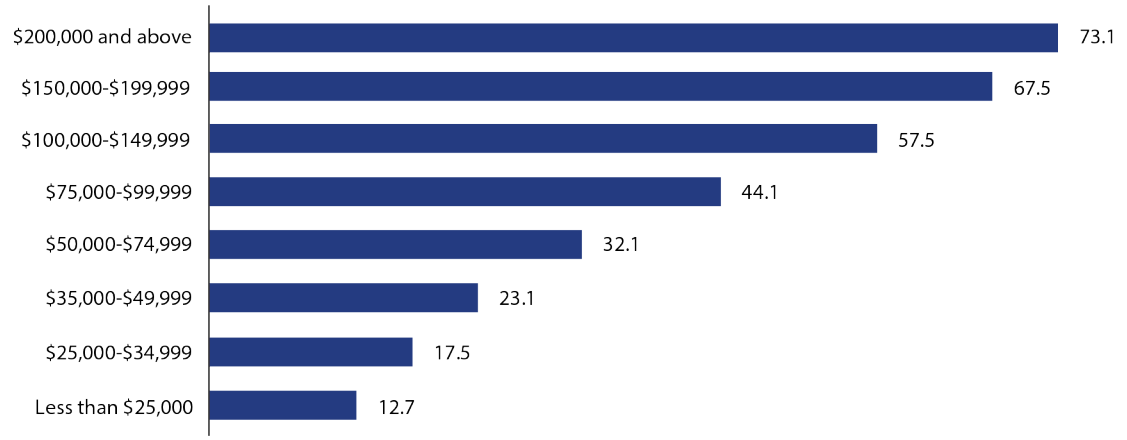
the pandemic.[9] Households with members who teleworked more frequently are with high income (figure 1-9) and education (figure 1-10).

[9] Joey Marshall, Charlynn Burd, and Michael Burrows, "Working From Home During the Pandemic: Those Who Switched to Telework Have Higher Income, Education and Better Health", Census Bureau, Mar. 31, 2021, https://www.census.gov/library/stories/2021/03/working-from-home-during-the-pandemic.html, accessed Oct. 15, 2021.

Online Shopping

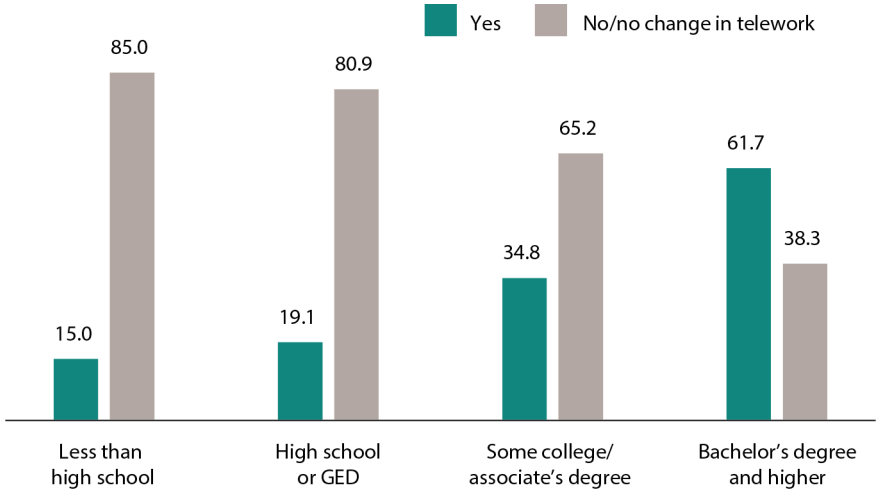
Many factors beyond telework have affected travel during the pandemic, such as the replacement of trips to the store with on-line shopping. The Census Household Pulse Surveys found that many Americans increased online shopping and reduced in-person shopping. Substitution of online shopping for trips to the store rose during the 2020

Figure 1-9 Percentage of Households by Income with Adult(s) Who Switched to Telework Because of the Coronavirus Pandemic in 2020



SOURCE: U.S. Census Bureau, Household Pulse Survey (Weeks 13-21: August 19-December 21, 2020). Estimates produced using public use microdata files.

Figure 1-10 Percentage of Households by Education and Telework Status During the Coronavirus Pandemic



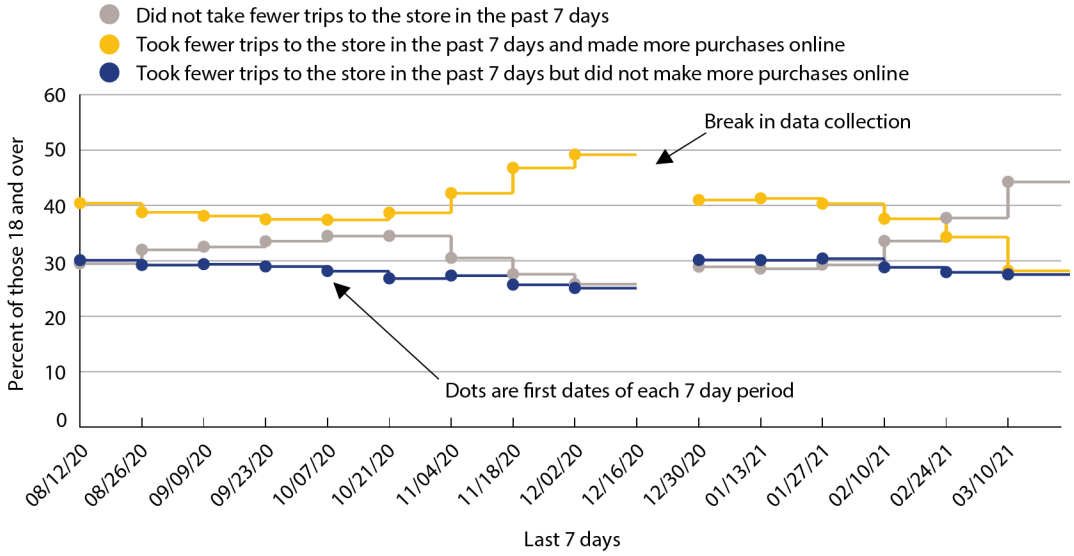
SOURCE: U.S. Census Bureau, Household Pulse Survey (Weeks 13-21: August 19-December 21, 2020). Estimates produced using public use microdata files.

holiday season. Now trip substitution is on the decline (figure 1-11).

Highway Travel Speed and Congestion

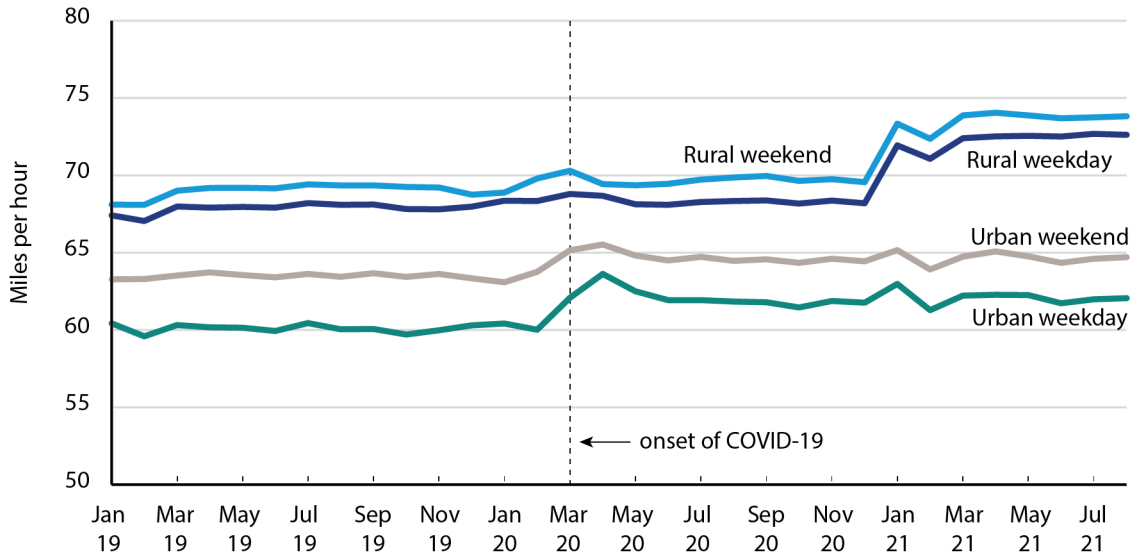
These changes in travel patterns also appear in highway travel speed, typically used to characterize congestion. The average speed of passenger vehicles increased on urban interstate segments and less so on rural interstates during the first month of the COVID-19 pandemic (figure 1-12). These trends reflect a drop in the number of vehicles traveling on interstates, allowing remaining motorists to drive at higher speeds

FIGURE 1-11 Fluctuations in Trips to the Store: August 2020–March 2021



SOURCE: https://www.bts.gov/browse-statistical-products-and-data/covid-related/effects-covid-19-person-vs-online-shopping

Figure 1-12 Average Passenger Vehicle Speed on the Interstate Highway System: January 2019–August 2021



SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, special tabulation of vehicle probe data.

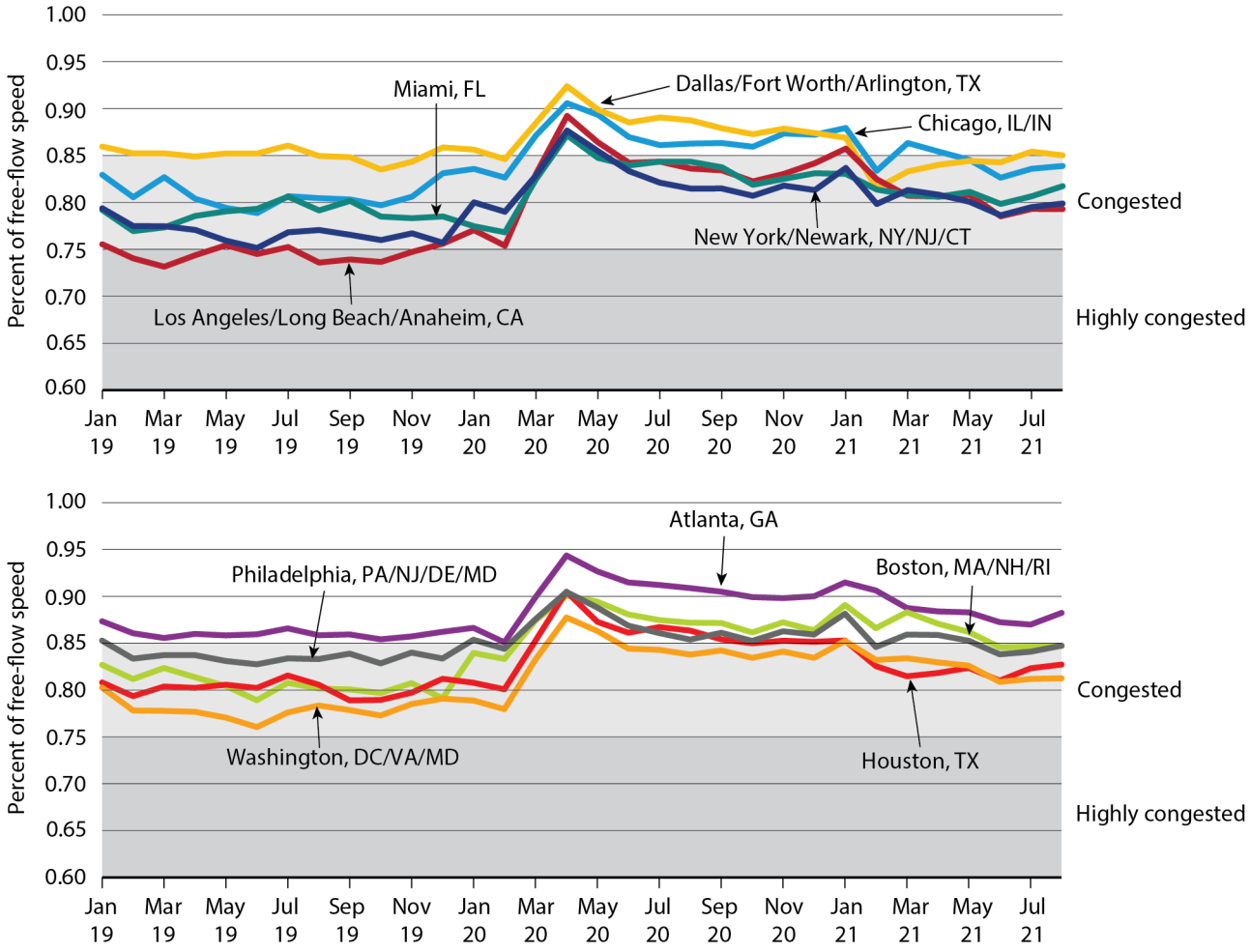
during traditional periods of peak congestion. Reasons for the jump in average speeds at the beginning of 2021 are not clear, especially on rural interstates. As described later in this report, increased speeds may be a contributor to recent increases in highway fatalities.

While speed data suggested the reduction of congestion in urban areas at the onset of the pandemic, congested conditions returned quickly in some urban areas, such as New York City and Miami, but has yet to return in other urban areas, such as Atlanta and Boston (figure 1-13). Congested conditions occur when measured speeds drop below free-slow speeds.

Household Spending on Transportation

A consequence of the changes in passenger travel was a 13.6 percent decline in household spending

FIGURE 1-13 Average Interstate Highway Congestion for Passenger Vehicles, Top 5 Urban Areas: January 2019–August 2021



NOTES: Congestion is measured as the average observed speed on each interstate highway segment divided by the free-flow speed on the same link. Congested conditions are when the observed speed is between 75% and 85% of the free-flow speed for a segment. Highly congested conditions are when the observed speed is less than 75% of free-flow speed.

SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, special tabulation of vehicle probe data.

on transportation from 2019 to 2020 (figure 1-14).[10] As Americans took fewer trips, the average U.S. household spent $9,645 on transportation in 2020, dropping from $10,960 in 2019. Overall household transportation spending fell to $1.2 trillion in 2020 from $1.4 trillion in 2019. This year-over-year decline (not adjusted for inflation) is similar in magnitude to the drop in 2009 during the economic recession and mirrors the disruptions in passenger travel by all modes of transportation during the pandemic.

Major Questions for the Future

One of the biggest unknowns confronting the future of passenger travel is the future of the workplace. Will accelerated growth of telework result in continued reductions in peak hour commuting, reductions in concentrations of offices, and further decentralization of housing from traditional employment centers? A better understanding of telework will require change in the way Federal surveys have asked about work at home, shifting from a binary choice of working at home most of the time or not, to asking how many days per week workers work at home.

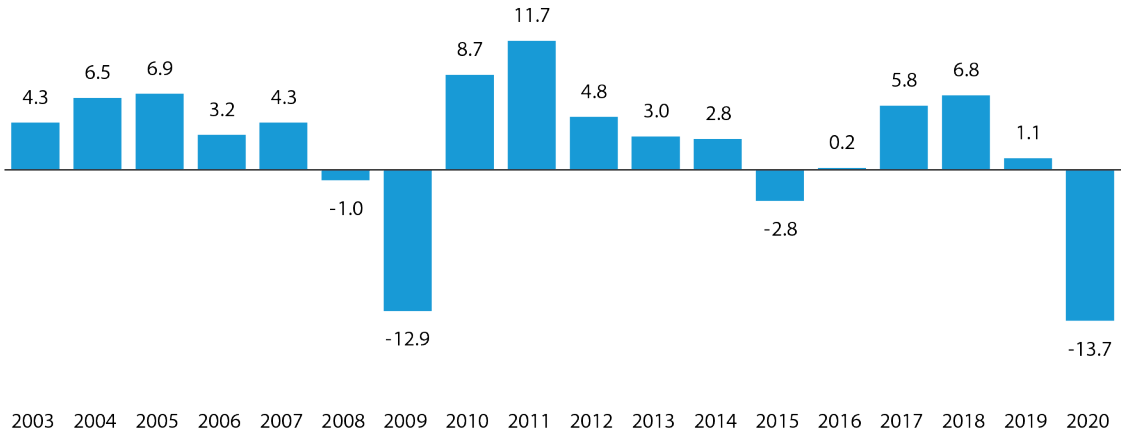
Other unknowns in the future of passenger travel include, but are not limited to:

- Whether trips to the store, to medical service providers, and to schools will be replaced increasingly by online shopping, telemedicine, and remote learning?
- Whether intercity business travel continues to be replaced by video conferences, reducing the number of higher paying customers boarding airlines and Amtrak?
- Whether disruptions in international travel, especially by foreign students attending U.S. colleges and universities, are temporary or lasting?

These questions require the robust program of data collection and analysis for passenger transportation highlighted in chapter 4 of this report.

[10] U.S. Department of Transportation, Bureau of Transportation Statistics, COVID-19 Pandemic Drops 2020 Household Spending on Transportation by Nearly 14%, Sept. 23, 2021, https://www.bts.gov/data-spotlight/covid-19-pandemic-drops-2020-household-spending-transportation-nearly-14, accessed Oct. 15, 2021

Figure 1-14 Year-Over-Year Percent Change in National Household Spending on Transportation: 2003–2020



NOTE: Household spending figures include spending by governments, employers, and other organizations on behalf of households—for example, employee transit subsidies.

SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis, Consumer Spending Data, https://www.bea.gov/data/consumer-spending/main

CHAPTER 2

Freight Transportation

Before the pandemic arrived, the Nation's transportation system moved about 51.0 million tons of goods worth $51.8 billion each day, or about 56.9 tons of freight for every resident of the United States. Unlike the lengthy and partial recovery in passenger travel, the demand for moving freight rebounded quickly, and supply chains that connect raw materials, farms, manufacturing facilities, wholesale establishments, and retailers to consumers placed major stresses on the transportation system.

Freight Transportation Before the Pandemic

Freight varies enormously from low valued, very heavy bulk commodities, such as stone and gravel, to high valued, light weight commodities such as pharmaceuticals. Shippers of the higher valued commodities are typically more concerned with speed than cost of delivery, while shippers of lower valued commodities use slower forms of transportation that are lower in cost. Some commodities have special shipping requirements, such as refrigeration for perishable food and specialized equipment for hazardous cargo. The value and weight of shipments affect the geography of freight transportation and the modes of transportation used.

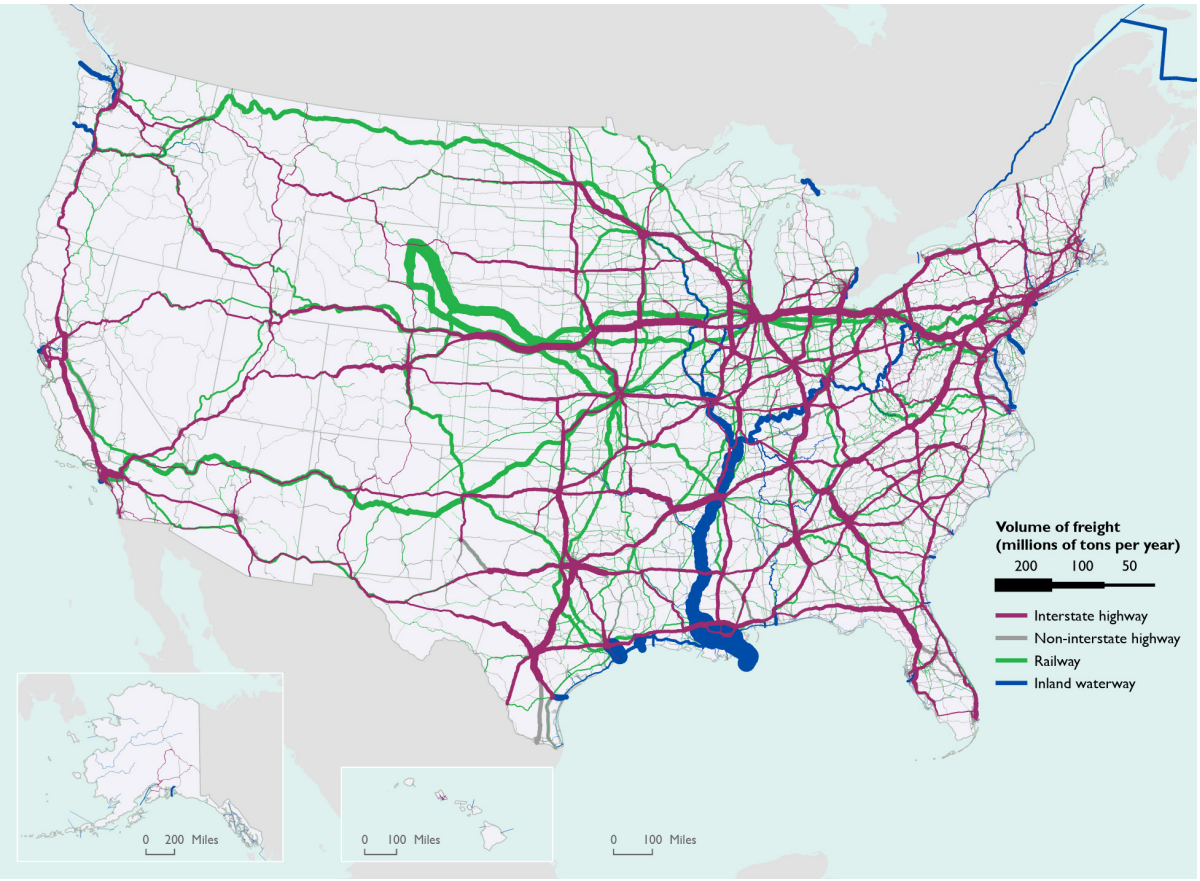
The top commodities by weight include natural gas and asphalt, sand and gravel, gasoline, and cereal grains. The top commodities by value include electronics, motor vehicles, mixed freight, machinery, and pharmaceuticals. Most shipments are domestic, accounting for almost 90 percent of the tons and 80 percent of the value of all freight moved to, from, or within the United States.[1]

Domestic flows of freight by surface modes, excluding pipeline, appear in figure 2-1. This national picture hides the fact that most freight movements are between locations less that 50 miles apart.

Imports and exports account for 11 percent of the tons and 20 percent of the value of all shipments made to, from, and within the United States. Even accounting for a small share of total freight activity, imports and exports are a special concern for ports, airports, and border crossings. Major international gateways by value of cargo entering and leaving the Nation include the Ports of Los Angeles and Long Beach, the Port of New York and New Jersey, John F. Kennedy International Airport in New York, and the truck and rail crossings at Laredo, Texas (figure 2-2). The top ports for handling containers (as measured in twenty-foot equivalents or TEUs) are the Ports of Los Angeles and Long Beach and the Port of New York and New Jersey, while the top ports by tons include Louisiana and Texas.

[1] Statistics are from the Commodity Origin-Destination Accounts of the Freight Analysis Framework, which covers all freight movement except shipments between foreign countries that pass through the United States. See www.bts.gov/faf.

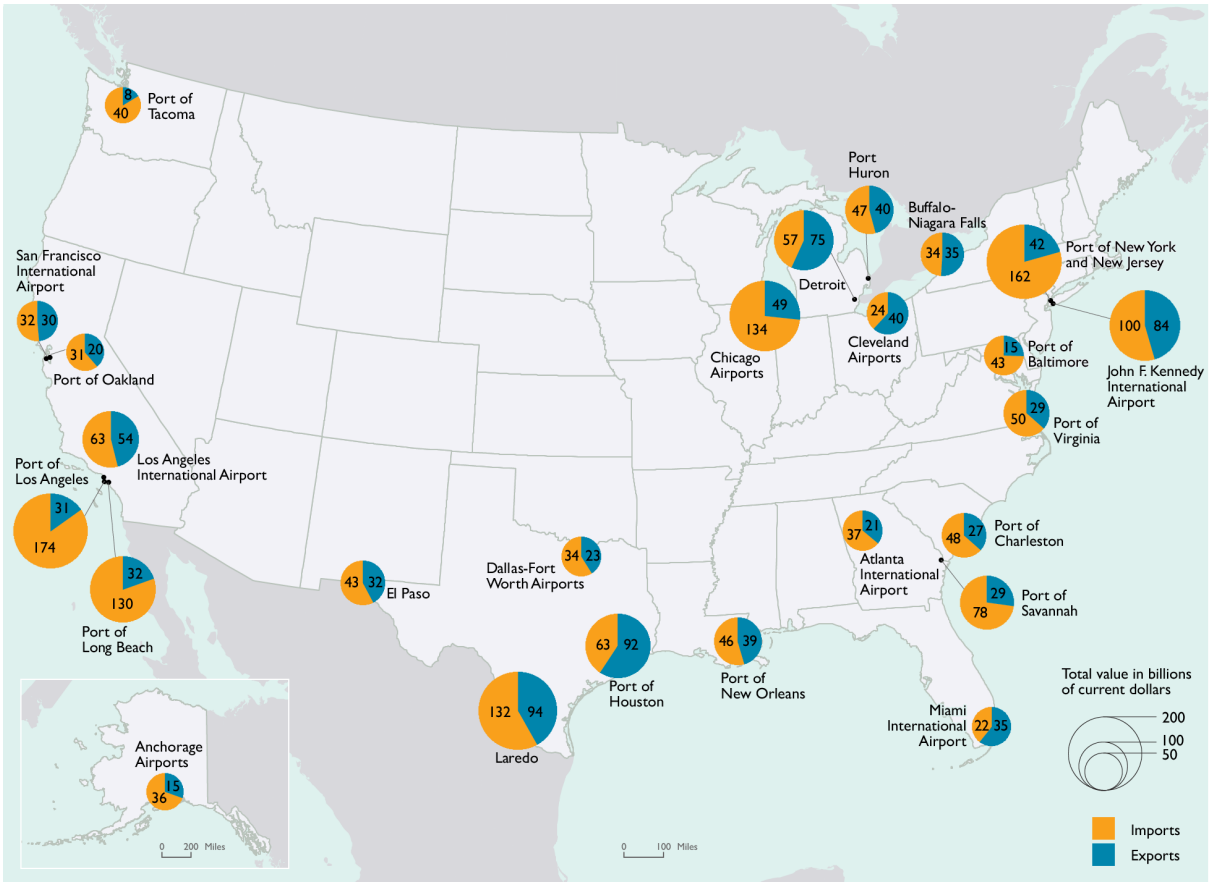
FIGURE 2-1 Pre-Pandemic Freight Flows by Highway, Railway, and Waterway



NOTE: Highway flows depicted in this map are based on Freight Analysis Framework data for 2015.

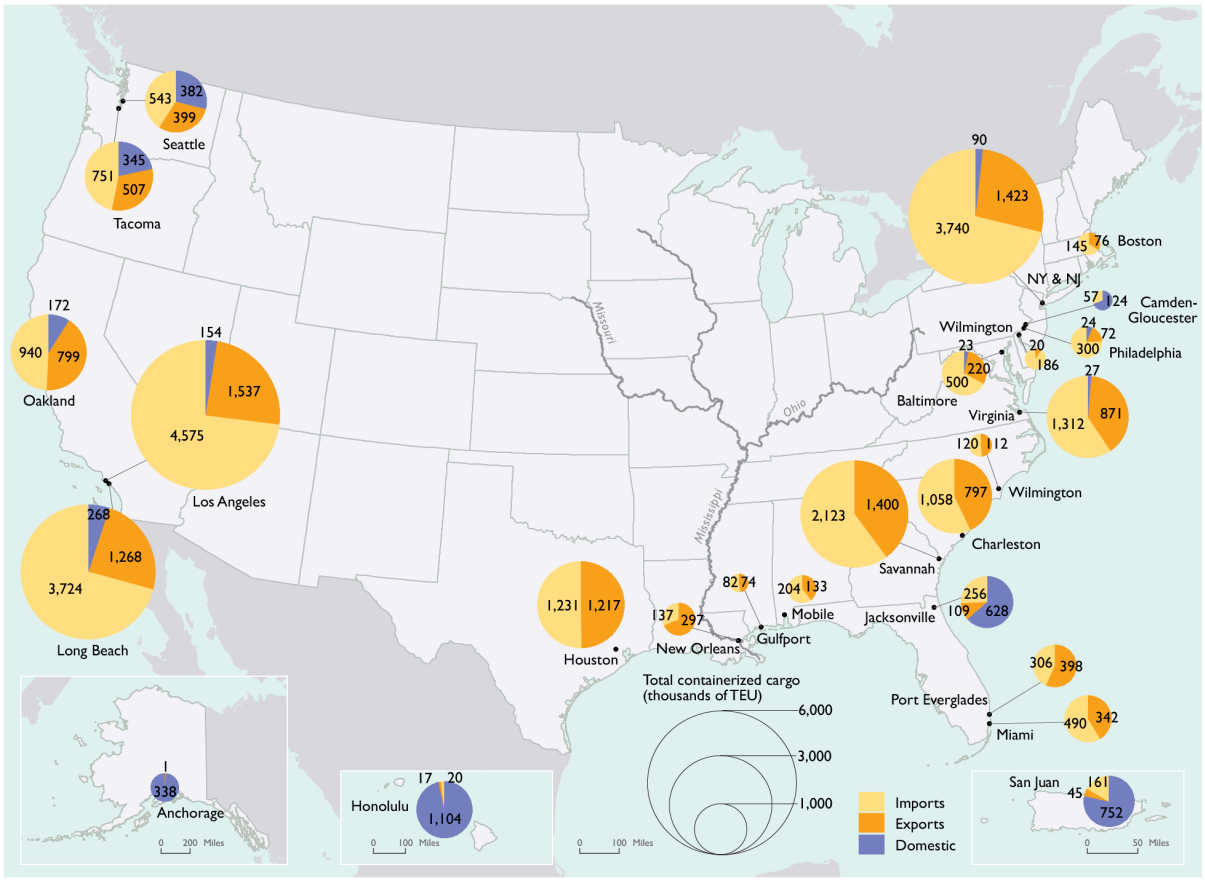
SOURCES: **Highway**—U.S. Department of Transportation, Bureau of Transportation Statistics and Federal Highway Administration, Freight Analysis Framework, version 4.3.1, 2015. **Rail**—Based on Surface Transportation Board, Annual Carload Waybill Sample and rail freight flow assignment done by Oakridge National Laboratory, 2018. **Inland Waterways**—U.S. Army Corps of Engineers, Institute of Water Resources, Annual Vessel Operating Activity and Lock Performance Monitoring System data, 2018.

FIGURE 2-2 Top 25 U.S.-International Freight Gateways by Value of Shipments: Pre-Pandemic as of 2019



SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, *National Transportation Statistics*, table 1-51, available at https://www.bts.gov/, accessed November 2020.

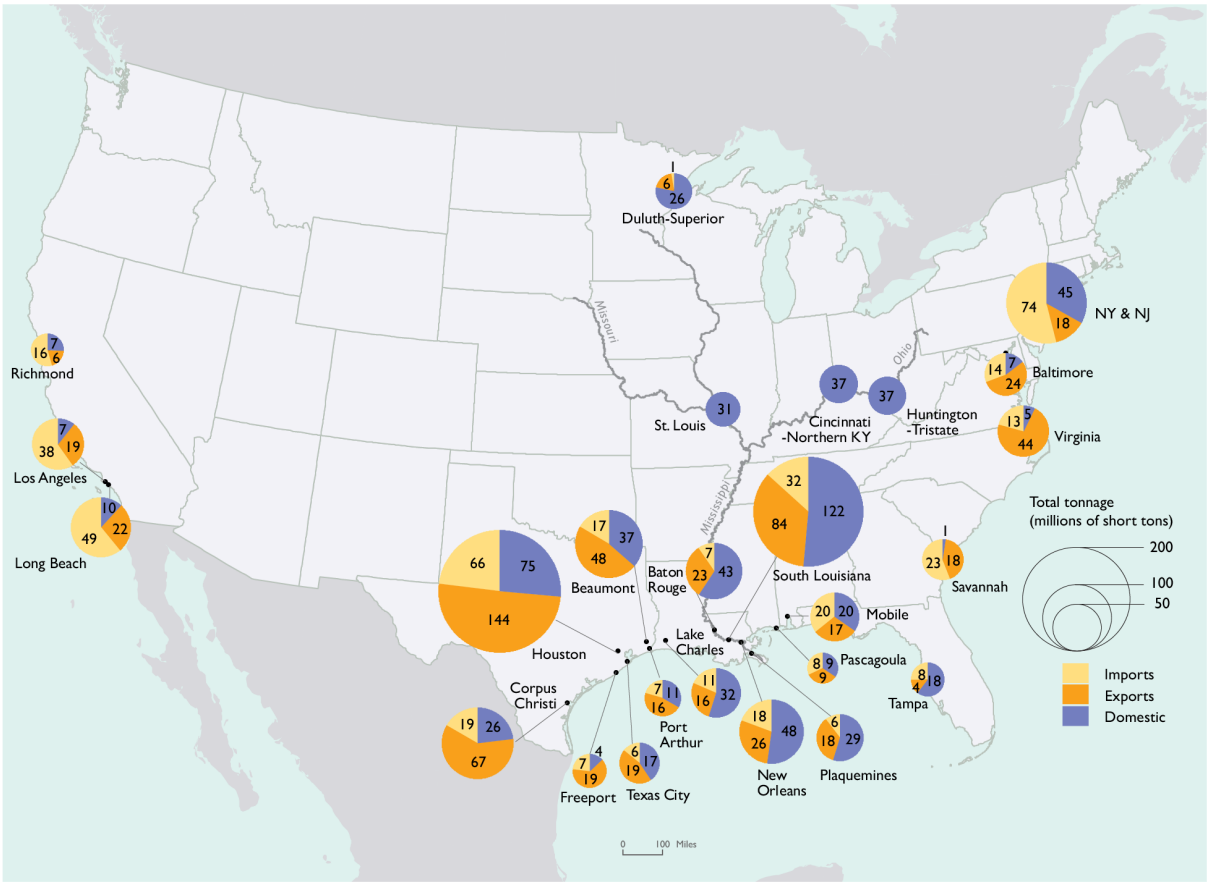
FIGURE 2-3 Top 25 Water Ports by TEU: 2019



KEY: TEU = twenty-foot equivalent unit.

SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, based on 2019 data provided by the U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center, special tabulation, accessed November 2020.

FIGURE 2-4 Top 25 Water Ports by Tonnage: 2019



NOTE: 1 short ton = 2,000 pounds.

SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, based on 2019 data provided by the U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center, special tabulation, accessed November 2020.

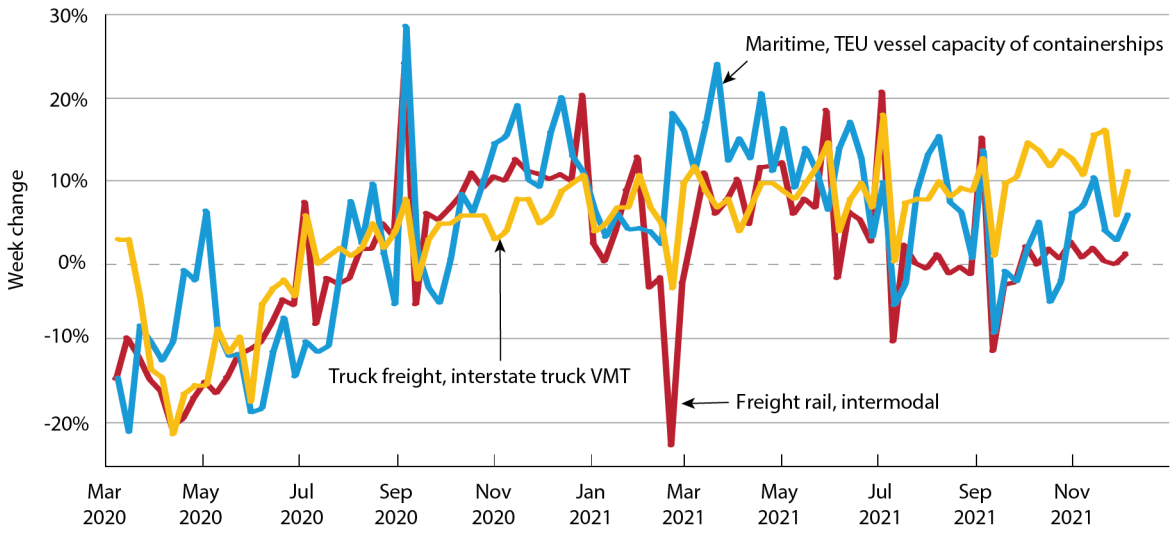
Freight Transportation During the Pandemic

Freight transportation carries cargo through supply chains that are pulled by the increasing demand for goods and pushed by responses of retailers to the demands of consumers and the responses of manufacturers and distributors to the demands of retailers. Supply chains are pushed and pulled by the availability of lumber, grain, and other basic resources that are affected by weather and other forces not related to economic demand.

These forces drove a faster rebound in freight transportation than passenger travel as illustrated by the selected key freight indicators in figure 2-5. The pandemic has affected both demands on the freight transportation system and the capacity of the freight transportation system to respond to those demands.

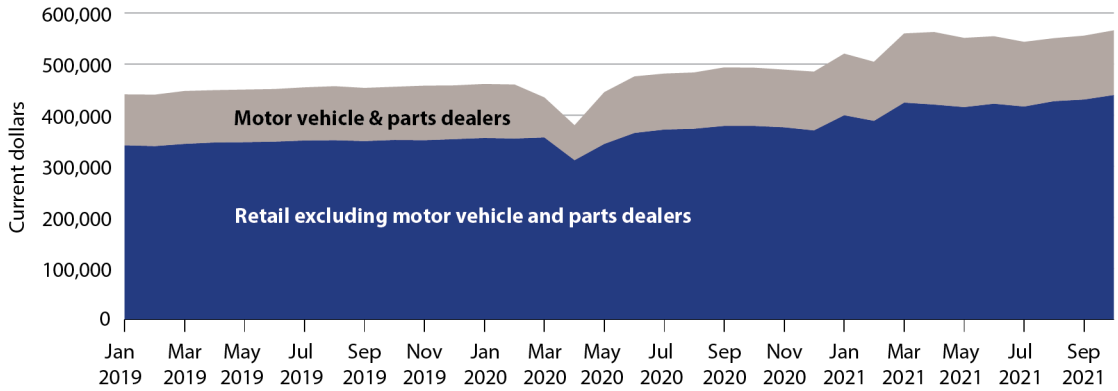
The modest growth in the demand for goods to be moved throughout 2019 reversed dramatically with the arrival of COVID-19 in spring of 2020

FIGURE 2-5 Freight Modes Percent Change from Baseline (weekly)



SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, *The Week in Transportation*, www.bts.gov/twit, accessed November, 2021.

FIGURE 2-6 Retail and Motor Vehicle Sales in Current Dollars: January 2019–September 2021



SOURCE: U.S. Department of Commerce, Bureau of the Census, Monthly Retail Trade, https://www.census.gov/retail/marts/www/timeseries.html, accessed Oct.15, 2021.

as represented by sales of retail goods and motor vehicles. Demand dropped 5 percent from March to April, 2020, returned to the pre-April trend by June, and jumped to a new plateau in February, 2021 that was 20 percent above the pre-April numbers (figure 2-6).

The Freight Transportation Services Index, an indicator of monthly changes in freight carried by for-hire transportation companies, has not exactly paralleled the demand for consumer goods since August 2019. The volume of freight moved declined moderately from August 2019 through February 2020, then collapsed with the arrival of COVID-19 in March but quickly rebounded by summer (figure 2-7). While the Transportation Services Index has a strong relationship with general economic cycles, the relationship between freight activity measured in the index and retail sales is less clear given the effects of inventories, international relations that govern foreign trade, the ability of manufacturers to respond to surges in sales, volumes of raw and intermediate materials to be moved, and available transportation capacity.

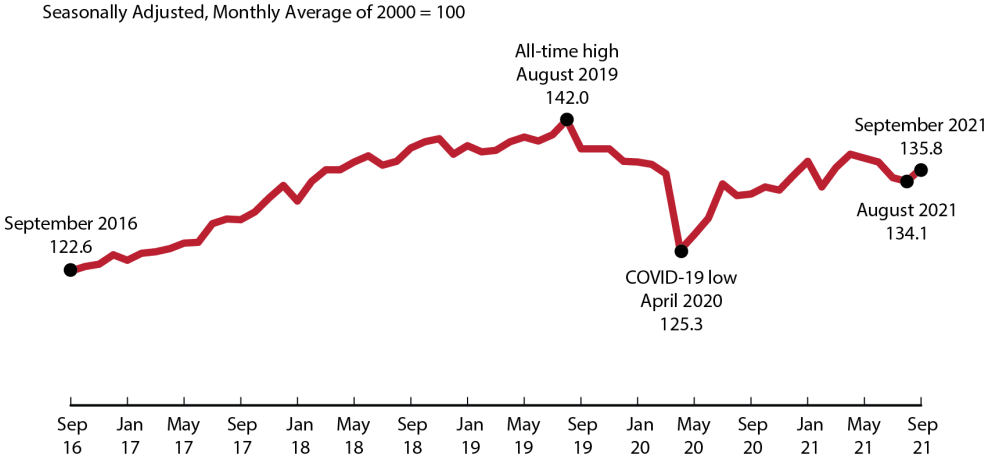
The freight transportation system has many pieces that must work together to serve supply chains, and the ability to adjust to volatile demands or to disruptions in the freight system are limited by years of emphasis on efficient logistics and lean supply chains.[2] Supply chains are especially complex when international trade is involved. While imports accounted for only 6 percent of the tons and 12 percent of the value of pre-pandemic freight movement in the United States, the surge in consumer spending pushed imports to record highs by the end of summer 2021 (figure 2-8) The result was unprecedented movements of containers by ship to U.S. ports (figures 2-9 and 2-10), resulting in unusual numbers of ships waiting to access ports (figure 2-11).

In addition to ports, the surged demand in consumer goods are also reflected in rail freight volume (figure 2-12). The dramatic drop in rail carloadings in winter 2021 was related to an unprecedented freeze in Texas, and reductions in vehicle manufacturing due to shortages in computer chips have reduced volumes of a major commodity moved by rail. Other sources of disruption included hurricanes,[3] temporary loss of a major truck crossing of the

[2] Rolf R. Schmitt and Edward L. Strocko, "Moving the Goods," *TRNews* 329: 44-48, September–October 2020.

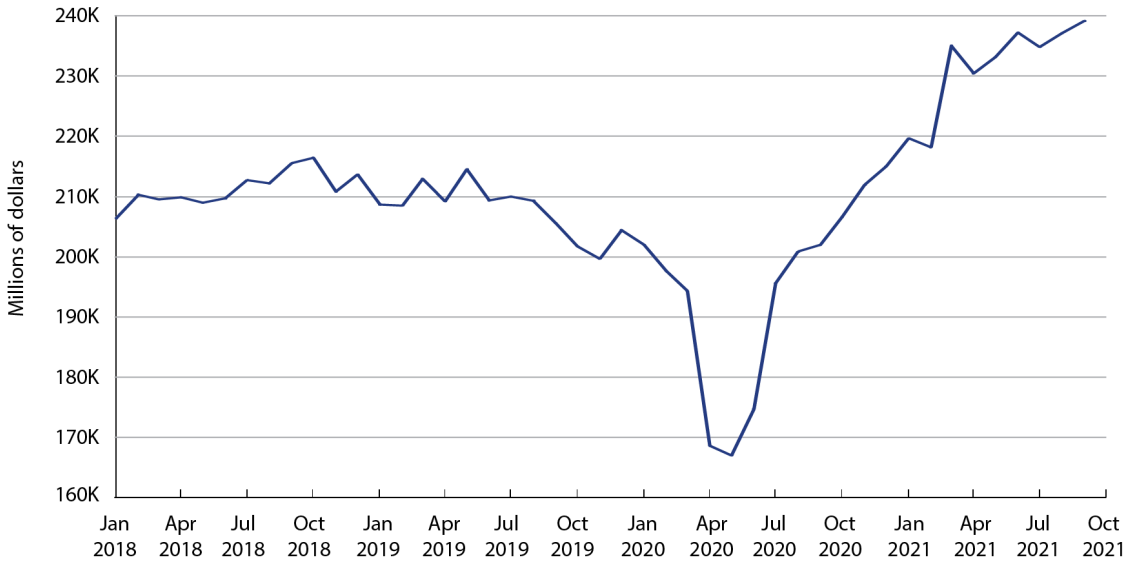
[3] U.S. Department of Transportation, Bureau of Transportation Statistics, Tropical Storm Elsa Makes Landfall in Florida; BTS Map Shows U.S. Ports Affected by 2020 Named Storms, https://www.bts.gov/data-spotlight/tropical-storm-elsa-makes-landfall-florida-bts-map-shows-us-ports-affected-2020, accessed November 2021

FIGURE 2-7 Freight Transportation Services Index: August 2016–September 2021



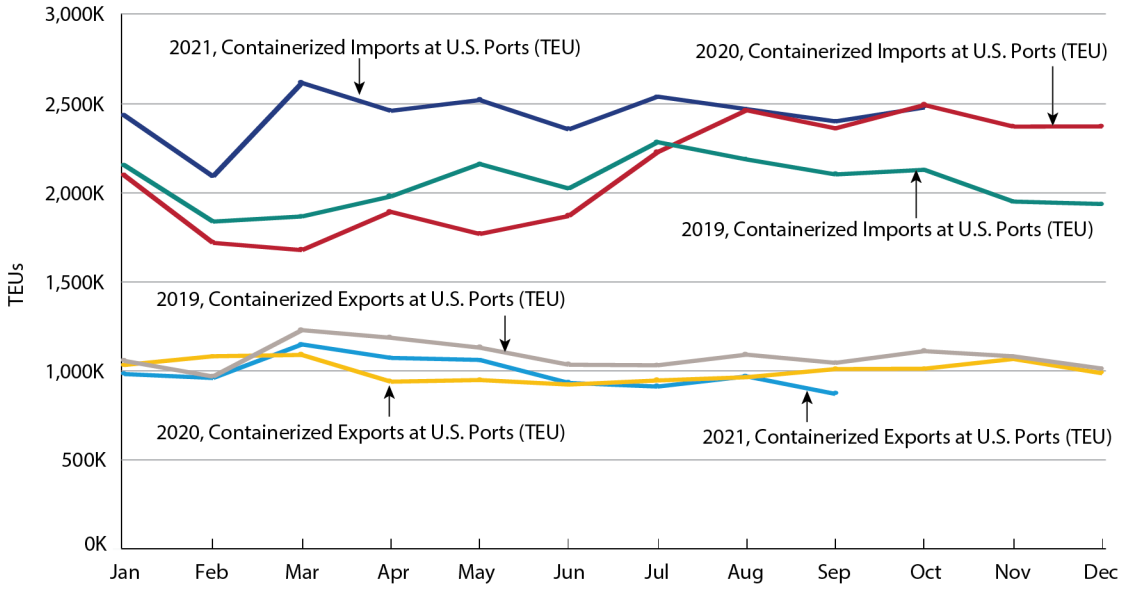
SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, August 2021 Freight Transportation Services Index (TSI), Oct. 14, 2021, https://www.bts.gov/newsroom/august-2021-freight-transportation-services-index-tsi, accessed Oct. 14, 2021.

FIGURE 2-8 Value of Goods Imported to the U.S.: 2018–2021



SOURCE: U.S. Census Bureau and U.S. Bureau of Economic Analysis, U.S. Imports of Goods by Customs Basis from World.

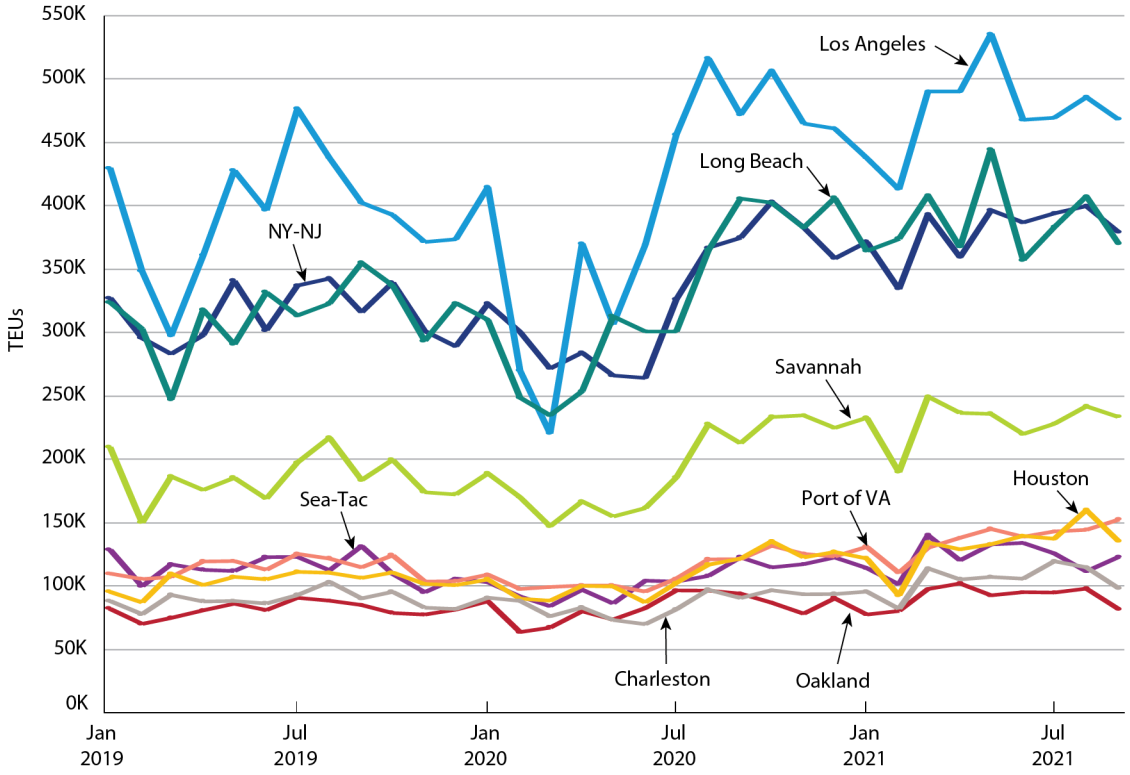
FIGURE 2-9 Containerized Imports at U.S. Ports: 2019–2021



NOTES: Includes data for all U.S. container ports. Data subject to revision due to data source gaps

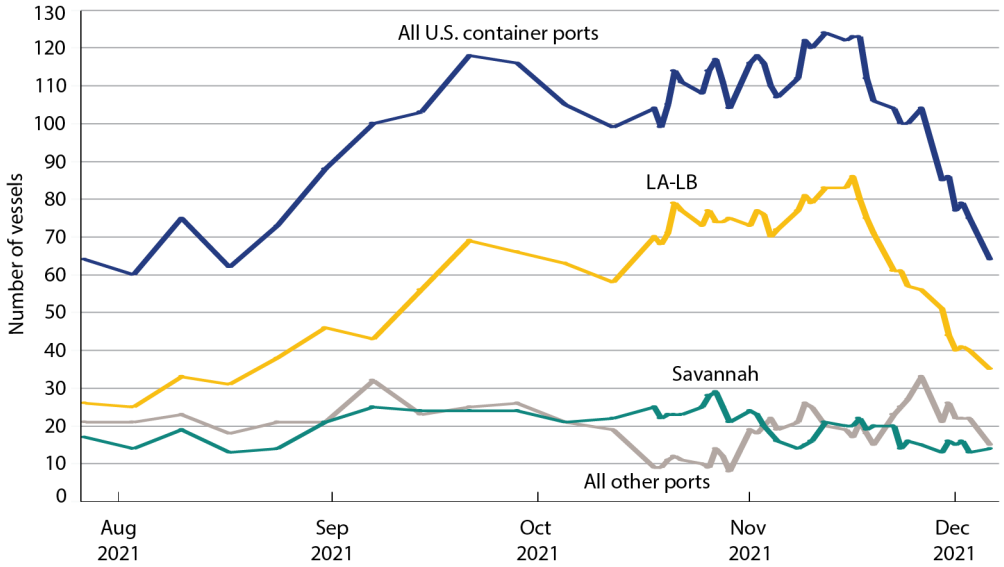
SOURCE: MARAD Office of Policy and Plans analysis of IHS Markit PIERS data.

FIGURE 2-10 Loaded Import Containers at Select U.S. Ports: January 2019–September 2021



SOURCE: MARAD Office of Policy and Plans analysis of TEU data published by U.S. Ports

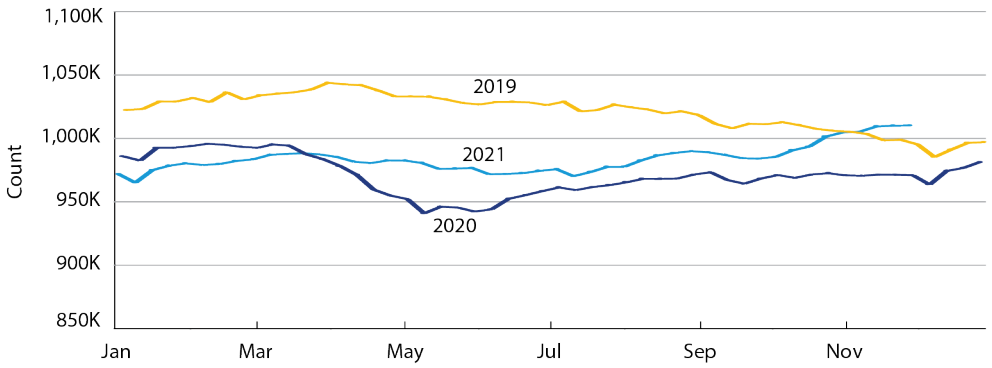
FIGURE 2-11 Containerships Anchored Off U.S. Ports: July–December 2021



NOTES: LA-LB totals include containerships in drift/holding areas. Data reported at more frequent intervals starting October 18, 2021.

SOURCE: MARAD Office of Policy and Plans analysis of AIS data. USDOT.

FIGURE 2-12 Rail Carloads: 2019–2021



SOURCE: Surface Transportation Board (STB)

Mississippi River in Memphis,[4] and blockage of the Suez Canal that trapped 51 container ships of which 25 were coming from or going to ports here in the United States with the capacity to carry more than 217,400 TEUs.[5]

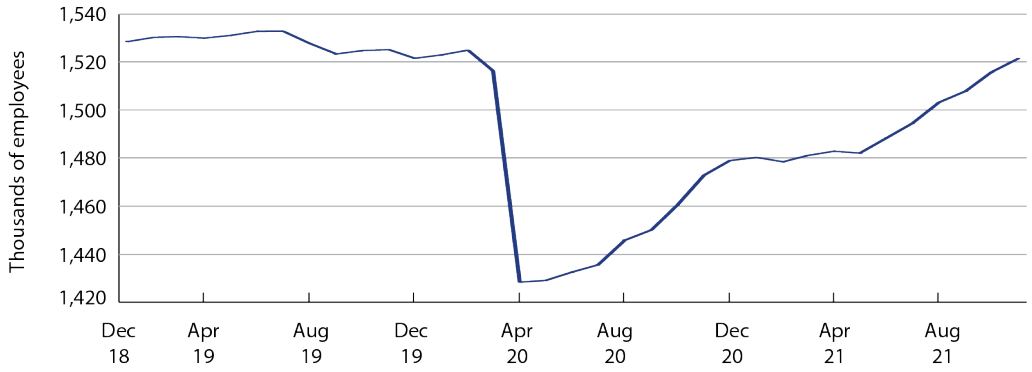
Trucks serve a key link in most supply chains, and availability of truck drivers is a central element of the capacity of trucks to move goods. The number of employed truck drivers dropped with the arrival of COVID-19 and has yet to return to pre-pandemic levels (figure 2-13). Labor availability throughout the warehousing and transportation sector, including dock workers, truck drivers, and warehousing workers and for whom job turnover and recruitment has been a challenge is reflected by the sizeable difference between the number of openings and the number of hires (figure 2-14).

The surged demand in consumer goods and the shortage in labor force and transportation equipment led to significant delays (Figures 2-15 and 2-16) and the increases in the costs to move goods. Truck spot rates increased to more than $2.4 per mile – exceeding the previous peak in summer

[4] U.S. Department of Transportation, Bureau of Transportation Statistics, I-40 Bridge Failure Causes Multimodal Challenges, May 17, 2021, https://www.bts.gov/data-spotlight/i-40-bridge-failure-causes-multimodal-challenges, accessed on Oct. 15, 2021.

[5] U.S. Department of Transportation, Bureau of Transportation Statistics, Suez Canal Blockage by Ever Given Will Affect U.S. Ports, Businesses, Consumers, April 1, 2021, https://www.bts.gov/data-spotlight/ever-given-suez-canal, accessed on Oct. 15, 2021.

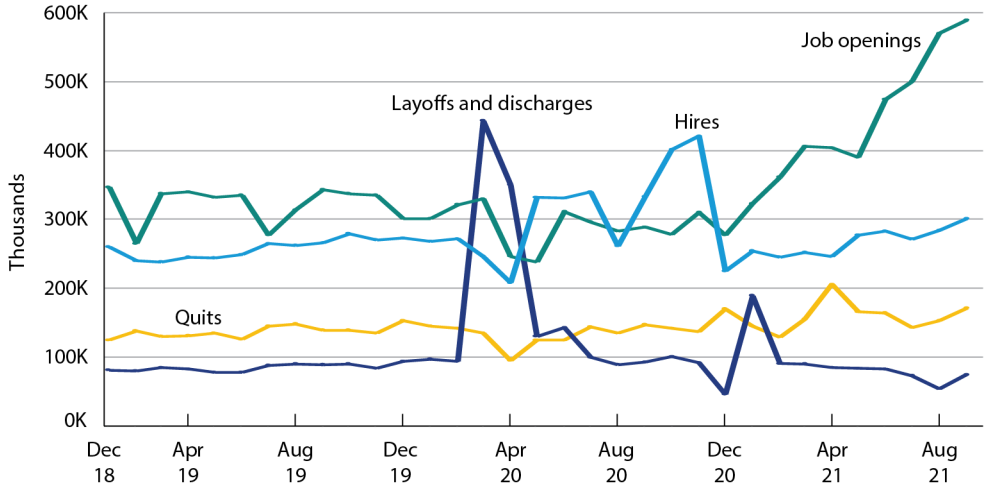
FIGURE 2-13 Truck Transportation Employees on Non-Farm Payroll (seasonally adjusted): 2019–2021



NOTE: Data in this chart represent wage and salary workers only, and exclude owner operators and independent contractors.

SOURCE: U.S. Bureau of Labor Statistics - Current Employment Statistics (CES)

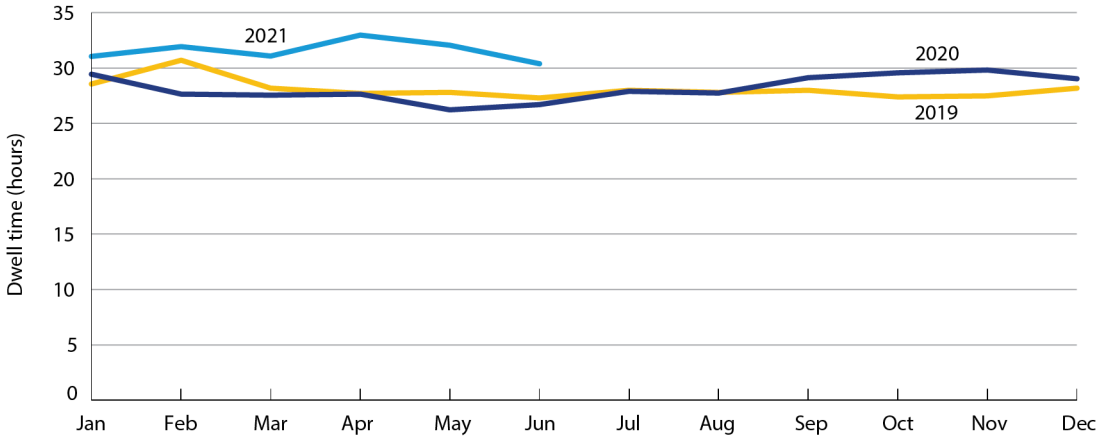
FIGURE 2-14 Monthly Job Openings, Hires, and Separations in the Transportation, Warehousing, and Utilities Sector: January 2019–September 2021



NOTE: Data in this chart represent wage and salary workers only, and exclude owner operators and independent contractors.

SOURCE: U.S. Bureau of Labor Statistics - Job Openings and Labor Turnover Survey (JOLTS)

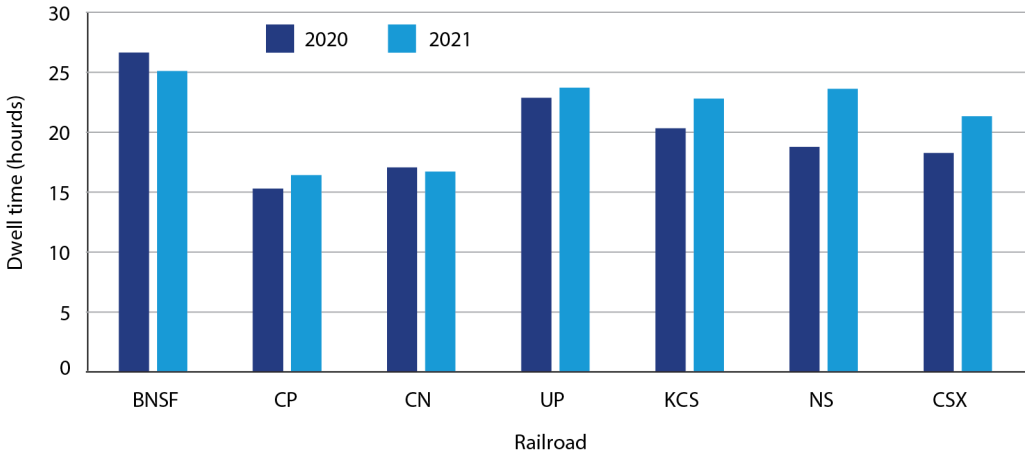
FIGURE 2-15 Average Container Vessel Dwell Times at the Top 25 U.S. Container Ports: 2019, 2020, 2021



NOTES: AIS signals are susceptible to interference, which can result in missing or incomplete dwell time records. This issue may impact the reliability of our estimated dwell times. However, in collaboration with the USACE, BTS takes numerous data quality steps each year, including verifying our port terminal boundaries to account for expansion or reconfiguration and changes in vessel activity at each port terminal. Vessel calls of less than 4 hours or more than 120 hours were excluded as representing calls either too short for significant cargo handling or too long for normal operations.

SOURCE: **Dwell times**: U.S. Department of Transportation (USDOT), Bureau of Transportation Statistics (BTS), calculated using AIS data from the U.S. Coast Guard's Nationwide Automatic Identification System (NAIS) archive, processed by U.S. Army Engineer Research and Development Center, Coastal and Hydraulics Laboratory, through the AIS Analysis Package (AISAP) software package as of December 2021. **Ports**: USDOT, BTS, based upon 2019 and 2020 port rankings, U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center, special tabulation as of December 2021.

FIGURE 2-16 System-wide Comparison of Average Terminal Dwell Time by Railroads



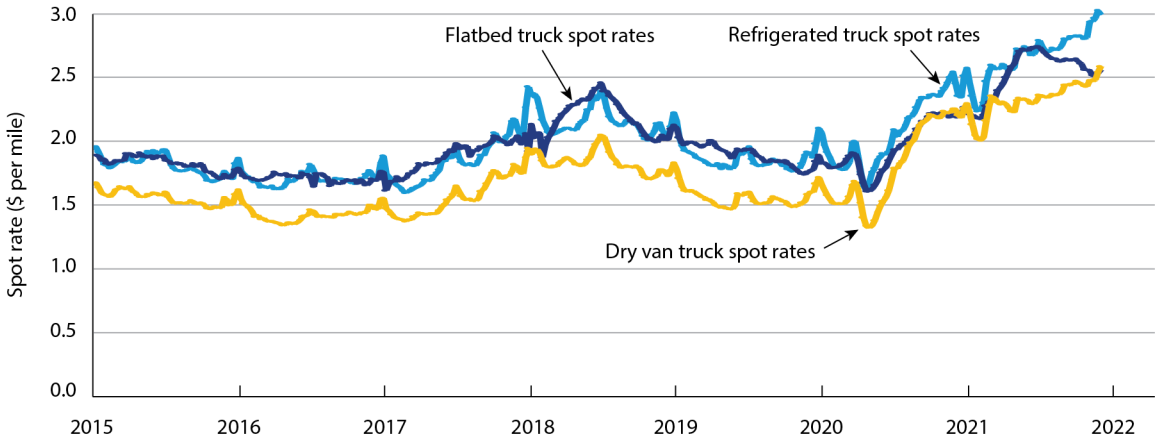
NOTE: Data through week of November 27, 2021.

SOURCE: Surface Transportation Board (STB)

of 2018 (figures 2-17). Even more noticeable is the cost difference between the westbound and eastbound trade lanes (figures 2-18 and 19).

Increased freight rates can affect the cost of consumer goods directly or through increased costs of intermediate goods, and the price of goods can be affected when delays in freight movement cause shortages in supply of goods to meet consumer demands. Supply chain issues are a probable contributor to the recent increase of the Consumer Price Index by 15 points from January 2021 to October 2021 (Figure 2-20).

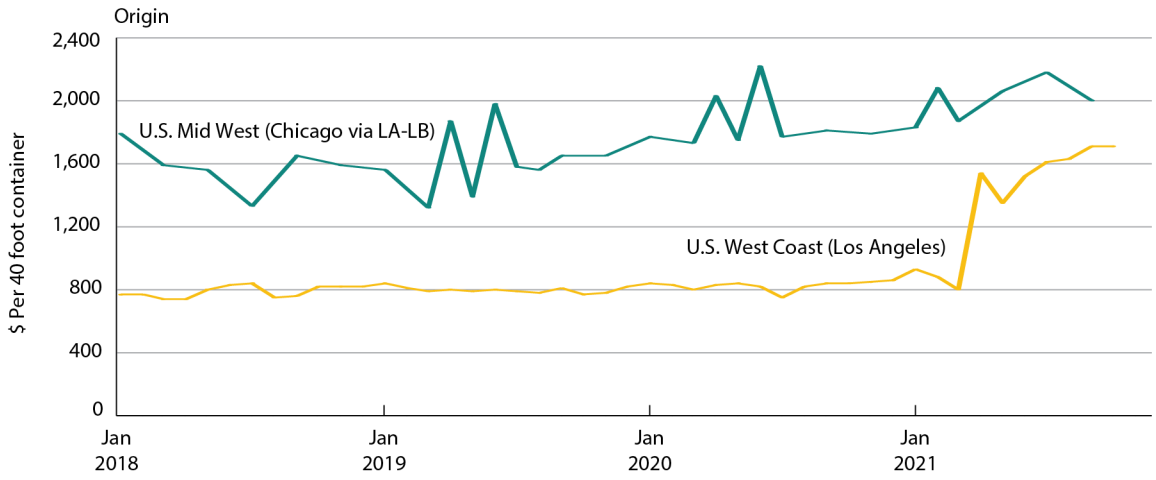
FIGURE 2-17 Truck Spot Rates: 2015–2021



NOTES: This data is for spot market trucking loads, which is approximately one-tenth of the overall common carrier trucking market. The data provider (DAT) is the largest clearinghouse for shipments that are not part of a pre-existing hauling contract. Dry van includes freight transported in enclosed cargo holds..

SOURCE: DAT Freight and Analytics

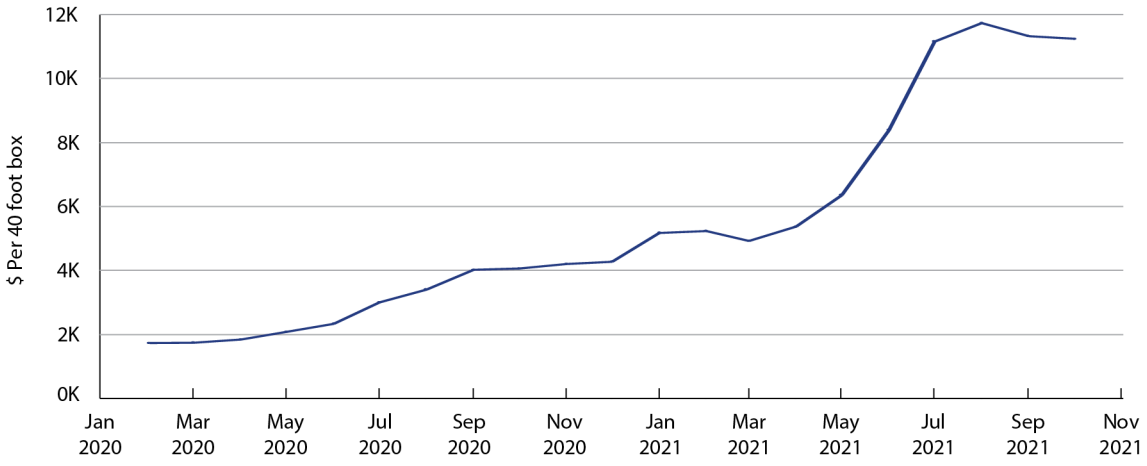
FIGURE 2-18 40 Foot Container Freight Rates to Central China (Shanghai): 2018–2021



NOTE: Spot ocean freight rates for a single container transaction in the selected westbound transpacific trade routes.

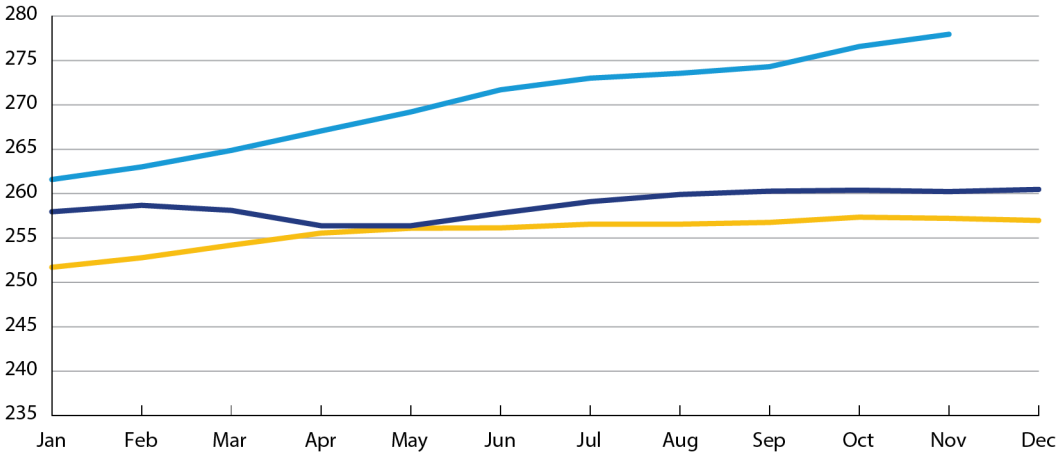
SOURCE: U.S. Department of Agriculture, Agricultural Market Service, Container Ocean Freight Rates from Drewry Supply Chain Advisors' Container Freight Rate Insight.

FIGURE 2-19 40 Foot Container Freight Rates from Shanghai to LA: 2020–2021



SOURCE: U.S. Department of Agriculture, Agricultural Market Service, Container Ocean Freight Rates from Drewry Supply Chain Advisors' Container Freight Rate Insight

Figure 2-20 Consumer Price Index



SOURCE: https://www.bls.gov/cpi/data.htm, CPI for All Urban Consumers (CPI-U). Data extracted on: November 30, 2021.

Questions for the Future

The popular press has been highlighting problems with supply chains and potential contributions of those problems to inflation. Will shortages in component parts for domestic goods and delays in transporting those parts and the final products be brief annoyances or lasting issues? Will the demand for consumer goods remain high and volatile? Will long-distance, just-in-time supply chains become shorter with onshoring—the relocation of business processes to a lower cost location elsewhere in the country—and better buffered with increased origins of supply and more warehousing? How much personal travel for goods and services will be replaced by home delivery services and communications technology? These questions underscore the need for the robust program of freight data collection and analysis described in chapter 4.

CHAPTER 3

Safety, Energy, and the Environment

In the calendar year before the pandemic, transportation accounted for 38,000 fatalities and 2.8 million injuries, consumed over one-fourth of total U.S. primary energy use, and accounted for about 22 percent of the Nation's total carbon dioxide emissions.[1] Reductions of these negative aspects of transportation would be expected as transportation activity declined during the pandemic, such as the precipitous drops in driving and commercial air flights documented in chapter 1. While reductions occurred in energy and emissions during the height of the pandemic, expected declines in fatalities did not materialize.

Transportation Safety

The number of fatalities and injuries by mode in the calendar year before the pandemic are summarized in table 3-1. Highways accounted for 95 percent of the fatalities, including 7,127 pedestrians and pedalcyclists (people on bikes) in 2020. According to the National Highway Traffic Safety Administration (NHTSA), fatality and injury data come from many sources that take time to capture and process, so data for 2020 are limited at time of publication. Historically, 9 out of 10 fatalities and injuries in air transportation involve general aviation and over 85 percent of the fatalities and injuries in water transportation involve recreational boating.

TABLE 3-1 Transportation Fatalities and Injuries by Mode: 2019 (pre-pandemic) and 2020 (during pandemic)

	Fatalities 2019	Fatalities 2020	Injuries 2019	Injuries 2020
TOTAL	**38,173**	**40,732**	**2,757,214**	**U**
Air	452	349	259	202
Highway	36,096	38,680	2,740,000	U
Pedestrian and pedacyclist	7,051	7,127	125,000	U
Railroad	862	752	7,944	5,503
Transit	268	289	23,325	15,418
Water	707	852	2,989	3,536
Pipeline	11	15	36	42

KEY: U = unavailable at time of publication

SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, *National Transportation Statistics*, tables 2-1 and 2-2, available at http://www.bts.gov/nts as of December 2021.

Railroad fatalities declined 12 percent and rail-highway grade crossing fatalities declined by a third between 2019 and 2020. The 81 percent decline in transit use was not reflected in an 8 percent increase in the number of transit fatalities, and a 20 percent increase in water transportation fatalities was driven by a 25 percent increase in fatalities involving recreational boating.[2]

The most unexpected safety outcome for 2020 was the 7.2 percent increase in highway fatalities

[1] U.S. Department of Transportation, Bureau of Transportation Statistics, *Transportation Statistics Annual Report*, 2020

[2] U.S. Department of Transportation, Bureau of Transportation Statistics, *National Transportation Statistics*, table 2-1 as of October 2021.

in spite of a 13 percent decrease in vehicle miles of travel (VMT). NHTSA Preliminary analysis suggests the following:[3]

- "The fatality rate for 2020 was 1.37 fatalities per 100 million VMT, up from 1.11 fatalities per 100 million VMT in 2019.
- Traffic fatalities rose in most major categories in 2019, including passenger vehicle occupants (23,395, up 5 percent), pedestrians (6,205, flat from 2019), motorcyclists (5,015, up 9 percent), and pedalcyclists (846, up 5 percent).
- The main behaviors that drove this increase are impaired driving, speeding, and failure to wear a seat belt. Crash factors that showed the largest increases in 2020 were occupant ejection (up 20 percent), unrestrained occupants of passenger vehicles (up 15 percent), speeding-related crashes (up 11 percent), and police-reported alcohol involvement crashes (up 9 percent).
- Fatalities on urban interstates were up 15 percent, on urban local/collector roads up 12 percent, and on rural local/collector roads up 11 percent.
- Nighttime fatalities increased 11 percent and weekend fatalities were up 9 percent."

NHTSA projections based on preliminary 2020 data include decreases in fatalities for some categories in 2020. Fatalities in crashes involving a large truck (commercial or non-commercial use) are projected to decline marginally (down 2 percent), and fatalities among persons aged 65 or older are projected to decline by about 9 percent.[4]

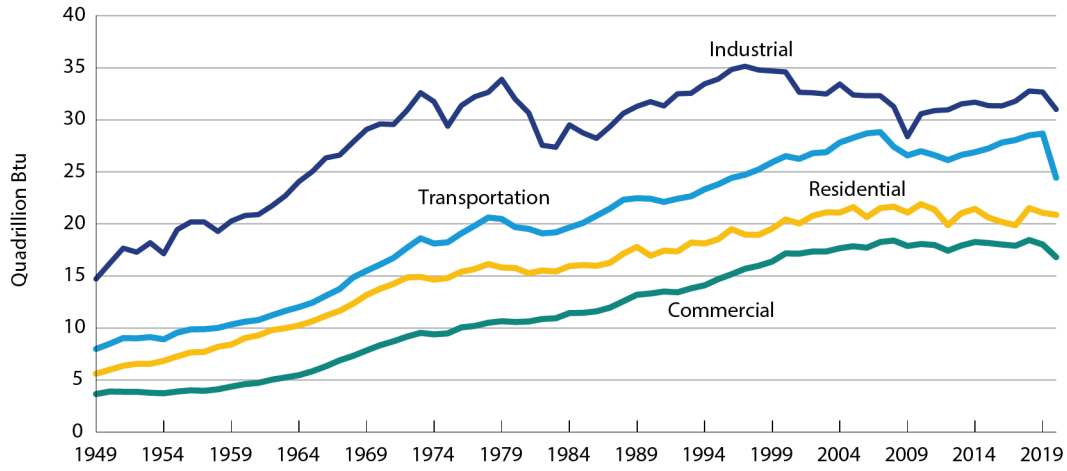
Energy and the Environment

Transportation accounts for a large share of energy consumption and related emissions of air pollutants and greenhouse gases (GHG). While the decrease in transportation activity following the start of the pandemic has reduced energy use and emissions, the continuing recovery of transportation activity

[3] U.S. Department of Transportation, National Highway Traffic Safety Administration, 2020 Fatality Data Show Increased Traffic Fatalities During Pandemic, June 3, 2021, at https://www.nhtsa.gov/press-releases/2020-fatality-data-show-increased-traffic-fatalities-during-pandemic as of Sept. 19, 2021.

[4] ibid

FIGURE 3-1 Annual Energy Consumption by End Use Sector: 1949–2020



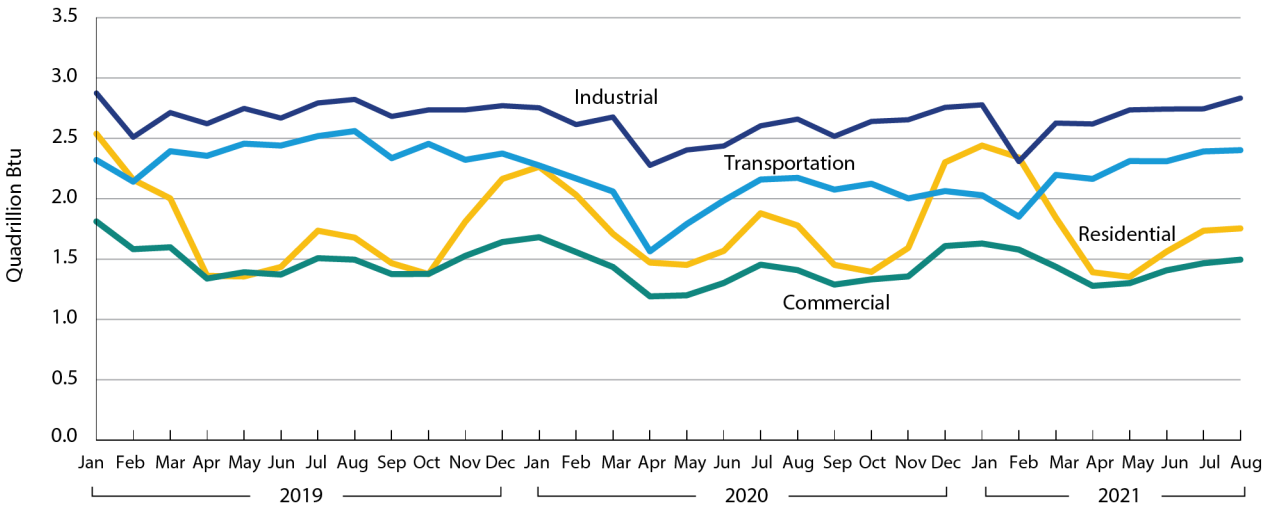
SOURCE: U.S. Energy Information Administration, *Monthly Energy Review*, table 2.5 Carbon Dioxide Emissions from Energy Consumption for Transportation Sector, available at https://www.eia.gov/totalenergy/data/monthly/ as of October 2021.

is accompanied by a rebound in air pollution and GHG emissions.

Transportation continues to exceed annual commercial and residential uses of energy for the last 7 decades (figure 3-1) and has been surpassed only by industrial uses (figure 3-2). While the decline in energy use following COVID-19 was far greater in transportation than in the other sectors, transportation remained above residential consumption in months excluding the winter heating seasons. The greater seasonal swings in residential consumption only exceeds transportation consumption in the winter heating season.

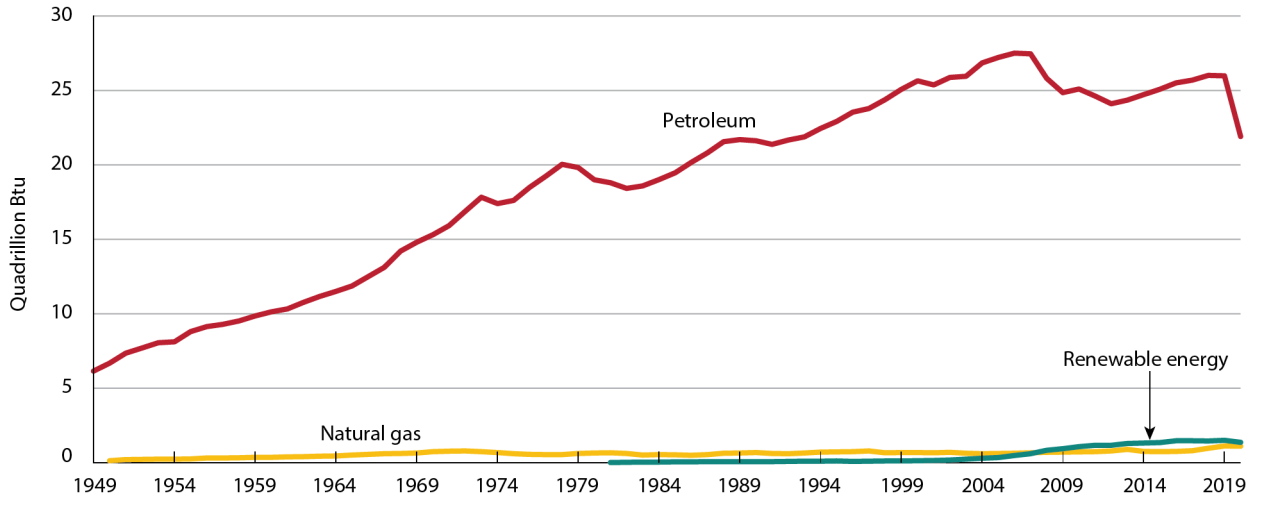
Petroleum remains the dominant source of energy consumed by transportation, dwarfing both natural gas and renewable energy (figures 3-3 and 3-4).

FIGURE 3-2 Monthly Energy Consumption by End Use Sector: 2019–2021



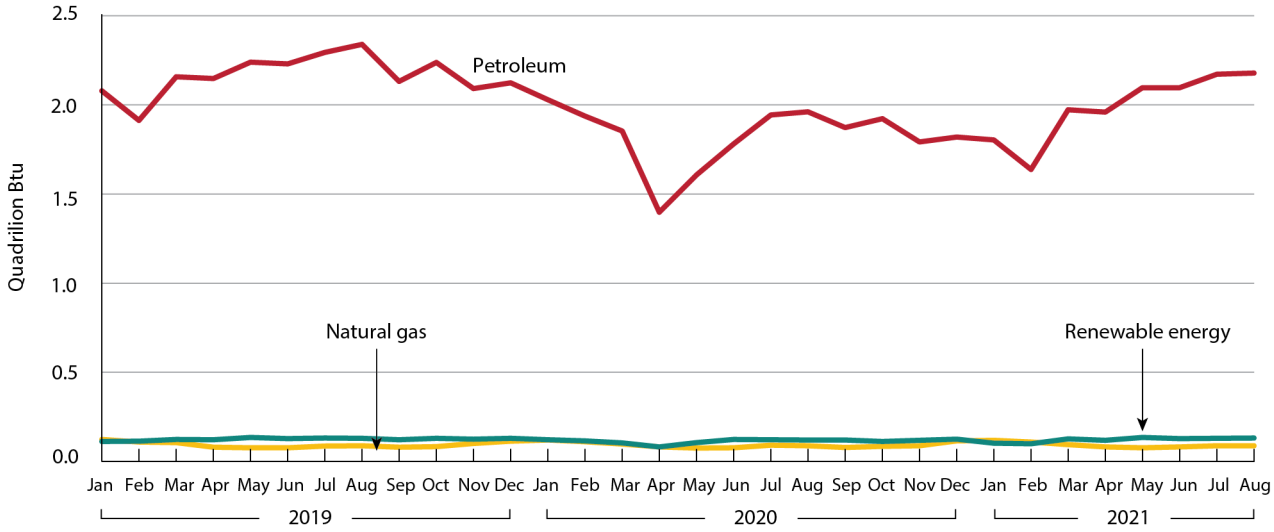
SOURCE: U.S. Energy Information Administration, *Monthly Energy Review*, table 2.5 Carbon Dioxide Emissions from Energy Consumption for Transportation Sector, available at https://www.eia.gov/totalenergy/data/monthly/ as of October 2021.

FIGURE 3-3 Transportation Energy Consumption by Source of Energy by Major Source: 1949–2020



SOURCE: U.S. Energy Information Administration, *Monthly Energy Review*, table 2.5 Carbon Dioxide Emissions from Energy Consumption for Transportation Sector, available at https://www.eia.gov/totalenergy/data/monthly/ as of October 2021.

FIGURE 3-4 Transportation Energy Consumption by Source of Energy by Major Source, Monthly: 2019–2021



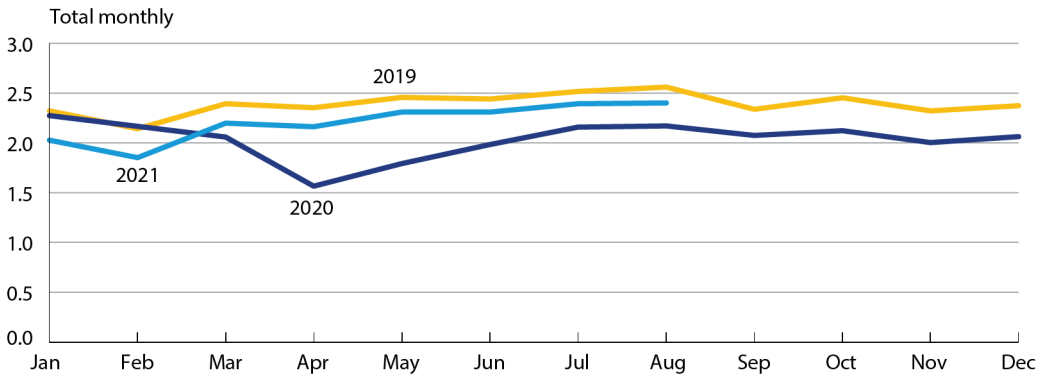
SOURCE: U.S. Energy Information Administration, *Monthly Energy Review*, table 2.5 Carbon Dioxide Emissions from Energy Consumption for Transportation Sector, available at https://www.eia.gov/totalenergy/data/monthly/ as of October 2021.

The dramatic downturn in petroleum use in 2020 occurred mainly in the spring, when typical seasonal increases in demand were offset by the collapse in travel following the arrival of COVID-19.

As of summer 2021, total transportation energy consumption was not back to pre-pandemic levels, but the traditional seasonal pattern of increases in the spring and summer and declines in the fall and winter had resumed (figure 3-5). Total transportation energy consumption in the first six months of 2020 was 18 percent below the first six months of 2019. Total transportation energy consumption in the first six months of 2021 recovered some of the 2020 declines, reaching 91 percent of the 2019 level.

Consumption of jet fuel by commercial aviation showed even more dramatic changes with the

FIGURE 3-5 Total Energy Consumption by Transportation: 2019 January 2019–August 2021



SOURCE: U.S. Energy Information Administration, *Monthly Energy Review*, table 2.5 Carbon Dioxide Emissions from Energy Consumption for Transportation Sector, available at https://www.eia.gov/totalenergy/data/monthly/ as of October 2021.

arrival of COVID-19. Compared to the pre-pandemic year of 2019, jet fuel consumption declined by 44 percent in 2020. The monthly declines in jet fuel consumption compared to 2019 reflected declines in enplaned passengers for both domestic flights and for international flights to and from the United States (figure 3-6).

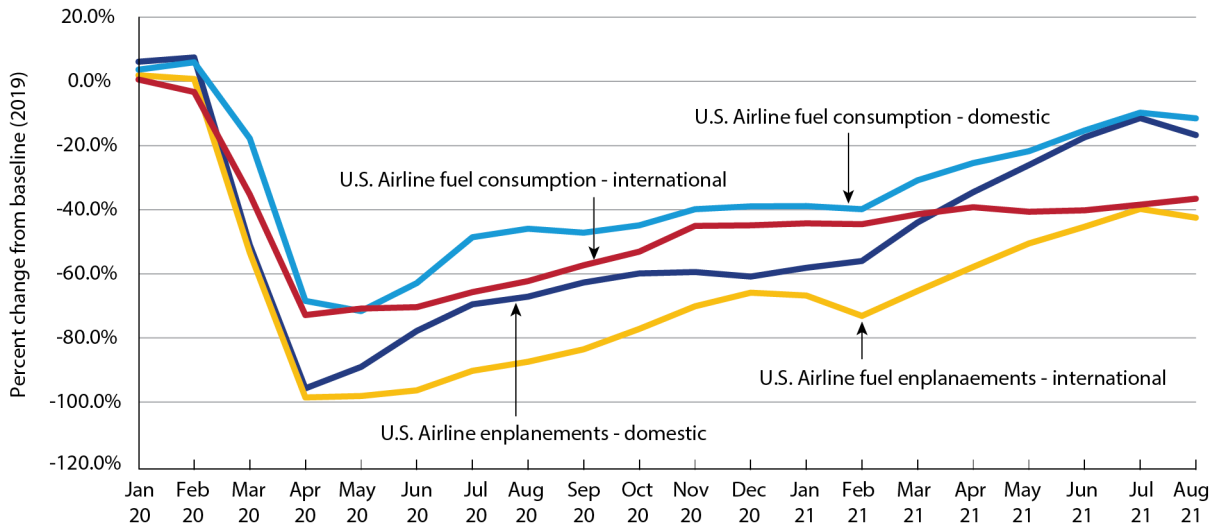
Of the many environmental consequences of transportation activity and energy consumption, carbon dioxide emissions receive particular attention as a greenhouse gas. Consistent with the decline in transportation activity across all modes during the pandemic, carbon dioxide emissions reached a low point in the spring of 2020. The largest decrease in carbon dioxide emissions in the transportation sector was due to the decline in motor gasoline (figure 3-7) and jet fuel use (figure 3-8).

Future fuel consumption and emissions could be significantly affected as petroleum-powered vehicles are supplanted by electric vehicles (EVs). While EVs currently represent less than 2 percent of all light-duty vehicles,[5] vehicle manufacturers are investing in EV technology and some manufacturers suggest an all-EV future.[6] EV sales started with hybrids in 2000 (figure 3-9). While sales of EVs dipped in spring 2020 with the arrival of COVID-19, hybrid EVs reached an all-time monthly high in March 2021, and May 2021 saw a record number of battery electric and plug-in hybrid electric vehicle sales (figure 3-10).

[5] Oak Ridge National Laboratory, *Transportation Energy Data Book Edition 39*, 2020, table 6.1 updated April 2021

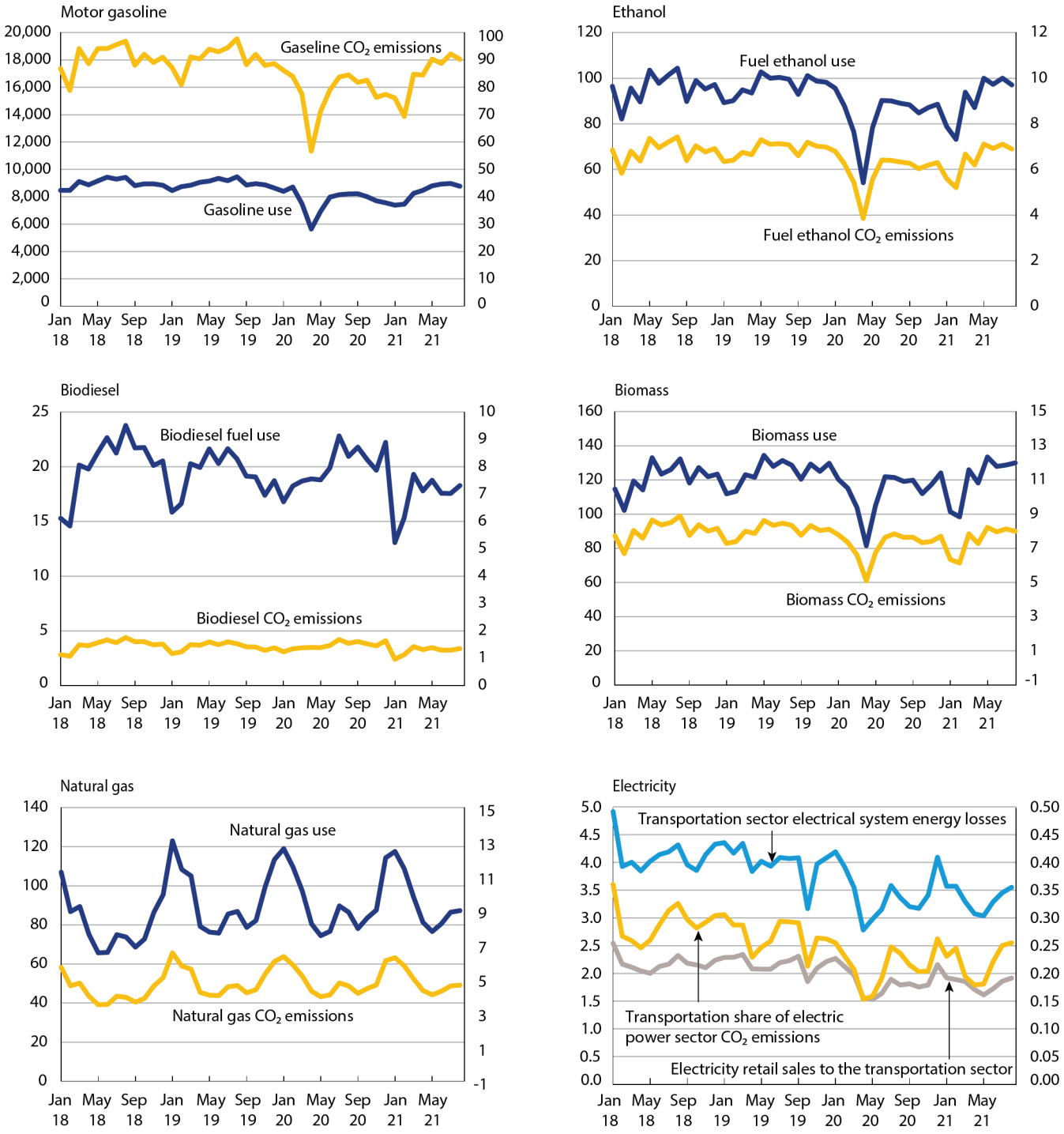
[6] See for example https://www.gm.com/commitments/electrification.html, accessed Oct. 15, 2021.

FIGURE 3-6 Scheduled U.S. Airline Activity and Fuel Consumption: January 2020–August 2021



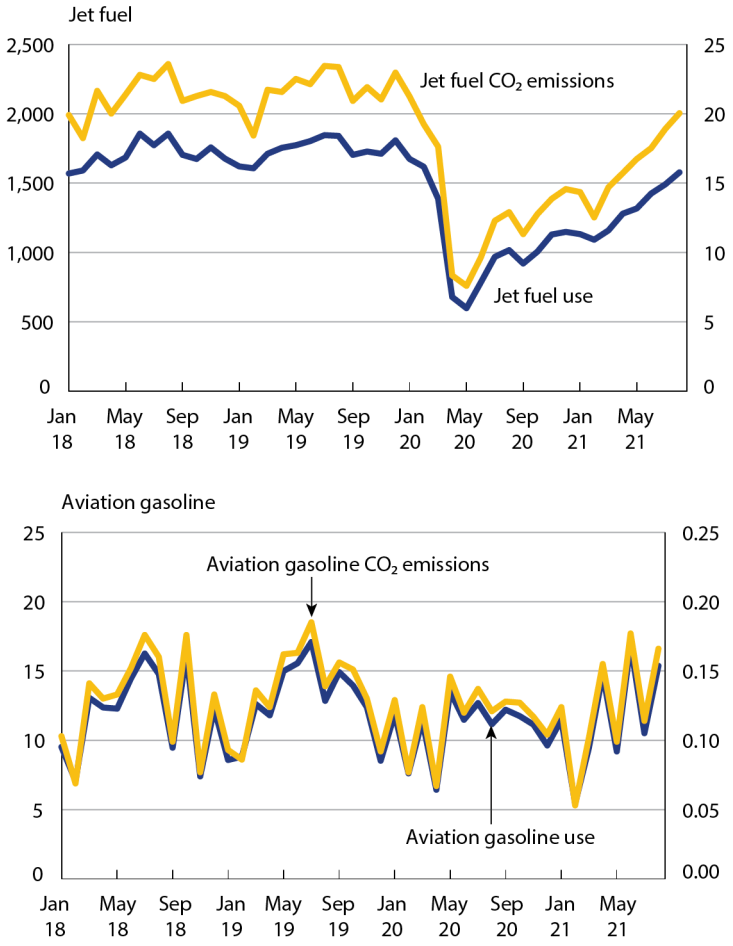
SOURCES: **Airline Enplanements**—U.S. Department of Transportation, Bureau of Transportation Statistics, Seasonally Adjusted Data, available at https://www.transtats.bts.gov/osea/seasonaladjustment/ as of July 2021. **U.S. Airline Fuel Consumption**—U.S. Department of Transportation, Bureau of Transportation Statistics, F41 Schedule P12A, available at https://www.transtats.bts.gov/fuel.asp as of July 2021.

FIGURE 3-7 Fuel Consumption and Carbon Dioxide Emissions for the Transportation Sector by Mode: January 2018–May 2021



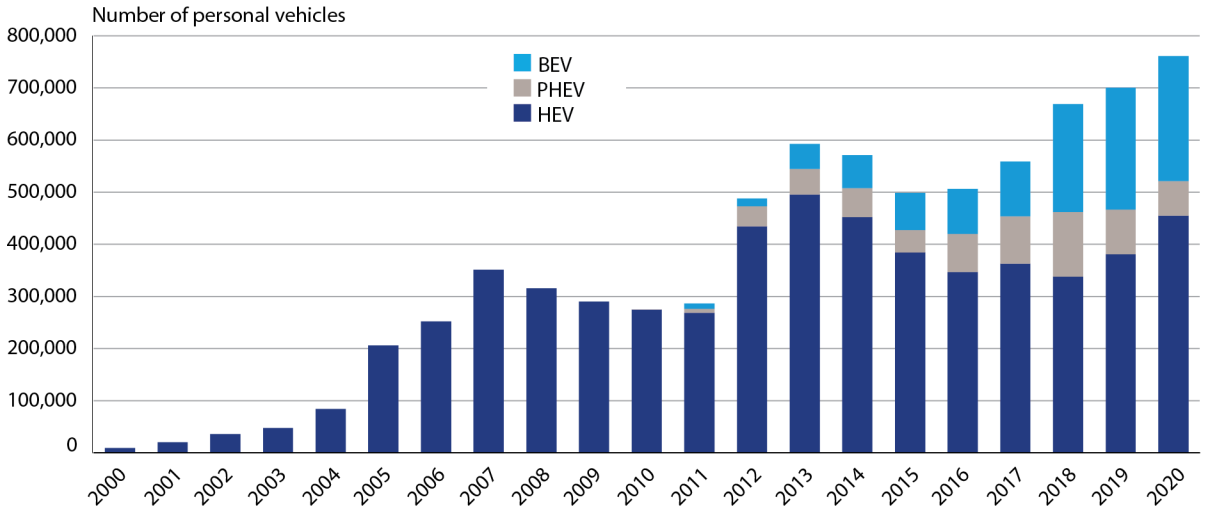
SOURCES: **Carbon Dioxide Emissions**—U.S. Energy Information Administration, *Monthly Energy Review*, table 11.5 Carbon Dioxide Emissions from Energy Consumption for Transportation Sector, available at https://www.eia.gov/totalenergy/data/monthly/ as of July 2021. **Fuel Use**— U.S. Energy Information Administration, *Monthly Energy Review*, table 3.7c Petroleum Consumption: Transportation and Electric Power Sectors, available at https://www.eia.gov/totalenergy/data/monthly/ as of July 2021 .

FIGURE 3-8 Aviation Fuel Consumption and Carbon Dioxide Emissions by Mode: January 2018–May 2021



SOURCES: **Carbon Dioxide Emissions**—U.S. Energy Information Administration, *Monthly Energy Review*, table 11.5 Carbon Dioxide Emissions from Energy Consumption for Transportation Sector, available at https://www.eia.gov/totalenergy/data/monthly/ as of July 2021. **Fuel Use**— U.S. Energy Information Administration, *Monthly Energy Review*, table 3.7c Petroleum Consumption: Transportation and Electric Power Sectors, available at https://www.eia.gov/totalenergy/data/monthly/ as of July 2021 .

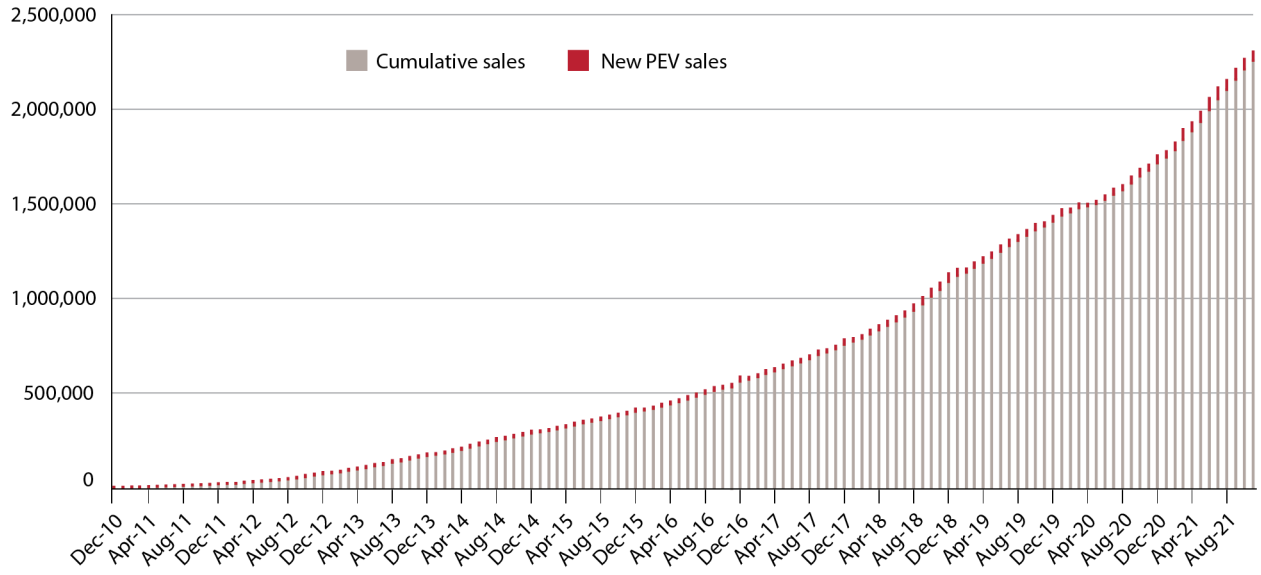
Figure 3-9 Sales of Hybrid, Plug-in Hybrid, and Battery Electric Vehicles: 2000–2020



KEY: BEV = battery electric vehicle; HEV = hybrid electric vehicle; PHEV = plug-in hybrid electric vehicles.

SOURCE: Oak Ridge National Laboratory, *Transportation Energy Data Book*, Annual Issues, available at tedb.ornl.gov as of May 2021.

Figure 3-10 Cumulative Plug-In Vehicle Sales: 2010–2021



SOURCE: Argonne National Laboratory's analysis of different vehicles sales databases, including but not limited to Green Car Congress, Hybrid Market Dashboard and Wards Auto, available at https://www.anl.gov/es/light-duty-electric-drive-vehicles-monthly-sales-updates with Monthly updates.

CHAPTER 4

State of Transportation Statistics

COVID-19, the arrival of a new national administration with its own priorities, implementation of the Foundations for Evidence-Based Policymaking Act,[1] and reauthorization of surface transportation programs bring increased demands on the Bureau of Transportation Statistics (BTS) and its partners to support decisions with objective, accurate, and timely information. BTS must mobilize both traditional and new sources of data to inform decision makers and the public in a rapidly changing world.

Adapting to COVID-19

BTS underwent a significant transformation to deal with the information demands and working environment of the pandemic. When senior leadership in the Department of Transportation (DOT) asked about the impact of COVID-19 on transportation, the extent of disruptions to supply chains, and the trajectory of transportation to a new post-pandemic normal, BTS turned to experimental statistics and innovative collaborations for rapid responses. The transformation of BTS required new data sources, new methods for creating statistical products, new partnerships, and a new approach to data quality.

Like most statistical agencies in the pre-pandemic era, BTS emphasized the creation of sound, comprehensive data with a deliberative and thorough approach to data quality. BTS and statistical units across the department improved timeliness of their traditional products by streamlining and automating data processing and data collections, and by shifting from print products to more frequent electronic releases. Traditional data collections included large-scale, infrequent surveys of households and freight shippers, annual surveys of businesses, monthly and quarterly data reported by commercial airlines, and administrative records and follow-up investigations used for analyses of safety. The use of data from remote sensing and location-based services and the creation of estimations based on integrated data from multiple sources was limited.

In response to pressing questions from DOT leadership as the pandemic disrupted the transportation sector, BTS transformed its traditional approaches by

1. shifting from annual and monthly statistics to daily and weekly reports. The enormous changes in travel caused by COVID-19 allowed BTS to use less precise measures of change and place a premium on publishing rough indicators.

2. collaborating with government partners for more timely measures, such as using the number of individuals scanned for daily airport

[1] Pub. L. 115-435 (Jan. 14, 2019).

security inspections as a proxy for counts of airline passengers normally reported to BTS by airlines a month later.

3. joining other agencies in adding questions to the Census Bureau's pulse surveys.

4. publishing weekly experimental statistics on daily travel.

The transformation to produce rapid COVID-19 indicators, first on a daily basis then on a weekly basis, posed unique statistical challenges not faced by approaches used to create monthly or annual statistics. This is true for the weekly statistics on daily travel and the percent population staying at home during COVID-19 based on data from cell phones and other location-based services that were initially compiled as a research project. The data from multiple sources are aggregated to estimate travel from anonymized tracks of cell phones and other location-based technology.

The pandemic has caused BTS to rethink its traditional data programs - not to replace quinquennial benchmarks, annual estimates, and monthly data that continue to meet information needs of the transportation community – but to supplement those statistics with new or more targeted evidence that provide additional information needed to understand how COVID-19 is affecting transportation today and in the long run. BTS is working to update its portfolio of passenger and freight statistics to inform current interest in equity, resiliency, and supply chain issues and to better understand the transportation effects of telework, eCommerce, and other conditions that COVID-19 has accelerated or impacted. BTS is also reviewing the quality of its data programs using the framework published by the Federal Committee on Statistical Methodology.[2]

[2] Federal Committee on Statistical methodology, A Framework for Data Quality, FCSM-20-04, September 2020, https://nces.ed.gov/fcsm/pdf/FCSM.20.04_A_Framework_for_Data_Quality.pdf, accessed December 2021.

Passenger Transportation

Data on passenger travel and transportation are needed to help answer three basic questions. Is the transportation system delivering people in a timely, reliable manner and at a reasonable cost to support the mobility needs of individuals and households? Is the transportation system delivering workers and tourists to support the national, regional, and local economies? Is passenger movement impeding freight movement, threatening safety, or causing environmental or societal disruption at the national, regional, and local levels? Environmental disruptions include contributions of climate change and societal disruptions include equity impacts.

Passenger movement includes the following:

- Trips by purpose and by socio-economic characteristics of the traveler from geographic origin to geographic destination.
- Linkages of passenger travel to economic activity, whether as workers, local customers of retail and services, or out-of-town visitors.
- Movements of personal vehicles, buses, trains, ships, and planes to carry passengers. The origins and destinations of these conveyances may differ from the origins and destinations of passengers being carried. Conveyances may consolidate trips, engage in overlapping pickups and deliveries or transfer the traveler among modes and carriers.

Trips are the building blocks for understanding the demand for passenger travel, the equity impacts of passenger travel, interregional economic interdependencies, and the economic importance of performance of passenger travel. Trips include chained or linked trips with one or more purposes that consist of multiple, individual, and unlinked trips with single purposes.

Current statistical products do not provide:

- comprehensive measures of passenger movement, especially on the characteristics of

travelers and the purposes of their travel with geographic specificity;

- statistics on timeliness, reliability, or cost of passenger movement;
- estimates of regions affected by a disruption to the transportation system; or
- estimates of passenger movement that is passing through a region or locality rather than serving the region or locality.

BTS and its partners are working to improve the completeness, timeliness, and geographic detail of passenger movement estimates; to identify the origin-destination patterns of passenger movements over specific portions of the transportation network for assessing system disruptions and resiliency and to identify the relationship of interregional passenger movement to localities for economic development and equity analyses; and to identify passenger transportation capacity, cost, and timeliness measures that collectively define the performance and impacts of the passenger transportation system (including denominators for highway safety analysis).

Freight Transportation

BTS products are valuable when they can help answer three basic questions for freight transportation that parallel the questions for passenger travel. Is the transportation system supporting national, regional, and local economies by delivering goods in a timely, reliable manner and at a reasonable cost? What markets for obtaining supplies and selling goods can be reached with the transportation system? Is freight movement impeding passenger travel, threatening safety or causing environmental or societal disruption at the national, regional, and local levels? Environmental disruptions include contributions of climate change and societal disruptions include equity impacts.

Shipments of commodities are the central building blocks for answering these questions.

- As mentioned in chapter 2, the degree of timeliness and reasonable cost depend on the commodity shipped.
- The origins and destinations of shipments define geographic markets for state and local economies. Commodity movements reflect the demand for freight activity, interregional trade and economic interdependencies, and the economic importance of performance of the freight activity on the transportation system.
- Linkages of shipments into networks of commodity movements from one industry to another define supply chains of raw materials to intermediate goods to finished goods to distribution centers to points of consumption. Shipments of commodities are conceptually the freight equivalent of unlinked trips in passenger travel, while supply chains and movement of conveyances are conceptually the freight equivalent of chained trips in passenger travel.

Beyond commodity movements and supply chains, answers to the basic questions require information on the following:

- The movements of trucks, trains, ships, barges, planes, and other freight activity to haul shipments of commodities. The origins and destinations of these conveyances are often different from the origins and destinations of the shipments carried. The vehicles or vessels may consolidate shipments, engage in overlapping pickups and deliveries, transfer shipments among modes and carriers for final delivery, or return empty to pick up the next shipment. Movements over the freight network involve timeliness and reliability of freight movement, conflicts with passenger travel, safety, and environmental or societal disruptions.
- The cost of shipping, the share of the cost of goods attributable to transportation, and the contribution of transportation costs to inflation.

- Employment and wages in freight transportation, which are positive contributions to economic health in the short term.
- Freight transportation productivity, which is a measure of transportation's longer term contribution to economic health.

In response to questions about freight flows and supply chains, BTS and FHWA developed the Freight Analysis Framework (FAF) to provide a comprehensive picture of commodity movements and related freight transportation activity. BTS has developed additional products such as the Transportation Services Index and the Transportation Satellite Account, a special version of the System of National Accounts by the Bureau of Economic Analysis, to understand supply chains and the consequences of freight movement for the national economy.

To answer questions related to the economic, environmental, and other aspects of freight-hauling motor vehicles, BTS is resurrecting the Vehicle Inventory and Use Survey (VIUS) in partnership with FHWA, the Department of Energy, and the Census Bureau to measure vehicle weights and configurations, commodities carried, fuel type and mileage, economic activities served, and other characteristics of trucks in 2021, restoring a survey conducted every 5 years from the 1960s until 2002. Data will be collected in 2022 and published in 2023-24.

While BTS products are frequently cited in national media and are the foundation of models that identify freight bottlenecks and estimate emissions, current products do not provide timely measures of freight volumes; statistics on timeliness, reliability, or cost of freight movement; estimates of commodities and regions affected by a disruption to the transportation system; or estimates of freight movement that is passing through a region or locality rather than serving the region or locality. BTS is undertaking several initiatives to improve the timeliness, geographic specificity, and utility of FAF estimates of region-to-region flows and to assign those flows to individual components of the transportation network for assessing transportation system disruptions and resiliency. Estimates of commodity flows on the network are also essential for identifying relationships of interregional freight movement to local economic development and equity issues, and for understanding the economic importance of transportation infrastructure.

To improve freight system capacity, cost, and timeliness measures that collectively define the performance and impacts of the freight system, BTS will explore options for developing:

- high frequency port throughput measures for waterside, on-premises, and interior moves;
- container tracking and dwell times at ports and destinations;
- freight shipment cost estimates based on proprietary industry data and on enhancements to Bureau of Labor Statistics Producer Price Indices by mode; and
- monthly region-to-region or county-to-county truck travel-time estimates based on truck probe data.

Safety

Safety is an issue that transcends the passenger and freight transportation systems. Every modal administration has safety data programs, and the data programs for highway safety are larger in budget and staff than the sum of all BTS programs. Rather than duplicating these modal safety programs, BTS provides a comprehensive compilation that accounts for overlaps (e.g., rail-highway grade crossing crashes appearing in both highway and rail statistics),[3] an annual report to the Congress on the conversion of the railroad

[3] U.S. Department of Transportation, Bureau of Transportation Statistics, National Transportation Statistics, Section 2, available at https://www.bts.gov/topics/national-transportation-statistics as of October 2021.

tank car fleet to safer equipment standards,[4] and BTS deploys its special capabilities to protect respondent confidentiality to obtain sensitive information on precursor safety, including close calls and near misses.[5]

The Confidential Information Protection and Statistical Efficiency Act (CIPSEA)[6] authorizes BTS to protect respondents to BTS data collections from direct or indirect identification. CIPSEA exempts data collected by BTS and other recognized Federal statistical agencies from the Freedom of Information Act (FOIA) and from judicial processes such as subpoenas. BTS uses this confidentiality protection to encourage voluntary reports of safety problems from employees and companies without fear of discovery and retaliation. BTS analyzes individual reports and summarizes than into statistical assessments that do not reveal the source to the sponsor of the safety precursor data program.

The Washington Metropolitan Area Transit Authority (WMATA) and the Bureau of Safety and Environmental Enforcement (BSEE) of the Department of the Interior are current sponsors of the BTS safety precursor data program. WMATA, the regional bus and rail transit operator for the Nation's capital, has sponsored the program since 2012, and BSEE has sponsored the program for offshore petroleum extraction since 2013. Both programs have identified safety problems that prompted corrective actions by the sponsors.

[4] U.S. Department of Transportation, Bureau of Transportation Statistics, Fleet Composition of Rail Tank Cars Carrying Flammable Liquids Annual Reports, available at https://www.bts.gov/surveys/annual-tank-car-facility-survey/fleet-composition-rail-tank-cars-carrying-flammable-liquids as of October 2021.

[5] U.S. Department of Transportation, Bureau of Transportation Statistics, Close Call Data Program at https://www.bts.gov/close-call as of October 2021.

[6] Title III of Foundations for Evidence-Based Policymaking Act of 2018, Pub. L. 115-435 (reauthorizing 2002 E-Gov Act).

Financial Statistics

The influx of funding of transportation through COVID-19-relief legislation and reauthorization of surface transportation programs emphasizes the importance of a BTS initiative to improve the economic and financial statistics related to transportation. Traditional sources of data on public investment in transportation take years to process, require complicated reconciliations of fiscal and calendar years and authorizations versus obligations versus final spending, and assume a clear distinction between public and private investment. That distinction is less clear with the increasing use of innovative financial instruments and public-private partnerships, and by the recent influx of funds through recent federal legislation. Working with the National Academy of Public Administration, BTS has identified strategies for producing more robust, timely statistics that more accurately account for public and private spending on transportation from capital projects to operations and maintenance.

Meeting State and Local Data Needs

Section 25003 of the Infrastructure Investment and Jobs Act of 2021[7] requires BTS to determine data and analysis tools that would assist states, metropolitan and rural planning organizations, and city, tribal, and local governments in dealing with a wide range of transportation-related issues, and to develop a roadmap for obtaining the desired data and analytical capabilities. This requirement is timely given the importance of understanding the short- and long-term effects of COVID-19 on transportation at all levels of government. BTS is initiating outreach with major stakeholders to develop the roadmap and identify alternatives for implementing the roadmap.

Conclusion

BTS has undergone a major transformation during the COVID-19 pandemic, shifting its

[7] Public Law 117-58, November 15, 2021.

emphasis from the development of annual reports supported by national data to the development of interactive statistical and mapping products that are continually updated with geographically and temporally detailed data. BTS recognizes that it must continue to evolve its traditional and new information products, data collection methods, and expertise to provide effective services to the transportation community in a rapidly changing world. As a forward-looking, effective statistical agency, BTS works continually to:

- collect, validate, integrate, and make available fresh, relevant information to a wide range of users in the formats that best meet user needs;
- be flexible and nimble to address emerging transportation issues and data user needs;
- focus on new technology for collection and delivery of information; and
- adhere to Statistical Policy Directives of the Office of Management and Budget and provisions of the Bureau's authorizing legislation to assure that statistics are objective, accurate, timely, and credible.

BTS strives to create increasingly robust, timely, and credible products in each of the topic areas identified in legislative mandates and in goals of the Department of Transportation. BTS endeavors to produce statistics that are relevant and useful throughout the Nation and to fulfill Abraham Lincoln's vision that: "Statistics will save us from doing what we do, in wrong places."[8]

[8] Lincoln, A., "Internal Improvements," Speech of Mr. A. Lincoln of Illinois in the House of Representatives (Washington, DC: June 28, 1848), *Congressional Globe*, 30th Cong., 1st Sess., pp. 709–711.

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