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Stacy C. Davis, Pankaj M. Dahal, Amy Moore, Latif Patwary
Oak Ridge National Laboratory

Robert G. Boundy
Roltek, Inc.

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Stacy C. Davis
Oak Ridge National Laboratory
National Transportation Research Center
2360 Cherahala Boulevard
Knoxville, Tennessee 37932
Telephone: (865) 341-1256
E-mail: DavisSC@ornl.gov
Website Location: tedb.ornl.gov

Raphael Isaac
Transportation Technologies Office
Office of Critical Minerals and Energy Innovation
U.S. Department of Energy
Forrestal Building
1000 Independence Avenue, S.W.
Washington, D.C. 20585
Website Location: www.energy.gov/cmei/vehicles/transportation-technologies-office

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This book would not be possible without the leadership, guidance, and vision of Phil Patterson, who began this book in the 1970's. We hope to continue this report in the future with the same level of excellence. The authors and the transportation research community will be forever grateful for his efforts.

ABSTRACT

The *Transportation Energy Data Book: Edition 41* is a statistical compendium prepared and published by Oak Ridge National Laboratory (ORNL) under contract with the U.S. Department of Energy, Office of Critical Minerals and Energy Innovation, Transportation Technologies Office. Designed for use as a desk-top reference, the Data Book represents an assembly and display of statistics and information that characterize transportation activity and presents data on other factors that influence transportation energy use. The purpose of this document is to present relevant statistical data in the form of tables and graphs. The latest edition of the Data Book is available via the Internet (tedb.ornl.gov).

This edition of the Data Book has 11 chapters which focus on various aspects of the transportation industry. Chapter 1 focuses on petroleum; Chapter 2 – energy; Chapter 3 – highway vehicles; Chapter 4 – light vehicles; Chapter 5 – heavy vehicles; Chapter 6 – alternative fuel vehicles; Chapter 7 – transit and other shared mobility; Chapter 8 – household vehicles; Chapter 9 – nonhighway modes; Chapter 10 – transportation and the economy; Chapter 11 – emissions. The sources used represent the latest available data. There are also two appendices which include detailed source information for some tables and measures of conversion. A glossary of terms is also included for the reader's convenience.

INTRODUCTION

In January 1976, the Transportation Energy Conservation (TEC) Division of the Energy Research and Development Administration contracted with Oak Ridge National Laboratory (ORNL) to prepare a Transportation Energy Conservation Data Book to be used by TEC staff in their evaluation of current and proposed conservation strategies. The major purposes of the Data Book were to draw together, under one cover, transportation data from diverse sources, to resolve data conflicts and inconsistencies, and to produce a comprehensive document. The first edition of the TEC Data Book was published in October 1976. With the passage of the Department of Energy (DOE) Organization Act, the work being conducted by the former Transportation Energy Conservation Division fell under the purview of the DOE's Office of Transportation Programs. This work continues today in the Transportation Technologies Office.

Policymakers and analysts need to be well-informed about activity in the transportation sector. The organization and scope of the data book reflect the need for different kinds of information. For this reason, Edition 41 updates much of the same type of data that is found in previous editions.

In any attempt to compile a comprehensive set of statistics on transportation activity, numerous instances of inadequacies and inaccuracies in the basic data are encountered. Where such problems occur, estimates are developed by ORNL. To minimize the misuse of these statistics, an appendix (Appendix A) is included to document the estimation procedures. The attempt is to provide sufficient information for the conscientious user to evaluate the estimates and to form their own opinions as to their utility. Clearly, the accuracy of the estimates cannot exceed the accuracy of the primary data, an accuracy which in most instances is unknown. In cases where data accuracy is known or substantial errors are strongly suspected in the data, the reader is alerted. In all cases it should be recognized that the estimates are not precise.

Most of the statistics contained in the data book are taken directly from published sources, although these data may be reformatted for presentation by ORNL. Consequently, neither ORNL nor DOE endorses the validity of these data.

PETROLEUM

Chapter 1



Credit: Anton Petrus/Moment/Getty Images

As new technologies appear, and new areas are explored, the amount of proved reserves of crude oil and natural gas have grown. Reserves of natural gas in the United States were 193% higher in 2023 than in 1980.

Table 1.1
Proved Reserves of Crude Oil and Natural Gas, 1980–2023

	Crude Oil Reserves (billion barrels)		U.S. Share of Crude Oil	Natural Gas Reserves (trillion cubic feet)		U.S. Share of Natural Gas
Year	World	United States	Reserves	World	United States	Reserves
1980	643.1	31.3	4.9%	2,585.5	206.3	8.0%
1985	699.2	29.9	4.3%	3,401.6	202.2	5.9%
1990	1,001.5	27.6	2.8%	3,981.0	177.6	4.5%
1995	944.1	23.5	2.5%	3,004.9	173.5	5.8%
2000	1,018.2	23.5	2.3%	5,151.1	186.5	3.6%
2001	1,029.6	23.8	2.3%	5,290.0	191.7	3.6%
2002	1,033.4	24.0	2.3%	5,458.6	195.6	3.6%
2003	1,214.7	23.1	1.9%	5,506.3	197.1	3.6%
2004	1,266.5	22.6	1.8%	6,079.9	201.2	3.3%
2005	1,278.8	23.0	1.8%	6,046.3	213.3	3.5%
2006	1,289.6	22.3	1.7%	6,126.0	220.4	3.6%
2007	1,320.3	22.8	1.7%	6,192.3	247.8	4.0%
2008	1,328.9	20.6	1.5%	6,215.8	255.0	4.1%
2009	1,336.8	22.3	1.7%	6,265.5	283.9	4.5%
2010	1,357.1	25.2	1.9%	6,641.4	317.6	4.8%
2011	1,475.4	29.0	2.0%	6,712.5	348.8	5.2%
2012	1,523.8	33.4	2.2%	6,814.0	322.7	4.7%
2013	1,644.9	36.5	2.2%	6,850.9	354.0	5.2%
2014	1,651.8	39.9	2.4%	6,979.4	388.8	5.6%
2015	1,659.3	35.2	2.1%	6,957.4	324.3	4.7%
2016	1,652.0	35.2	2.1%	6,885.5	341.1	5.0%
2017	1,647.1	42.0	2.5%	6,929.8	464.3	6.7%
2018	1,662.8	47.1	2.8%	7,131.3	504.5	7.1%
2019	1,659.2	47.2	2.8%	7,176.9	494.9	6.9%
2020	1,661.9	38.2	2.3%	7,257.2	473.3	6.5%
2021	1,696.9	44.4	2.6%	7,299.0	625.4	8.6%
2022	[a]	48.3	[a]	[a]	691.0	[a]
2023	[a]	46.4	[a]	[a]	603.6	[a]
		Average annual percentage change				
1980-2023	[a]	0.9%	[a]	[a]	2.5%	[a]
2013-2023	[a]	2.4%	[a]	[a]	5.5%	[a]

Sources:
1980—2020: U.S. Department of Energy, Energy Information Administration, *International Energy Statistics*, April 2021. (Additional resources: www.eia.gov/)
2021—2023 U.S. data: U.S. Department of Energy, Energy Information Administration, U.S. Crude Oil and Natural Gas Proved Reserves, Year-end 2023, June 25, 2025.
2021 World Crude Oil Reserves: Central Intelligence Agency, The World Factbook, Field Listing -- Petroleum, www.cia.gov/the-world-factbook/field/petroleum, accessed September 4, 2025.
2021 World Natural Gas Reserves: Central Intelligence Agency, The World Factbook, Field Listing – Natural gas, https://www.cia.gov/the-world-factbook/field/natural-gas, accessed September 4, 2025.

[a] Data are not available.

In 2024, the Organization of Petroleum Exporting Countries (OPEC) accounted for 35.3% of world oil production. U.S. crude oil production reached an all-time high in 2024 reaching more than 13 million barrels per day.

Table 1.2
World Crude Oil Production, 1960–2024[a]
(million barrels per day)

Year	United States	U.S. share	Total OPEC[b]	OPEC share	Total non-OPEC	World
1960	7.04	33.5%	8.70	41.4%	12.29	20.99
1965	7.80	25.7%	14.35	47.3%	15.98	30.33
1970	9.64	21.0%	23.30	50.8%	22.59	45.89
1975	8.37	17.6%	25.45	53.5%	22.12	47.57
1980	8.60	14.4%	24.95	41.9%	34.61	59.56
1985	8.97	16.6%	15.08	27.9%	38.89	53.97
1990	7.36	12.2%	22.24	36.8%	38.26	60.50
1995	6.56	10.7%	23.86	38.8%	37.71	61.57
1996	6.46	10.3%	24.34	38.7%	38.50	62.84
1997	6.45	9.9%	25.60	39.4%	39.40	65.00
1998	6.25	9.5%	26.39	40.0%	39.53	65.92
1999	5.88	9.1%	25.02	38.9%	39.34	64.36
2000	5.82	8.8%	26.04	39.2%	40.32	66.36
2001	5.80	8.7%	25.43	38.3%	40.90	66.33
2002	5.74	8.7%	23.77	36.1%	42.01	65.77
2003	5.65	8.0%	27.15	38.7%	43.03	70.18
2004	5.44	7.5%	29.22	40.1%	43.69	72.92
2005	5.18	7.0%	30.32	40.9%	43.74	74.06
2006	5.09	6.9%	30.43	41.0%	43.78	74.21
2007	5.07	6.8%	29.98	40.4%	44.24	74.22
2008	5.00	6.7%	30.09	40.4%	44.45	74.55
2009	5.36	7.3%	28.44	38.8%	44.80	73.24
2010	5.48	7.4%	28.72	38.6%	45.73	74.45
2011	5.67	7.5%	29.49	39.3%	45.61	75.10
2012	6.52	8.5%	30.70	40.0%	46.00	76.69
2013	7.49	9.8%	29.66	38.6%	47.16	76.82
2014	8.79	11.2%	29.73	37.8%	48.90	78.63
2015	9.45	11.7%	30.95	38.2%	49.99	80.94
2016	8.85	10.9%	32.00	39.5%	48.99	80.99
2017	9.37	11.5%	31.98	39.4%	49.23	81.21
2018	10.96	13.2%	31.90	38.5%	51.03	82.93
2019	12.25	14.9%	29.88	36.4%	52.25	82.13
2020	11.31	14.9%	26.13	34.4%	49.74	75.87
2021	11.31	14.7%	27.03	35.1%	50.02	77.05
2022	11.99	14.9%	29.42	36.4%	51.31	80.73
2023	12.93	15.8%	28.89	35.3%	52.93	81.82
2024	13.21	16.2%	28.88	35.3%	52.89	81.76
			Average annual percentage change			
1960-2024	1.0%		1.9%		2.3%	2.1%
1970-2024	0.6%		0.4%		1.6%	1.1%
2014-2024	4.2%		-0.3%		0.8%	0.4%

Source:
U.S. Department of Energy, Energy Information Administration, *Monthly Energy Review,* July 2025. (Additional resources: www.eia.gov/)

[a] Includes lease condensate. Excludes natural gas plant liquids.
[b] See Glossary for membership.

This table shows petroleum production, which includes both crude oil and natural gas plant liquids. Because other liquids and processing gain are not included, the world total is often smaller than world petroleum consumption (Table 1.4). The United States was responsible for 22.4% of the world's petroleum production in 2024 and 16.2% of the world's crude oil production (Table 1.2).

Table 1.3
World Petroleum Production, 1973–2024[a]
(million barrels per day)

Year	United States	U.S. share	Total OPEC[b]	OPEC share	Total non-OPEC	Non-OPEC share	World
1973	10.95	20.6%	29.39	55.3%	23.75	44.7%	53.15
1975	10.01	19.9%	25.82	51.3%	24.54	48.7%	50.36
1980	10.17	16.1%	25.60	40.6%	37.40	59.4%	63.00
1985	10.58	18.3%	15.88	27.4%	42.02	72.6%	57.90
1990	8.91	13.7%	23.41	35.9%	41.73	64.1%	65.14
1995	8.32	12.1%	26.86	39.1%	41.80	60.9%	68.66
1996	8.29	11.8%	27.32	39.0%	42.75	61.0%	70.08
1997	8.27	11.4%	28.73	39.7%	43.66	60.3%	72.39
1998	8.01	10.9%	29.76	40.5%	43.78	59.5%	73.54
1999	7.73	10.7%	28.69	39.6%	43.79	60.4%	72.48
2000	7.73	10.3%	30.45	40.4%	44.87	59.6%	75.32
2001	7.67	10.2%	29.78	39.6%	45.51	60.4%	75.29
2002	7.62	10.2%	28.25	37.7%	46.69	62.3%	74.94
2003	7.37	9.6%	29.72	38.5%	47.41	61.5%	77.13
2004	7.25	9.0%	32.51	40.2%	48.39	59.8%	80.90
2005	6.90	8.3%	34.26	41.4%	48.44	58.6%	82.71
2006	6.82	8.3%	33.99	41.2%	48.58	58.8%	82.57
2007	6.86	8.3%	33.83	40.8%	49.05	59.2%	82.88
2008	6.78	8.0%	35.23	41.6%	49.53	58.4%	84.76
2009	7.27	8.7%	33.50	40.1%	50.04	59.9%	83.54
2010	7.56	8.9%	33.24	39.4%	51.21	60.6%	84.46
2011	7.88	9.2%	33.98	39.8%	51.30	60.2%	85.27
2012	8.93	10.2%	35.46	40.6%	51.94	59.4%	87.41
2013	10.10	11.5%	34.38	39.2%	53.33	60.8%	87.71
2014	11.80	13.1%	34.43	38.3%	55.54	61.7%	89.97
2015	12.79	13.8%	35.67	38.5%	57.01	61.5%	92.68
2016	12.36	13.3%	36.83	39.6%	56.19	60.4%	93.02
2017	13.15	14.1%	36.74	39.3%	56.80	60.7%	93.54
2018	15.33	16.0%	36.59	38.2%	59.19	61.8%	95.79
2019	17.07	17.9%	34.47	36.1%	60.89	63.9%	95.35
2020	16.48	18.5%	30.55	34.2%	58.70	65.8%	89.25
2021	16.73	18.4%	31.52	34.7%	59.20	65.3%	90.72
2022	17.93	19.9%	29.23	32.4%	60.96	67.6%	90.19
2023	19.43	21.4%	27.76	30.5%	63.10	69.5%	90.86
2024	20.15	22.4%	26.28	29.2%	63.59	70.8%	89.87
Average annual percentage change							
1973-2024	1.2%		-0.2%		1.9%		1.0%
2014-2024	5.5%		-2.7%		1.4%		0.0%

Sources:
U.S. Department of Energy, Energy Information Administration, *International Energy Statistics* website, July 2025.
(Additional resources: www.eia.gov/)

[a] Includes natural gas plant liquids, crude oil and lease condensate. Does not account for all inputs or refinery processing gain.

[b] Organization of Petroleum Exporting Countries. See Glossary for membership.

During the 1980s and 1990s, the United States accounted for about one-quarter of the world's petroleum consumption. In 2023 the U.S. share of petroleum consumption fell below 20% for the first time in this series due to rising World petroleum consumption. Increasing petroleum consumption in non-OECD countries is responsible for the increase in World consumption.

Table 1.4
World Petroleum Consumption, 1960–2023
(million barrels per day)

Year	United States	U.S. share	Total OECD[a]	Total non-OECD	World
1960	9.80	45.9%	15.78	5.56	21.34
1965	11.51	37.0%	22.81	8.33	31.14
1970	14.70	31.4%	34.69	12.12	46.81
1975	16.32	29.0%	39.23	16.97	56.20
1980	17.06	27.0%	42.02	21.11	63.14
1985	15.73	26.1%	37.79	22.37	60.16
1990	16.99	25.5%	41.85	24.78	66.64
1995	17.72	25.4%	45.66	24.11	69.76
1996	18.31	25.5%	46.81	25.03	71.84
1997	18.62	25.5%	47.54	25.51	73.05
1998	18.92	25.6%	47.71	26.16	73.87
1999	19.52	25.9%	48.62	26.86	75.49
2000	19.70	25.6%	48.78	28.23	77.01
2001	19.65	25.3%	48.81	28.91	77.72
2002	19.76	25.1%	48.88	29.73	78.61
2003	20.03	25.0%	49.59	30.66	80.25
2004	20.73	24.9%	50.45	32.96	83.42
2005	20.80	24.6%	50.82	33.83	84.64
2006	20.69	24.1%	50.64	35.12	85.76
2007	20.68	23.7%	50.47	36.97	87.43
2008	19.50	22.4%	48.68	38.17	86.86
2009	18.77	21.8%	46.67	39.36	86.04
2010	19.18	21.6%	47.39	41.44	88.83
2011	18.90	21.1%	46.84	42.58	89.41
2012	18.48	20.4%	46.38	44.30	90.68
2013	18.97	20.6%	46.41	45.75	92.16
2014	19.10	20.4%	46.12	47.57	93.70
2015	19.53	20.5%	46.86	48.61	95.47
2016	19.69	20.3%	47.30	49.66	96.96
2017	19.95	20.1%	47.89	51.41	99.30
2018	20.51	20.5%	48.14	51.75	99.89
2019	20.54	20.4%	48.15	52.47	100.62
2020	18.19	20.0%	42.31	48.70	91.01
2021	19.89	20.6%	45.10	51.57	96.67
2022	20.01	20.1%	46.01	53.50	99.51
2023	20.28	19.9%	46.11	55.75	101.86
		Average annual percentage change			
1960-2023	1.2%		1.7%	3.7%	2.5%
1970-2023	0.6%		0.5%	2.9%	1.5%
2013-2023	0.7%		-0.1%	2.0%	1.0%

Source:
U.S. Department of Energy, Energy Information Administration, *International Energy Statistics*, July 2025.
(Additional resources: www.eia.gov/)

[a] Organization for Economic Cooperation and Development. See Glossary for membership.

Although OPEC historically has more than two-thirds of world oil reserves, they have a smaller share of world petroleum production and very little petroleum consumption. The United States has a small share (2%) of crude oil reserves, but about 20% of the world's petroleum production and consumption.

Table 1.5
World Oil Reserves, Production, and Consumption, 1980, 2000 and 2023

	Crude oil reserves (billion barrels)	Reserve share	Petroleum production (million barrels per day)	Production share	Petroleum consumption (million barrels per day)	Consumption share
				1980		
United States	31.2	5%	8.6	13%	17.1	27%
OPEC	423.0	66%	25.7	40%	2.4	4%
Rest of world	188.9	29%	29.7	47%	43.6	69%
				2000		
United States	23.2	2%	9.1	12%	19.7	26%
OPEC	803.2	79%	30.6	39%	4.8	6%
Rest of world	191.8	19%	38.0	49%	51.1	68%
				2023		
United States	38.2	2%	21.0	21%	20.3	20%
OPEC	1218.8	72%	32.4	32%	9.7	10%
Rest of world	439.9	26%	46.8	47%	71.9	70%

Note: Totals for production and consumption differ because of refinery processing gain, other liquids (e.g., alcohol, coal-to-liquids), stock changes and statistical differences. See Glossary for OPEC countries.

Sources:
1980 and 2000 data: Energy Information Administration, *International Energy Statistics*, August 2020. (Additional resources: www.eia.gov/)
2023 data: Central Intelligence Agency, The World Factbook, Field Listing -- Petroleum, https://www.cia.gov/the-world-factbook/field/petroleum/ accessed September 4, 2025.

[a] Reserves data are for 2021.

The share of petroleum imported to the United States can be calculated using total imports or net imports. Net imports, which are the preferred data, rose to over 50% of U.S. petroleum consumption for the first time in 1998, while total imports reached 50% for the first time in 1993. OPEC share of net imports has been below 50% since 1993. Due to declining total imports and rising petroleum exports, net petroleum imports were negative in 2020 for the first time in the series.

Table 1.6
U.S. Petroleum Imports, 1960–2024
(million barrels per day)

Year	Net OPEC[a] imports	Net OPEC[a] share	Net imports	Net imports as a share of U.S. consumption	Total imports
1960	1.23	68.0%	1.61	16.5%	1.81
1965	1.44	58.3%	2.28	19.8%	2.47
1970	1.29	37.8%	3.16	21.5%	3.42
1975	3.60	59.5%	5.85	35.8%	6.06
1980	4.30	62.2%	6.36	37.3%	6.91
1985	1.83	36.1%	4.29	27.3%	5.07
1990	4.30	53.6%	7.16	42.2%	8.02
1995	4.00	45.3%	7.89	44.5%	8.83
2000	5.20	45.4%	10.42	52.9%	11.46
2001	5.53	46.6%	10.90	55.5%	11.87
2002	4.61	39.9%	10.55	53.4%	11.53
2003	5.16	42.1%	11.24	56.1%	12.26
2004	5.70	43.4%	12.10	58.4%	13.15
2005	5.59	40.7%	12.55	60.3%	13.71
2006	5.52	40.2%	12.39	59.9%	13.71
2007	5.98	44.4%	12.04	58.2%	13.47
2008	5.95	46.1%	11.11	57.0%	12.92
2009	4.78	40.9%	9.67	51.5%	11.69
2010	4.91	41.6%	9.44	49.2%	11.79
2011	4.56	39.8%	8.45	44.7%	11.44
2012	4.27	40.3%	7.39	40.0%	10.60
2013	3.72	37.7%	6.24	32.9%	9.86
2014	3.24	35.0%	5.07	26.5%	9.24
2015	2.89	30.6%	4.71	24.1%	9.45
2016	3.45	34.3%	4.79	24.3%	10.06
2017	3.37	33.2%	3.77	18.9%	10.14
2018	2.89	29.0%	2.34	11.4%	9.94
2019	1.64	17.9%	0.67	3.3%	9.14
2020	0.89	11.3%	-0.63	-3.5%	7.86
2021	0.96	11.3%	-0.06	-0.3%	8.47
2022	1.25	15.1%	-1.19	-6.0%	8.33
2023	1.34	15.7%	-1.71	-8.4%	8.53
2024	1.26	14.9%	-2.27	-11.1%	8.44
			Average annual percentage change		
1960-2024	0.0%		[b]		2.4%
1970-2024	-0.1%		[b]		1.7%
2014-2024	-9.0%		[b]		-0.9%

Source:
U.S. Department of Energy, Energy Information Administration, *Monthly Energy Review,* July 2025, Table 3.3a. (Additional resources: www.eia.gov/)

[a] Organization of Petroleum Exporting Countries. See Glossary for membership.
[b] Data are not available.

More than 60% of the oil imported to the United States in 2024 was from North America. Canada and Mexico provided most of the oil, plus a small amount from the U.S. Virgin Islands (not listed separately).

Table 1.7
Petroleum Imports by Country of Origin, 1960–2024
(million barrels per day)

Year	Saudi Arabia	Venezuela	Nigeria	Other OPEC[a] countries	Canada	Mexico	Russia	Other non-OPEC countries	Total imports
1960	0.08	0.91	0.00	0.24	0.12	0.02	[b]	0.45	1.81
1965	0.16	0.99	0.00	0.29	0.32	0.05	[b]	0.66	2.47
1970	0.03	0.99	0.00	0.27	0.77	0.04	0.00	1.31	3.42
1973	0.49	1.13	0.46	0.91	1.32	0.02	0.03	1.90	6.26
1975	0.71	0.70	0.76	1.42	0.85	0.07	0.01	1.52	6.06
1980	1.26	0.48	0.86	1.70	0.45	0.53	0.00	1.62	6.91
1985	0.17	0.60	0.29	0.76	0.77	0.82	0.01	1.64	5.07
1990	1.34	1.02	0.80	1.13	0.93	0.76	0.04	1.99	8.02
1995	1.34	1.48	0.63	0.55	1.33	1.07	0.02	2.41	8.83
2000	1.57	1.55	0.90	1.19	1.81	1.37	0.07	3.00	11.46
2001	1.66	1.55	0.89	1.43	1.83	1.44	0.09	2.98	11.87
2002	1.55	1.40	0.62	1.03	1.97	1.55	0.21	3.20	11.53
2003	1.77	1.38	0.87	1.14	2.07	1.62	0.25	3.15	12.26
2004	1.56	1.55	1.14	1.45	2.14	1.66	0.30	3.34	13.15
2005	1.54	1.53	1.17	1.36	2.18	1.66	0.41	3.87	13.71
2006	1.46	1.42	1.11	1.52	2.35	1.71	0.37	3.76	13.71
2007	1.48	1.36	1.13	2.00	2.45	1.53	0.41	3.09	13.47
2008	1.53	1.19	0.99	2.25	2.49	1.30	0.47	2.70	12.92
2009	1.00	1.06	0.81	1.90	2.48	1.21	0.56	2.66	11.69
2010	1.10	0.99	1.02	1.80	2.54	1.28	0.61	2.46	11.79
2011	1.19	0.95	0.82	1.59	2.73	1.21	0.62	2.32	11.44
2012	1.37	0.96	0.44	1.51	2.95	1.03	0.48	1.87	10.60
2013	1.33	0.81	0.28	1.30	3.14	0.92	0.46	1.62	9.86
2014	1.17	0.79	0.09	1.19	3.39	0.84	0.33	1.44	9.24
2015	1.06	0.83	0.08	0.93	3.76	0.76	0.37	1.66	9.45
2016	1.11	0.80	0.24	1.31	3.78	0.67	0.44	1.72	10.06
2017	0.96	0.67	0.33	1.40	4.05	0.68	0.39	1.65	10.14
2018	0.90	0.59	0.19	1.21	4.29	0.72	0.38	1.67	9.94
2019	0.53	0.09	0.19	0.82	4.43	0.65	0.52	1.90	9.14
2020	0.52	[b]	0.08	0.29	4.12	0.75	0.54	1.56	7.86
2021	0.43	[b]	0.13	0.40	4.34	0.71	0.67	1.79	8.47
2022	0.56	[b]	0.11	0.59	4.37	0.81	0.15	1.75	8.33
2023	0.44	0.13	0.16	0.61	4.43	0.91	0.00	1.84	8.53
2024	0.34	0.23	0.17	0.52	4.65	0.63	[b]	1.89	8.42
Average annual percentage change									
1960-2024	2.2%	-2.1%	[b]	1.2%	5.9%	5.9%	[b]	2.3%	2.4%
1970-2024	4.6%	-2.7%	[b]	1.2%	3.4%	5.1%	[b]	0.7%	1.7%
2014-2024	-11.7%	-11.5%	6.2%	-8.0%	3.2%	-2.9%	[b]	2.7%	-0.9%

Sources:
U.S. Department of Energy, Energy Information Administration, *Monthly Energy Review,* July 2025, Tables 3.3c and 3.3d. (Additional resources: www.eia.gov/)

[a] Organization of Petroleum Exporting Countries. See Glossary for membership.
[b] Data are not available.

The Strategic Petroleum Reserve (SPR) began in October 1977 as a result of the 1975 Energy Policy and Conservation Act. Its purpose is to provide protection against oil supply disruptions. The U.S. consumed 20.3 million barrels per day in 2024. At that rate of consumption, the SPR supply would last 19.4 days if used exclusively and continuously.

Table 1.8
Crude Oil Supplies, 1973-2024

Year	Strategic Petroleum Reserve	Other crude oil stocks[a]	Total crude oil stocks	U.S. petroleum consumption	Number of days the SPR would supply the U.S.[b]
	(million barrels)			(million barrels per day)	
1973	[c]	242.5	242.5	17.3	[c]
1980	107.8	358.2	466.0	17.1	6.3
1985	493.3	320.9	814.2	15.7	31.4
1990	585.7	322.7	908.4	17.0	34.5
1995	591.6	303.3	895.0	17.7	33.4
2000	540.7	285.5	826.2	19.7	27.4
2001	550.2	312.0	862.2	19.6	28.0
2002	599.1	277.6	876.7	19.8	30.3
2003	638.4	268.9	907.3	20.0	31.9
2004	675.6	285.7	961.3	20.7	32.6
2005	684.5	307.7	992.2	20.8	32.9
2006	688.6	295.8	984.4	20.7	33.3
2007	696.9	268.4	965.3	20.7	33.7
2008	701.8	308.2	1,010.1	19.5	36.0
2009	726.6	307.1	1,033.8	18.8	38.7
2010	726.5	312.1	1,038.6	19.2	37.9
2011	696.0	308.2	1,004.2	18.9	36.8
2012	695.3	337.8	1,033.1	18.5	37.6
2013	696.0	327.2	1,023.2	19.0	36.7
2014	691.0	360.9	1,051.8	19.1	36.2
2015	695.1	449.2	1,144.3	19.5	35.6
2016	695.1	484.6	1,179.7	19.7	35.3
2017	662.8	421.6	1,084.5	20.0	33.2
2018	649.1	442.5	1,091.6	20.5	31.6
2019	635.0	432.8	1,067.7	20.5	30.9
2020	638.1	485.5	1,123.6	18.2	35.1
2021	593.7	421.2	1,014.9	19.9	29.8
2022	372.0	430.1	802.1	20.0	18.6
2023	354.7	426.5	781.2	20.3	17.5
2024	393.6	413.7	807.3	20.3	19.4
			Average annual percentage change		
1973-2024	[c]	1.1%	2.4%	0.3%	[c]
2014-2024	-5.5%	1.4%	-2.6%	0.6%	-6.1%

Sources:
U.S. Department of Energy, Energy Information Administration, *Monthly Energy Review,* July 2025, Tables 3.1 and 3.4. (Additional resources: www.eia.gov/)

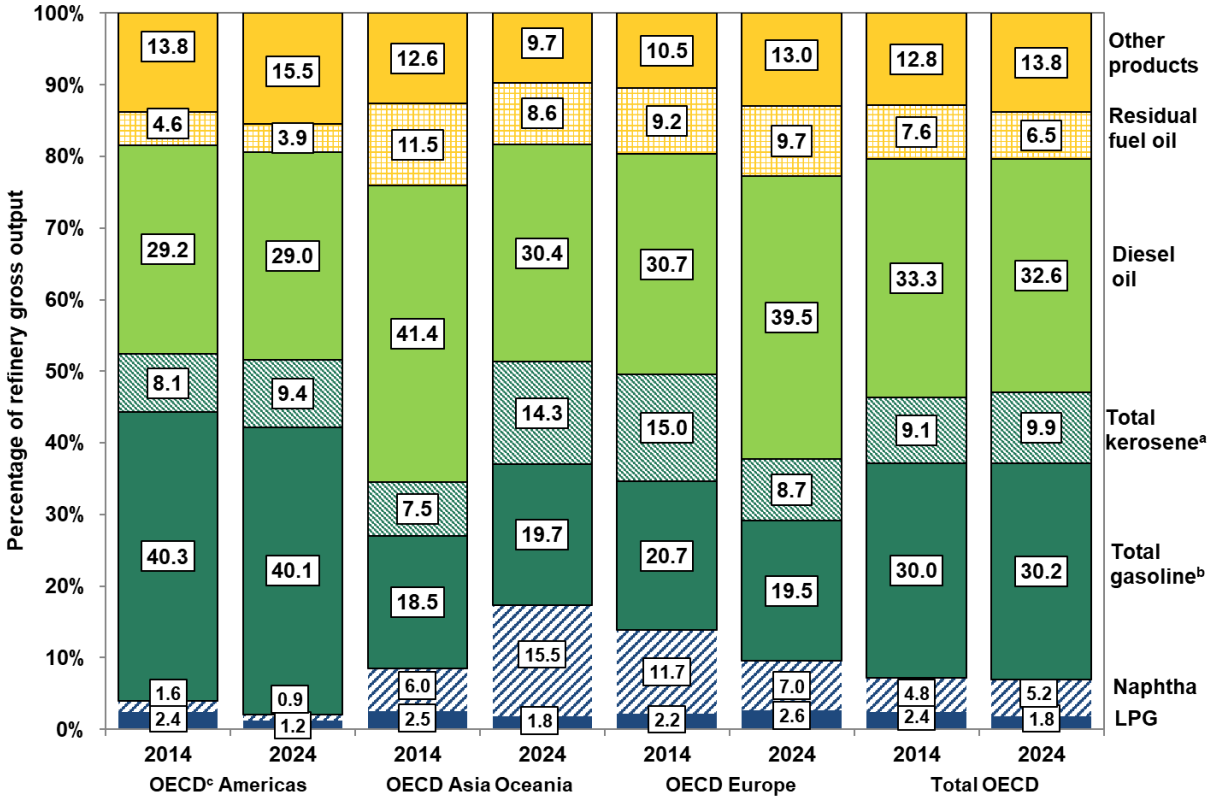
[a] Other crude oil stocks include stocks held by petroleum companies, as well as stocks of Alaskan crude oil in transit.

[b] Strategic Petroleum Reserves divided by U.S. consumption per day. This would only hold true if the SPR were the only oil used for that many days.

[c] Not applicable.

Other parts of the world refine crude oil to produce more diesel fuel and less gasoline than the OECD Americas. The OECD Asia Oceania countries produced the lowest share of gasoline and highest share of diesel in 2014 while OECD Europe did in 2024.

Figure 1.1. Refinery Gross Output by World Region, 2014 and 2024



Source:
International Energy Agency, *Monthly Oil Statistics*, August 2025 and *Monthly Oil Survey*, December 2014. (Additional resources: www.iea.org)

[a] Includes jet kerosene and other kerosene.
[b] Includes motor gasoline, jet gasoline, and aviation gasoline.
[c] Organization for Economic Cooperation and Development. See Glossary for membership.

Oxygenate refinery input increased significantly in 1995, almost certainly due to the Clean Air Act Amendments of 1990 which mandated the sale of reformulated gasoline in certain areas beginning in January 1995. MBTE use fell sharply after 2003 and was essentially eliminated by 2008, as many states banned MBTE and the Energy Policy Act of 2005 removed the reformulated-gasoline oxygen requirement. The other hydrocarbons and liquids category includes unfinished oils, motor gasoline blending components and aviation gasoline blending components.

Table 1.9
U.S. Refinery Input of Crude Oil and Petroleum Products, 1987–2024
(thousand barrels)

			Oxygenates			Other	
Year	Crude oil	Natural gas liquids	Fuel ethanol	MTBE[a]	Other oxygenates[b]	hydrocarbons and liquids	Total input to refineries
1987	4,691,783	280,889	[c]	[c]	[d]	132,720	5,105,392
1990	4,894,379	170,589	[c]	[c]	[d]	260,108	5,325,076
1995	5,100,317	172,026	9,055	79,396	3,876	190,657	5,555,327
1996	5,195,265	164,552	11,156	79,407	3,444	214,408	5,668,232
1997	5,351,466	151,769	11,803	86,240	3,750	201,764	5,806,792
1998	5,434,383	146,921	11,722	89,362	3,363	206,810	5,892,561
1999	5,403,450	135,756	13,735	94,784	3,334	226,592	5,877,651
2000	5,514,395	138,921	15,268	90,288	3,151	201,989	5,964,012
2001	5,521,637	156,479	16,929	87,116	3,113	194,063	5,979,337
2002	5,455,530	155,429	26,320	90,291	2,325	225,580	5,955,475
2003	5,585,875	152,763	55,626	67,592	1,937	163,459	6,027,252
2004	5,663,861	154,356	74,095	47,600	940	194,203	6,135,055
2005	5,555,332	161,037	84,088	39,751	612	295,064	6,135,884
2006	5,563,354	182,924	117,198	11,580	57	322,989	6,198,102
2007	5,532,097	184,383	136,603	1,610	0	349,807	6,204,500
2008	5,361,287	177,559	190,084	480	0	548,483	6,277,893
2009	5,232,656	177,194	240,955	90	0	518,998	6,169,893
2010	5,374,094	161,479	285,883	901	0	523,015	6,345,372
2011	5,404,347	178,884	297,266	1,154	0	541,059	6,422,710
2012	5,489,516	186,270	304,155	806	0	425,946	6,406,693
2013	5,589,006	181,112	310,568	915	0	495,476	6,577,077
2014	5,784,637	186,601	317,171	719	1	490,213	6,779,342
2015	5,908,550	188,722	325,858	830	0	446,744	6,870,704
2016	5,924,395	196,281	334,767	1,062	0	483,229	6,939,734
2017	6,055,241	206,629	335,023	318	[d]	405,948	7,003,159
2018	6,193,832	209,708	336,205	[d]	[d]	397,744	7,137,489
2019	6,045,396	208,501	337,168	[d]	[d]	479,185	7,070,250
2020	5,201,596	185,968	293,706	[d]	[d]	381,848	6,063,118
2021	5,528,474	200,325	321,747	[d]	[d]	412,291	6,462,837
2022	5,831,695	207,362	323,722	[d]	[d]	340,259	6,703,038
2023	5,827,889	227,190	326,884	[d]	[d]	338,222	6,720,185
2024	5,937,836	238,378	327,807	[d]	[d]	286,739	6,790,760
			Average annual percentage change				
1987-2024	0.6%	[d]	[d]	[d]	[d]	[d]	0.8%
2014-2024	0.3%	2.5%	0.3%	[d]	[d]	[d]	0.0%

Source:
U.S. Department of Energy, Energy Information Administration, *Petroleum Supply Annual 2024, Vol. 1*, August 2025, Table 16, and Petroleum & Other Liquids Data Navigator. (Additional resources: www.eia.gov/)

[a] Methyl tertiary butyl ether (MTBE).
[b] Includes methanol and other oxygenates.
[c] Reported in "Other hydrocarbons and liquids" category in this year.
[d] Data are not available.

When crude oil and other hydrocarbons are processed into products that are, on average, less dense than the input, a processing volume gain occurs. Due to this gain, the product yield from a barrel of crude oil is more than 100%. For the last 30 years, the processing volume gain has been about 5-7%.

Table 1.10
U.S. Refinery Yield of Petroleum Products from a Barrel of Crude Oil, 1978–2024
(percentage)

Year	Motor gasoline	Distillate fuel oil	Jet fuel	Liquefied petroleum gas	Other[a]	Total[b]
1978	44.1	21.4	6.6	2.3	29.6	104.0
1980	44.5	19.7	7.4	2.4	30.0	104.0
1985	45.6	21.6	9.6	3.1	24.6	104.5
1990	45.6	20.9	10.7	3.6	24.1	104.9
1995	46.4	21.8	9.7	4.5	22.8	105.2
1996	45.7	22.7	10.4	4.5	22.4	105.7
1997	45.7	22.5	10.3	4.6	22.4	105.5
1998	46.2	22.3	9.9	4.4	22.9	105.7
1999	46.5	22.3	10.2	4.5	22.4	105.9
2000	46.2	23.1	10.3	4.5	22.0	106.1
2001	46.2	23.8	9.8	4.3	21.6	105.7
2002	47.3	23.2	9.8	4.3	21.5	106.1
2003	46.9	23.7	9.5	4.2	22.1	106.4
2004	46.8	23.9	9.7	4.0	22.2	106.6
2005	46.2	25.0	9.8	3.6	21.6	106.2
2006	45.8	25.4	9.3	3.9	21.7	106.1
2007	45.5	26.1	9.1	4.1	21.5	106.3
2008	44.2	27.8	9.7	4.1	20.7	106.5
2009	46.6	26.6	9.2	4.1	20.1	106.6
2010	46.3	27.2	9.2	4.3	20.1	107.1
2011	45.6	28.6	9.3	4.0	19.5	107.0
2012	45.7	28.7	9.4	4.0	19.0	106.8
2013	45.7	29.1	9.4	3.9	18.9	107.0
2014	45.7	29.5	9.4	4.0	17.9	106.5
2015	46.0	29.5	9.6	3.7	17.6	106.4
2016	47.0	28.4	9.8	3.8	17.6	106.6
2017	46.5	29.0	9.9	3.7	17.4	106.5
2018	46.1	29.2	10.3	3.6	17.2	106.4
2019	46.2	29.7	10.5	3.5	16.4	106.3
2020	46.9	32.0	6.9	3.7	16.8	106.3
2021	47.8	29.7	8.4	4.0	16.3	106.2
2022	46.5	30.3	9.9	3.7	16.1	106.5
2023	46.6	29.7	10.5	3.7	15.9	106.4
2024	46.0	29.7	11.0	3.6	15.9	106.2

Source:
U.S. Department of Energy, Energy Information Administration, *Petroleum Supply Navigator*, July 2025. (Additional resources: www.eia.gov/)

[a] Includes aviation gasoline (0.1%), kerosene (0.1%), residual fuel oil (1.4%), naphtha for petrochemical feedstock use (1.1%), other oils for petrochemical feedstock use (0.6%), special naphthas (0.2%), lubricants (1.1%), petroleum coke (4.9%), asphalt and road oil (2.2%), still gas (4.1%), and miscellaneous products (0.5%).

[b] Products sum to greater than 100% due to processing gain. The processing gain for years 1978 to 1980 is assumed to be 4%.

Domestic petroleum production increased in 2009 for the first time in 20 years and reached an all-time high of 20 mmbd in 2024. Most of the petroleum imported by the United States is in the form of crude oil. Exports were at an all-time high in 2024 as well, partly due to the lifting of crude oil export restrictions in December 2015.

Table 1.11
United States Petroleum Production, Imports, and Exports, 1950–2024
(million barrels per day)

	Domestic production			Total imports			Exports		
	Crude oil	Natural gas plant liquids	Total[a]	Crude oil	Petroleum products	Total	Crude oil	Petroleum products	Total
1950	5.41	0.50	5.91	0.49	0.36	0.85	0.10	0.21	0.30
1955	6.81	0.77	7.58	0.78	0.47	1.25	0.03	0.34	0.37
1960	7.04	0.93	7.96	1.02	0.80	1.81	0.01	0.19	0.20
1965	7.80	1.21	9.01	1.24	1.23	2.47	0.00	0.18	0.19
1970	9.64	1.66	11.30	1.32	2.10	3.42	0.01	0.25	0.26
1975	8.37	1.63	10.01	4.10	1.95	6.06	0.01	0.20	0.21
1980	8.60	1.57	10.17	5.26	1.65	6.91	0.29	0.26	0.54
1985	8.97	1.61	10.58	3.20	1.87	5.07	0.20	0.58	0.78
1990	7.36	1.56	8.91	5.89	2.12	8.02	0.11	0.75	0.86
1995	6.56	1.76	8.32	7.23	1.61	8.83	0.09	0.85	0.95
2000	5.82	1.91	7.73	9.07	2.39	11.46	0.05	0.99	1.04
2001	5.80	1.87	7.67	9.33	2.54	11.87	0.02	0.95	0.97
2002	5.74	1.88	7.62	9.14	2.39	11.53	0.01	0.97	0.98
2003	5.65	1.72	7.37	9.66	2.60	12.26	0.01	1.01	1.03
2004	5.44	1.81	7.25	10.09	3.06	13.15	0.03	1.02	1.05
2005	5.18	1.72	6.90	10.13	3.59	13.71	0.03	1.13	1.16
2006	5.09	1.74	6.82	10.12	3.59	13.71	0.02	1.29	1.32
2007	5.07	1.78	6.86	10.03	3.44	13.47	0.03	1.41	1.43
2008	5.00	1.78	6.78	9.78	3.13	12.92	0.03	1.77	1.80
2009	5.36	1.91	7.27	9.01	2.68	11.69	0.04	1.98	2.02
2010	5.48	2.07	7.56	9.21	2.58	11.79	0.04	2.31	2.35
2011	5.67	2.22	7.89	8.94	2.50	11.44	0.05	2.94	2.99
2012	6.52	2.41	8.93	8.53	2.07	10.60	0.07	3.14	3.20
2013	7.50	2.61	10.10	7.73	2.13	9.86	0.13	3.49	3.62
2014	8.78	3.01	11.80	7.34	1.90	9.24	0.35	3.82	4.18
2015	9.43	3.34	12.77	7.36	2.09	9.45	0.47	4.27	4.74
2016	8.85	3.51	12.36	7.85	2.20	10.06	0.59	4.67	5.26
2017	9.36	3.78	13.14	7.97	2.18	10.14	1.16	5.22	6.38
2018	10.96	4.37	15.33	7.77	2.17	9.94	2.05	5.55	7.60
2019	12.31	4.82	17.14	6.80	2.34	9.14	2.98	5.49	8.47
2020	11.32	5.17	16.50	5.88	1.99	7.86	3.21	5.29	8.50
2021	11.31	5.42	16.73	6.11	2.36	8.47	2.96	5.57	8.54
2022	11.99	5.93	17.93	6.28	2.05	8.33	3.58	5.94	9.52
2023	12.93	6.50	19.43	6.49	2.04	8.53	4.08	6.15	10.23
2024	13.23	7.04	20.28	6.59	1.85	8.44	4.09	6.62	10.71
	Average annual percentage change								
1950-2024	1.2%	3.6%	1.7%	3.6%	2.2%	3.1%	5.2%	4.8%	4.9%
1970-2024	0.6%	2.7%	1.1%	3.0%	-0.2%	1.7%	11.1%	6.3%	7.1%
2014-2024	4.2%	8.7%	5.5%	-1.1%	-0.4%	-0.9%	27.9%	5.7%	9.9%

Source:
U.S. Department of Energy, Energy Information Administration, *Monthly Energy Review*, Washington, DC, July 2025, Tables 3.1, 3.3b, and 3.3e. (Additional resources: www.eia.gov/)

[a] Total domestic production includes crude oil, natural gas plant liquids and small amounts of other liquids.

Domestic petroleum production reached 20 million barrels per day in 2024. Net imports of petroleum in 2020 were negative for the first time in the series history and have continued to be negative through 2024. Transportation petroleum use as a share of domestic production was below 100% in 2018 for the first time since the 1980s and in 2024 was 68.3%.

Table 1.12
Petroleum Production and Transportation Petroleum Consumption in Context, 1950–2024

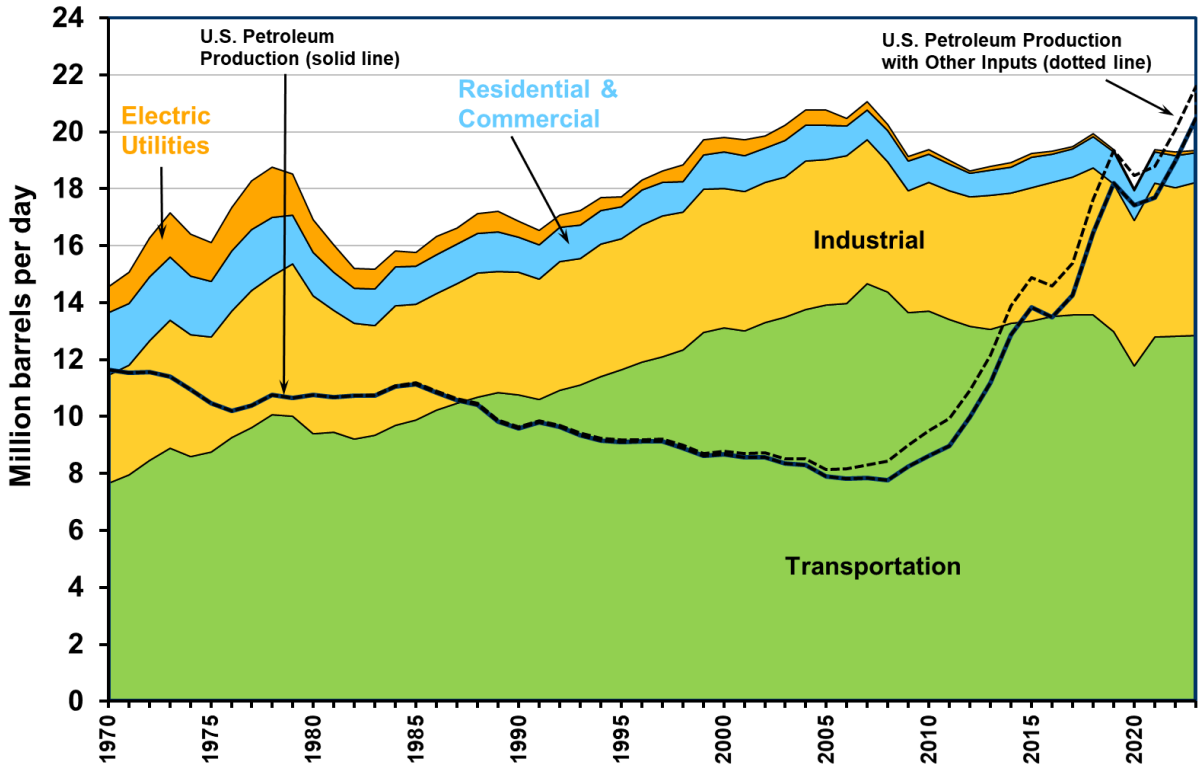
Year	Domestic petroleum production[a]	Net petroleum imports	Transportation petroleum consumption	U.S. petroleum consumption	World petroleum consumption	Net imports as a share of U.S. consumption	U.S. petroleum consumption as a share of world consumption	Transportation petroleum use as a share of domestic production
	(million barrels per day)							
1950	5.91	0.55	3.36	6.46	[b]	8.4%	[b]	56.8%
1955	7.58	0.88	4.46	8.46	[b]	10.4%	[b]	58.8%
1960	7.99	1.62	5.15	9.82	21.34	16.5%	45.9%	64.5%
1965	9.01	2.28	6.04	11.51	31.14	19.8%	37.0%	67.0%
1970	11.30	3.16	7.78	14.70	46.81	21.5%	31.4%	68.9%
1975	10.01	5.85	8.92	16.32	56.20	35.8%	29.0%	89.4%
1980	10.17	6.36	9.55	17.06	63.14	37.3%	27.0%	93.9%
1985	10.58	4.29	9.84	15.73	60.16	27.3%	26.1%	93.0%
1990	8.91	7.16	10.89	16.99	66.66	42.2%	25.5%	122.1%
1995	8.32	7.89	11.67	17.72	69.79	44.5%	25.4%	140.2%
2000	7.73	10.42	13.01	19.70	77.01	52.9%	25.6%	168.3%
2005	6.90	12.55	13.96	20.80	84.64	60.3%	24.6%	202.3%
2006	6.82	12.39	14.18	20.69	85.76	59.9%	24.1%	207.7%
2007	6.86	12.04	14.29	20.68	87.43	58.2%	23.7%	208.4%
2008	6.78	11.11	13.62	19.50	86.86	57.0%	22.4%	200.8%
2009	7.27	9.67	13.30	18.77	86.04	51.5%	21.8%	183.0%
2010	7.56	9.44	13.50	19.18	88.83	49.2%	21.6%	178.6%
2011	7.89	8.45	13.29	18.90	89.41	44.7%	21.1%	168.4%
2012	8.93	7.39	13.01	18.48	90.68	40.0%	20.4%	145.7%
2013	10.10	6.24	13.25	18.97	92.16	32.9%	20.6%	131.2%
2014	11.80	5.07	13.45	19.10	93.70	26.5%	20.4%	114.1%
2015	12.77	4.71	13.65	19.53	95.47	24.1%	20.5%	106.9%
2016	12.36	4.79	13.89	19.69	96.96	24.3%	20.3%	112.4%
2017	13.14	3.77	14.02	19.95	99.30	18.9%	20.1%	106.7%
2018	15.33	2.34	14.16	20.51	99.89	11.4%	20.5%	92.3%
2019	17.14	0.67	14.15	20.54	100.62	3.3%	20.4%	82.5%
2020	16.50	-0.63	11.95	18.19	91.01	-3.5%	20.0%	72.5%
2021	16.73	-0.06	13.31	19.89	96.67	-0.3%	20.6%	79.6%
2022	17.93	-1.19	13.54	20.01	99.51	-6.0%	20.1%	75.5%
2023	19.43	-1.71	13.76	20.28	101.86	-8.4%	19.9%	70.8%
2024	20.28	-2.37	13.76	20.46	[b]	-11.5%	[b]	68.3%
			Average annual percentage change					
1950-2024	1.7%	[b]	1.9%	1.6%	[b]			
1970-2024	1.1%	[b]	1.1%	0.6%	[b]			
2014-2024	5.5%	[b]	0.2%	0.6%	[b]			

Sources:
U.S. Department of Energy, Energy Information Administration, *Monthly Energy Review*, Washington, DC, July 2025, Tables 2.5, 3.1, and 11.2. (Pre-1973 data from the *Annual Energy Review*). (Additional resources: www.eia.gov/)

[a] Total domestic production includes crude oil, natural gas plant liquids and small amounts of other liquids.
[b] Data are not available.

Before 1989 the U.S. produced enough petroleum to meet the needs of the transportation sector but was still short of meeting the petroleum needs of all the sectors, including industrial, residential and commercial, and electric utilities. In 1970 the gap between what the U.S. produced and what was consumed was about 3 million barrels per day and in 2007, the gap was 12.8 million barrels per day. In 2023, more petroleum was produced than used in the United States.

Figure 1.2. United States Petroleum Production and Consumption, All Sectors, 1970–2023



Notes: "Total U.S. Petroleum Production" includes crude oil, natural gas plant liquids, and refinery gains. It does not include dry natural gas.

"Total U.S. Petroleum Production with Other Inputs" also includes non-petroleum sources such as ethanol, biomass, liquids from coal, other blending components, other hydrocarbons, and ethers which were domestically produced.

Sources:

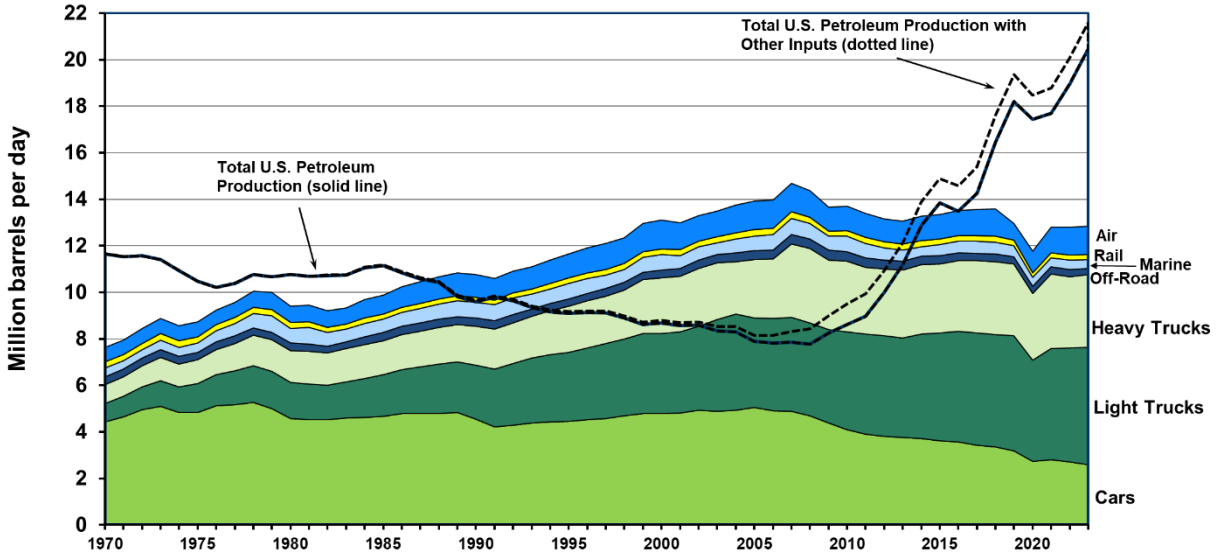
Transportation petroleum use – See Tables 1.14 and 1.15. Petroleum use for other sectors – See Table 1.13.

U.S. petroleum production – Energy Information Administration, *Monthly Energy Review July 2025*, Table 3.1.

Other inputs - Energy Information Administration, *Monthly Energy Review July 2025*, Tables 10.3 and 10.4.

In 1989, for the first time, petroleum consumption for transportation surpassed total U.S. petroleum production, which was declining. These contrasting trends in production and consumption created a gap that was met with foreign imports of petroleum. In 2009, however, the U.S. production of petroleum (for all uses including, but not limited to, transportation) began to increase substantially because of new hydraulic fracturing and oil extraction technology. In 2015 (including refinery gain), total production exceeded all transportation sector petroleum consumption. Transportation accounted for about two-thirds (68%) of all U.S. petroleum consumption in 2023. Including non-petroleum sources such as ethanol, the production exceeds transportation demand by approximately 8.7 million barrels per day in 2023.

Figure 1.3. United States Petroleum Production and Transportation Consumption, 1970–2023



Notes: "Total U.S. Petroleum Production" includes crude oil, natural gas plant liquids, and refinery gains. It does not include dry natural gas.

"Total U.S. Petroleum Production" is for all uses, including but not limited to transportation.

"Total U.S. Petroleum Production with Other Inputs" also includes non-petroleum sources such as ethanol, biomass, liquids from coal, other blending components, other hydrocarbons, and ethers which were domestically produced.

The sharp increase in the value for heavy trucks between 2006 and 2007 is the result of the Federal Highway Administration's methodology change.

Sources:

Historical transportation petroleum use – See Tables 1.14 and 1.15. Historical U.S. petroleum production – Energy Information Administration, *Monthly Energy Review August 2025*, Table 3.1. Historical other inputs - Energy Information Administration, *Monthly Energy Review August 2025*, Tables 10.3 and 10.4.

Total petroleum consumption in 2024 rose to 20.31 million barrels per day – an 11.7% increase from 2020. Nearly 68% was consumed by the transportation sector and another 27% by the industrial sector.

Table 1.13
Consumption of Petroleum by End-Use Sector, 1950–2024
(million barrels per day)

Year	Transportation	Percentage	Residential	Commercial	Industrial	Electric utilities	Total
1950	3.36	52.0%	0.66	0.41	1.82	0.21	6.46
1955	4.46	52.7%	0.89	0.52	2.39	0.21	8.46
1960	5.14	52.4%	1.12	0.59	2.71	0.24	9.80
1965	6.04	52.4%	1.24	0.67	3.25	0.32	11.51
1970	7.78	52.9%	1.42	0.76	3.81	0.93	14.70
1975	8.95	54.8%	1.29	0.65	4.04	1.39	16.32
1980	9.55	56.0%	0.89	0.63	4.84	1.15	17.06
1985	9.84	62.6%	0.81	0.53	4.07	0.48	15.73
1990	10.89	64.1%	0.74	0.49	4.30	0.57	16.99
1991	10.76	64.4%	0.74	0.46	4.22	0.53	16.71
1992	10.88	63.9%	0.75	0.44	4.52	0.43	17.03
1993	11.12	64.5%	0.77	0.41	4.44	0.49	17.24
1994	11.42	64.4%	0.76	0.41	4.67	0.47	17.72
1995	11.67	65.8%	0.74	0.38	4.59	0.33	17.72
1996	11.92	65.1%	0.81	0.40	4.82	0.36	18.31
1997	12.10	65.0%	0.78	0.38	4.95	0.41	18.62
1998	12.42	65.7%	0.72	0.36	4.84	0.58	18.92
1999	12.76	65.4%	0.82	0.37	5.03	0.53	19.52
2000	13.01	66.0%	0.87	0.41	4.90	0.51	19.70
2001	12.94	65.8%	0.85	0.41	4.89	0.56	19.65
2002	13.21	66.8%	0.82	0.38	4.93	0.43	19.76
2003	13.29	66.3%	0.86	0.43	4.92	0.53	20.03
2004	13.72	66.2%	0.84	0.42	5.22	0.53	20.73
2005	13.96	67.1%	0.81	0.39	5.10	0.55	20.80
2006	14.18	68.5%	0.69	0.34	5.19	0.29	20.69
2007	14.29	69.1%	0.71	0.34	5.06	0.29	20.68
2008	13.62	69.9%	0.76	0.35	4.56	0.21	19.50
2009	13.30	70.8%	0.68	0.35	4.27	0.17	18.77
2010	13.50	70.4%	0.66	0.34	4.51	0.17	19.18
2011	13.29	70.3%	0.61	0.34	4.53	0.14	18.90
2012	13.01	70.4%	0.51	0.30	4.56	0.10	18.48
2013	13.25	69.9%	0.57	0.30	4.72	0.12	18.97
2014	13.45	70.4%	0.61	0.32	4.58	0.14	19.10
2015	13.65	69.9%	0.58	0.48	4.69	0.13	19.53
2016	13.89	70.5%	0.52	0.47	4.70	0.11	19.69
2017	14.02	70.3%	0.52	0.46	4.85	0.10	19.95
2018	14.16	69.0%	0.61	0.48	5.15	0.12	20.51
2019	14.15	68.9%	0.63	0.49	5.19	0.09	20.54
2020	11.95	65.7%	0.55	0.48	5.12	0.09	18.19
2021	13.31	66.9%	0.57	0.52	5.39	0.10	19.89
2022	13.54	67.6%	0.59	0.54	5.23	0.11	20.01
2023	13.76	67.8%	0.57	0.50	5.37	0.08	20.28
2024	13.76	67.8%	0.54	0.49	5.44	0.08	20.31
			Average annual percentage change				
1950-2024	1.9%		-0.3%	0.2%	1.5%	-1.3%	1.6%
1970-2024	1.1%		-1.8%	-0.8%	0.7%	-4.5%	0.6%
2014-2024	0.2%		-1.1%	4.3%	1.7%	-5.7%	0.6%

Source:
U.S. Department of Energy, Energy Information Administration, *Monthly Energy Review,* Washington, DC, July 2025, Tables 3.7a–3.7c. (Additional resources: www.eia.gov/)

Transportation accounted for 80% or more of petroleum consumption in twenty-one states in 2023. Florida had the highest transportation petroleum share at 91% while Louisiana had the lowest share at 22%.

Table 1.14
Transportation Petroleum Consumption by State, 1960-2023

	(million barrels)								Share of transportation use to all petroleum use,
State	1960	1970	1980	1990	2000	2010	2020	2023	2023
Alabama	31	46	61	70	83	87	90	99	87%
Alaska	5	11	16	30	38	34	30	36	76%
Arizona	19	31	45	56	82	94	92	102	86%
Arkansas	18	29	36	41	53	53	50	53	83%
California	220	333	424	511	552	543	433	555	86%
Colorado	19	36	45	49	66	77	69	83	82%
Connecticut	22	34	35	38	42	44	36	41	69%
Delaware	8	9	10	12	13	15	14	15	71%
District of Columbia	5	6	5	5	5	3	2	3	79%
Florida	65	112	174	209	259	288	266	330	91%
Georgia	38	73	100	124	158	183	155	173	89%
Hawaii	11	22	26	28	23	28	20	29	65%
Idaho	8	12	15	16	22	24	28	31	82%
Illinois	91	141	149	141	176	180	146	163	72%
Indiana	48	69	80	104	120	109	97	105	77%
Iowa	27	36	42	41	49	55	50	54	63%
Kansas	24	33	42	44	45	47	45	48	73%
Kentucky	25	42	56	65	79	86	81	88	76%
Louisiana	40	58	100	112	142	103	79	86	22%
Maine	12	16	16	21	22	22	18	22	63%
Maryland	31	50	58	61	74	85	68	74	86%
Massachusetts	41	64	66	75	84	86	67	80	77%
Michigan	71	110	114	124	148	138	120	130	80%
Minnesota	34	50	60	60	91	85	75	83	72%
Mississippi	18	29	40	46	60	58	57	59	80%
Missouri	46	70	75	87	102	108	96	104	85%
Montana	11	12	16	15	18	20	21	21	64%
Nebraska	16	23	25	27	31	37	34	36	79%
Nevada	8	14	21	24	38	47	41	49	87%
New Hampshire	6	10	11	14	19	20	17	20	66%
New Jersey	62	90	104	145	165	147	107	124	81%
New Mexico	14	20	25	28	34	35	38	40	83%
New York	142	195	184	167	174	218	162	206	79%
North Carolina	43	67	82	99	130	144	139	158	87%
North Dakota	8	10	13	12	13	16	18	18	57%
Ohio	87	124	144	146	179	167	146	154	77%
Oklahoma	27	41	53	58	74	79	71	77	78%
Oregon	21	33	43	49	57	58	51	59	87%
Pennsylvania	94	127	145	148	176	171	139	149	63%
Rhode Island	11	11	10	11	12	12	9	10	68%
South Carolina	23	36	46	57	70	86	82	89	88%
South Dakota	8	10	12	12	15	17	17	18	77%
Tennessee	32	52	73	82	105	114	113	122	88%
Texas	137	207	306	371	456	480	494	572	36%
Utah	12	17	23	27	40	40	45	51	82%
Vermont	4	6	6	8	10	10	7	8	58%
Virginia	51	79	87	106	125	142	128	141	88%
Washington	33	53	75	102	113	102	91	113	82%
West Virginia	14	19	25	25	28	28	26	30	75%
Wisconsin	33	50	60	62	77	82	76	83	78%
Wyoming	7	9	15	14	17	18	17	17	64%
Total	1,880	2,839	3,494	3,974	4,762	4,926	4,375	5,020	68%

Source:

U.S. Energy Information Administration, State Energy Data System, August 29, 2025. (Additional resources: eia.doe.gov)

Cars and light-duty trucks use most of the petroleum in the transportation sector. Light-duty trucks include pick-ups, minivans, sport-utility vehicles, and vans. Table 1.16 shows nonhighway petroleum consumption. See Table 2.9 for highway energy use in trillion Btu.

Table 1.15
Highway Transportation Petroleum Consumption by Mode, 1970–2023[a]
(thousand barrels per day)

Year	Cars	Light trucks	Light vehicle subtotal	Motor-cycles	Buses	Class 3-6 trucks	Class 7-8 trucks	Heavy trucks subtotal	Highway subtotal	Total transportation[b]
1970	4,424	803	5,227	4	62	140	598	738	6,031	7,301
1975	4,836	1,245	6,081	7	58	181	771	952	7,099	8,435
1980	4,565	1,552	6,117	13	68	247	1,055	1,302	7,500	9,092
1985	4,665	1,785	6,450	12	72	265	1,131	1,396	7,930	9,526
1990	4,538	2,323	6,861	12	78	304	1,294	1,597	8,549	10,414
1995	4,440	2,975	7,415	13	87	357	1,523	1,881	9,396	11,340
1996	4,515	3,089	7,604	13	88	367	1,564	1,931	9,636	11,595
1997	4,559	3,222	7,781	13	91	370	1,579	1,949	9,834	11,769
1998	4,677	3,292	7,968	13	93	382	1,630	2,012	10,086	12,004
1999	4,780	3,448	8,228	14	96	420	1,792	2,212	10,550	12,637
2000	4,766	3,453	8,219	14	98	437	1,861	2,298	10,630	12,787
2001	4,798	3,491	8,290	13	93	436	1,859	2,295	10,690	12,656
2002	4,923	3,602	8,525	12	91	456	1,944	2,401	11,029	12,938
2003	4,866	3,963	8,829	12	90	443	1,890	2,334	11,265	13,118
2004	4,919	4,137	9,055	13	92	411	1,752	2,162	11,323	13,385
2005	5,050	3,840	8,890	12	93	461	1,965	2,426	11,422	13,553
2006	4,893	3,959	8,852	14	94	470	2,006	2,476 [c]	11,436	13,596
2007	4,852	4,034	8,885	31	92	585	2,495	3,080	12,089	14,286
2008	4,664	3,992	8,656	32	95	591	2,521	3,112	11,895	13,977
2009	4,344	4,033	8,376	31	95	549	2,341	2,890	11,393	13,248
2010	4,060	4,220	8,280	28	90	558	2,379	2,937	11,335	13,282
2011	3,891	4,291	8,182	28	93	525	2,240	2,766	11,068	12,988
2012	3,777	4,331	8,108	32	95	525	2,238	2,763	10,998	12,989
2013	3,737	4,276	8,013	31	97	537	2,288	2,824	10,965	12,885
2014	3,684	4,502	8,185	30	98	545	2,325	2,871	11,184	13,058
2015	3,602	4,627	8,229	29	100	542	2,311	2,853	11,210	13,165
2016	3,539	4,769	8,308	30	102	556	2,372	2,928	11,368	13,374
2017	3,410	4,816	8,226	30	105	570	2,429	2,998	11,359	13,408
2018	3,338	4,814	8,152	30	107	575	2,452	3,027	11,316	13,440
2019	3,169	4,948	8,117	29	106	566	2,412	2,977	11,230	13,298
2020	2,702	4,366	7,068	27	90	525	2,237	2,762	9,947	11,383
2021	2,768	4,790	7,558	29	94	590	2,516	3,106	10,786	12,513
2022	2,678	4,895	7,573	35	101	563	2,399	2,961	10,670	12,598
2023	2,559	5,046	7,605	30	99	576	2,455	3,031	10,764	12,771
					Average annual percentage change					
1970-2023	-1.0%	3.5%	0.7%	3.9%	0.9%	2.7%	2.7%	2.7%	1.1%	1.1%
2013-2023	-3.7%	1.7%	-0.5%	-0.2%	0.2%	0.7%	0.7%	0.7%	-0.2%	-0.1%

Source:
See Appendix A, Section 2.1 Highway Energy Use.

[a] Each gallon of petroleum product was assumed to equal one gallon of crude oil. The oil used to produce electricity is also estimated. See Appendix A, Section 2.4 for details.

[b] Total transportation figures do not include military and off-highway energy use and may not include all possible uses of fuel for transportation (e.g., snowmobiles).

Although 19% of transportation energy use is for nonhighway modes, only 14% of transportation petroleum use is for nonhighway. This is because some nonhighway modes, such as pipelines and transit rail, use electricity. An estimate for the petroleum used to make electricity is included in the data. Table 1.15 shows highway petroleum consumption. See Table 2.10 for nonhighway transportation energy use in trillion Btu.

Table 1.16
Nonhighway Transportation Petroleum Consumption by Mode, 1970–2023[a]
(thousand barrels per day)

Year	Air	Water	Pipeline	Rail	Nonhighway subtotal	Total transportation[b]
1970	625	381	14	250	1,270	7,301
1975	651	423	16	246	1,336	8,435
1980	697	625	11	259	1,592	9,092
1985	814	564	4	214	1,596	9,526
1990	991	655	5	214	1,865	10,414
1995	1,036	668	3	238	1,945	11,340
1996	1,068	644	3	244	1,959	11,595
1997	1,113	574	3	245	1,935	11,769
1998	1,102	566	4	247	1,918	12,004
1999	1,202	626	4	255	2,087	12,637
2000	1,236	663	3	254	2,157	12,787
2001	1,161	546	4	255	1,966	12,656
2002	1,079	572	3	256	1,909	12,938
2003	1,094	494	4	262	1,853	13,118
2004	1,188	593	3	276	2,062	13,385
2005	1,226	623	3	279	2,131	13,553
2006	1,216	657	2	285	2,159	13,596
2007	1,215	704	2	276	2,197	14,286
2008	1,160	657	1	265	2,083	13,977
2009	1,029	604	1	221	1,856	13,248
2010	1,040	665	1	240	1,946	13,282
2011	1,044	623	1	253	1,920	12,988
2012	1,218	525	1	247	1,772	12,989
2013	1,198	467	1	253	1,710	12,885
2014	1,203	405	1	265	1,702	13,058
2015	1,234	465	1	254	1,770	13,165
2016	1,259	512	1	234	1,820	13,374
2017	1,290	517	1	242	1,881	13,408
2018	1,357	514	1	252	1,936	13,440
2019	1,364	466	1	237	1,439	13,298
2020	850	380	1	206	1,520	11,383
2021	1,126	387	1	213	1,712	12,513
2022	1,318	394	1	215	1,819	12,598
2023	1,419	376	1	211	1,807	12,771
			Average annual percentage change			
1970-2023	1.6%	0.0%	-5.7%	-0.3%	0.7%	1.1%
2013-2023	1.7%	-2.1%	-1.6%	-1.8%	0.5%	-0.1%

Source:
See Appendix A, Section 2.3. Nonhighway Energy Use.

[a] Each gallon of petroleum product was assumed to equal one gallon of crude oil. The oil used to produce electricity is also estimated. See Appendix A, Section 2.4 Nonhighway Energy Use for details.

[b] Total transportation figures do not include military and off-highway energy use and may not include all possible uses of fuel for transportation (e.g., snowmobiles).

Highway vehicles were responsible for 85.6% of all transportation petroleum use in 2023. See Table 2.8 for transportation energy use in trillion Btu.

Table 1.17
Transportation Petroleum Use by Mode, 2022–2023[a]

	Thousand barrels per day		Percentage of total[b]		Percentage of total U.S. petroleum consumption[b]	
	2022	2023	2022	2023	2022	2023
HIGHWAY	**10,670.3**	**10,764.4**	**84.7%**	**84.3%**	**54.7%**	**54.7%**
Light vehicles	**7,608.0**	**7,634.8**	**60.5%**	**59.9%**	**39.7%**	**39.0%**
Cars	2,677.5	2,559.0	21.3%	20.1%	15.4%	14.9%
Light trucks[c]	4,895.2	5,045.8	38.9%	39.6%	24.1%	24.0%
Motorcycles	35.3	29.9	0.3%	0.2%	0.1%	0.1%
Buses	**100.9**	**99.0**	**0.8%**	**0.8%**	**0.5%**	**0.5%**
Transit	35.5	36.4	0.3%	0.3%	0.2%	0.2%
Intercity	18.8	18.0	0.1%	0.1%	0.1%	0.1%
School	46.6	44.6	0.4%	0.4%	0.2%	0.2%
Medium/heavy trucks	**2,961.4**	**3,030.6**	**23.3%**	**23.5%**	**14.5%**	**15.2%**
Class 3-6	562.7	575.8	4.5%	4.5%	2.8%	2.9%
Class 7-8	2,398.8	2,454.8	18.9%	19.0%	11.7%	12.3%
NONHIGHWAY	**1,927.6**	**2,006.6**	**15.3%**	**15.7%**	**9.6%**	**9.9%**
Air	**1,318.3**	**1,418.7**	**10.5%**	**11.1%**	**6.6%**	**7.0%**
General aviation	148.4	132.3	1.2%	1.0%	0.7%	0.7%
Domestic air carriers	774.3	835.7	6.2%	6.6%	3.9%	4.1%
International air carriers	225.4	240.3	3.1%	3.5%	2.0%	2.2%
Water	**393.5**	**376.1**	**3.1%**	**3.0%**	**2.0%**	**1.9%**
Freight	282.7	264.7	2.2%	2.1%	1.4%	1.3%
Recreational	110.8	111.4	0.9%	0.9%	0.6%	0.5%
Pipeline	**1.0**	**0.7**	0.0%	0.0%	0.0%	0.0%
Rail	**214.8**	**211.1**	**1.7%**	**1.7%**	**1.1%**	**1.0%**
Freight (Class I)	205.1	201.2	1.6%	1.6%	1.0%	1.0%
Passenger	9.7	10.0	0.1%	0.1%	0.0%	0.0%
Transit	0.2	0.1	0.0%	0.0%	0.0%	0.0%
Commuter	6.3	6.2	0.0%	0.0%	0.0%	0.0%
Intercity	3.3	3.7	0.0%	0.0%	0.0%	0.0%
HWY & NONHWY TOTAL[d]	**12,568.3**	**12,740.7**	**100.0%**	**100.0%**	**62.8%**	**62.8%**
Off-Highway[e]	2,109.8	2,134.9				

Source:
See Appendix A, Section 2. Energy Use Sources.

[a] Each gallon of petroleum product was assumed to equal one gallon of crude oil. The oil used to produce electricity is also estimated. See Appendix A, Section 2.4 for details.

[b] Percentages may not sum to totals due to rounding.

[c] Two-axle, four-tire trucks.

[d] Civilian consumption only. Totals may not include all possible uses of fuels for transportation (e.g., snowmobiles).

[e] Includes equipment that does not travel on roads, such as equipment from agriculture, construction, and airports.

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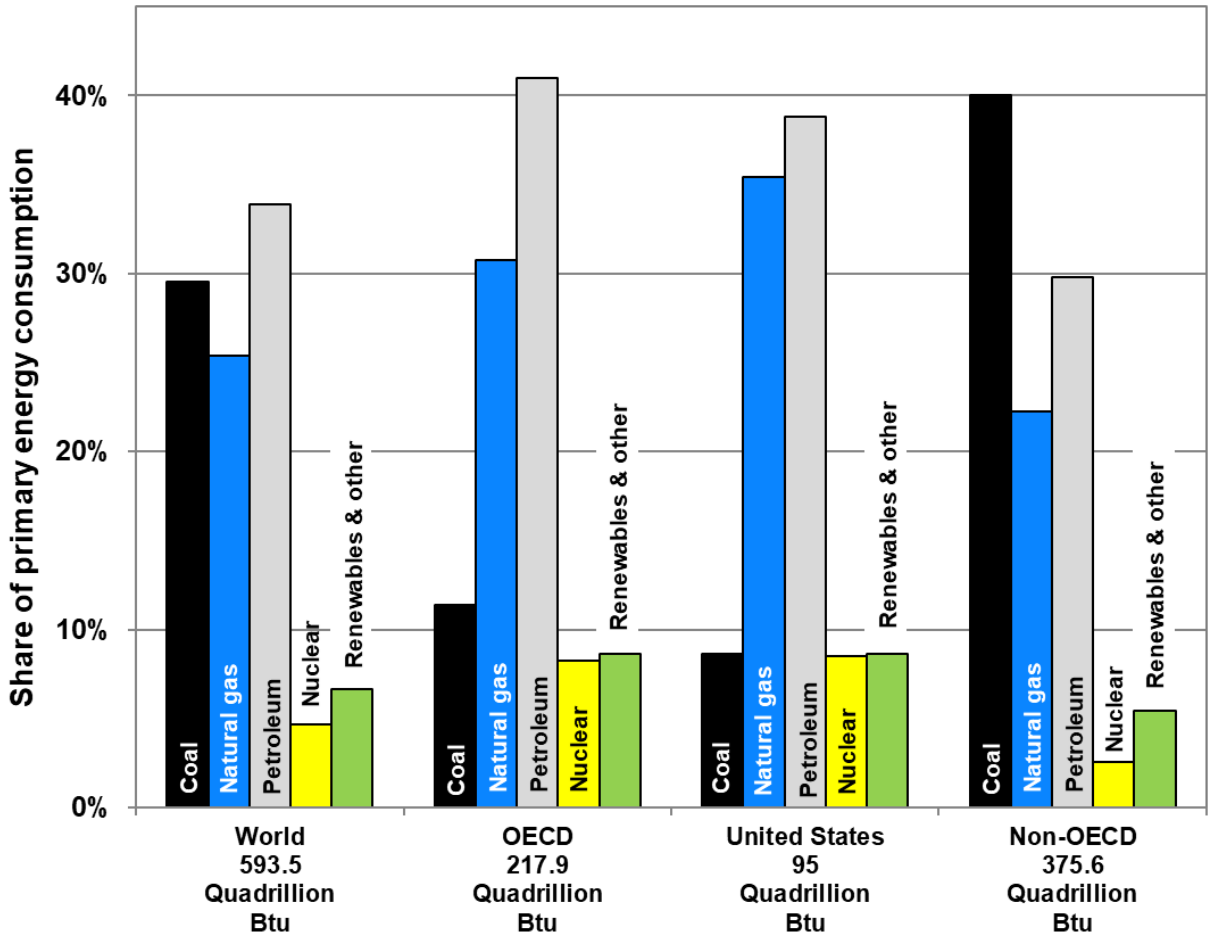
Chapter 2



Credit: Allou/iStock/Getty Images

Petroleum accounted for 34% of the world's energy use in 2023. Although petroleum and natural gas are the dominant energy sources for OECD countries, the non-OECD countries rely on coal and petroleum. The U.S. shares of primary energy sources are similar to the OECD countries as a whole, but with a lesser reliance on coal and a greater reliance on natural gas.

Figure 2.1. World Consumption of Primary Energy, 2023



Note: The United States data are shown separately but are also included in the OECD data.

Source:
U.S. Department of Energy, Energy Information Administration, International Energy Data, July 2025, www.eia.gov/international/data/world. (Additional resources: www.eia.gov)

The United States had only 6% of world natural gas reserves but produced 26% of natural gas in 2023. Although OPEC had 35% of natural gas reserves in all three of the years shown, they have increased the share of natural gas production, from 4% in 1980 to 19% in 2010, before easing to 16% in 2023. The world consumption of natural gas outpaced the United States' consumption, evidenced by the U.S. consumption being 38% in 1980 but only 21% in 2023.

Table 2.1
World Natural Gas Reserves, Production, and Consumption, 1980, 2010, and 2023
(trillion cubic feet)

	Natural gas reserves	Reserve share	Natural gas production	Production share	Natural gas consumption	Consumption share
				1980		
United States	201.0	8%	19.4	36%	19.9	38%
OPEC	911.1	35%	2.2	4%	2.2	4%
Rest of world	1,473.4	57%	31.7	60%	30.9	58%
				2010		
United States	272.5	4%	21.3	18%	24.1	21%
OPEC	2,292.0	35%	22.3	19%	13.4	12%
Rest of world	4,077.0	61%	76.1	64%	78.2	68%
				2023		
United States	473.3[a]	6%	37.9	26%	32.5	21%
OPEC	2,574.7 [a]	35%	23.2	16%	21.0	13%
Rest of world	4,251.0 [a]	58%	86.7	59%	103.1	66%

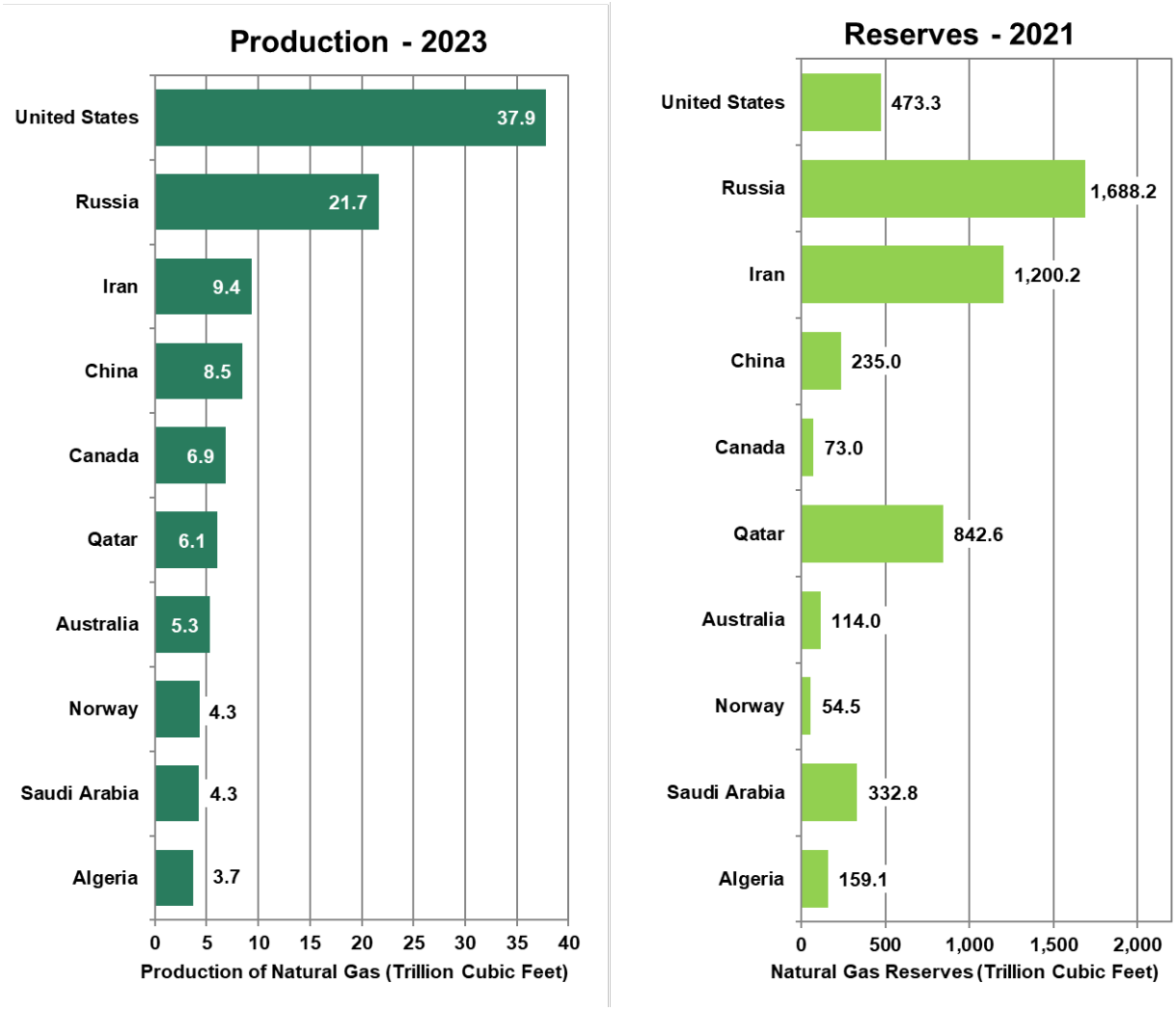
Note: Production data are dry gas production. See Glossary for OPEC countries.

Source:
Central Intelligence Agency, The World Factbook, Field Listing – Natural Gas, www.cia.gov/the-world-factbook/field/natural-gas, accessed September 4, 2025.

[a] Reserves data are for 2021.

In 2023, the United States and Russia were by far the top natural gas producing countries with more than double that of any other country. Although the United States produced more than Russia, Russia had 3.6 times more reserves in 2021.

Figure 2.2. Natural Gas Production and Reserves for the Top Ten Natural Gas Producing Countries



Source:
Central Intelligence Agency, The World Factbook, Field Listing – Natural Gas, www.cia.gov/the-world-factbook/field/natural-gas, accessed September 4, 2025.

Total energy use has been consistently over 90 quadrillion Btu (quads) since 2021, with the transportation sector using nearly 30% of total U.S. energy. The Energy Information Administration includes renewable energy in the appropriate sectors.

Table 2.2
U.S. Consumption of Total Energy by End-Use Sector, 1950–2024
(quadrillion Btu)

Year	Transportation	Percentage transportation of total	Industrial	Commercial	Residential	Total[a]
1950	8.5	25.3%	15.7	3.7	5.7	33.5
1955	9.5	24.3%	18.9	3.7	7.0	39.2
1960	10.6	24.1%	20.3	4.4	8.7	43.9
1965	12.4	23.6%	24.4	5.5	10.2	52.6
1970	16.1	24.4%	28.9	7.9	13.2	66.0
1975	18.2	26.1%	28.5	8.9	14.1	69.8
1980	19.7	25.9%	31.2	10.1	15.1	76.0
1985	20.1	27.0%	28.0	10.8	15.3	74.3
1990	22.4	27.3%	31.0	12.7	16.2	82.2
1995	23.8	26.9%	33.1	14.0	17.7	88.7
2000	26.5	27.4%	33.9	16.5	19.7	96.7
2001	26.2	27.8%	32.2	16.6	19.5	94.4
2002	26.8	28.0%	32.0	16.7	20.1	95.6
2003	26.9	28.1%	31.9	16.7	20.4	95.8
2004	27.8	28.4%	32.9	17.0	20.4	98.0
2005	28.3	28.8%	31.8	17.2	20.9	98.1
2006	28.7	29.5%	31.7	16.9	19.9	97.2
2007	28.8	29.1%	31.8	17.6	20.8	99.0
2008	27.4	28.4%	30.7	17.7	20.9	96.6
2009	26.6	29.0%	27.8	17.0	20.2	91.6
2010	27.0	28.3%	30.0	17.2	21.0	95.1
2011	26.6	28.3%	30.1	17.0	20.3	94.0
2012	26.1	28.5%	30.2	16.4	18.9	91.7
2013	26.6	28.2%	30.8	16.9	20.0	94.3
2014	26.9	28.2%	30.9	17.2	20.3	95.3
2015	27.3	28.8%	30.6	17.1	19.5	94.5
2016	27.8	29.6%	30.5	16.8	18.9	94.1
2017	28.0	29.9%	30.8	16.5	18.5	93.9
2018	28.5	29.3%	31.8	17.1	20.0	97.4
2019	28.7	29.7%	31.7	16.6	19.6	96.6
2020	24.5	27.5%	30.3	15.3	18.8	88.9
2021	27.1	29.0%	31.4	15.9	19.0	93.4
2022	27.7	29.2%	31.1	16.6	19.5	94.8
2023	28.1	30.0%	31.0	16.3	18.3	93.6
2024	28.2	29.9%	31.2	16.5	18.5	94.2
		Average annual percentage change				
1950-2024	1.6%		0.9%	2.1%	1.6%	1.4%
1970-2024	1.0%		0.1%	1.4%	0.6%	0.7%
2014-2024	0.5%		0.1%	-0.4%	-1.0%	-0.1%

Source:
U.S. Department of Energy, Energy Information Administration, *Monthly Energy Review, July* 2025, Washington, DC, Table 2.1. (Additional resources: www.eia.doe.gov)

[a] Electrical energy losses have been distributed among the sectors. Renewable energy consumption is included in the appropriate sectors.

In transportation, the alcohol fuels blended into gasoline to make gasohol (15% ethanol or less) are counted under "renewables" and are not in with petroleum. The petroleum category, however, still contains other blending agents that are not actually petroleum but are not broken out into a separate category. The transportation sector remains highly dependent upon petroleum in 2024 unlike the other sectors.

Table 2.3
Distribution of Energy Consumption by Source and Sector, 1970 and 2024
(percentage)

Energy source	Transportation		Residential		Commercial	
	1970	2024	1970	2024	1970	2024
Petroleum[a]	95.8%	88.1%	18.8%	5.0%	16.8%	5.2%
Natural gas[b]	4.0%	4.9%	33.4%	24.7%	27.8%	21.0%
Coal	0.0%	0.0%	0.6%	0.0%	1.7%	0.1%
Renewable	0.0%	6.8%	2.4%	3.6%	0.1%	1.6%
Nuclear	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Electricity[c]	0.2%	0.2%	44.8%	66.7%	53.6%	72.1%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Energy source	Industrial		Electric utilities	
	1970	**2024**	**1970**	**2024**
Petroleum[a]	27.9%	27.5%	17.8%	0.5%
Natural gas[b]	31.8%	35.1%	19.0%	42.5%
Coal	12.4%	2.8%	44.0%	21.4%
Renewable	3.7%	7.3%	14.4%	10.6%
Nuclear	0.0%	0.0%	4.6%	24.9%
Electricity[c]	24.2%	27.3%	0.2%	0.1%
Total	100.0%	100.0%	100.0%	100.0%

Source:
U.S. Department of Energy, Energy Information Administration, *Monthly Energy Review*, July 2025, Washington, DC, Tables 2.2, 2.3, 2.4, 2.5, and 2.6. (Additional resources: www.eia.doe.gov)

[a] In transportation, the petroleum category contains some blending agents which are not petroleum.
[b] Includes supplemental gaseous fuels. Transportation sector includes pipeline fuel and natural gas vehicle use.
[c] Includes electrical system energy losses.

Total transportation energy consumption was more than 28 quads in 2024, up from 24.4 quads in 2020. Petroleum had accounted for more than 90% of transportation energy consumption from the mid-1950s until 2020. Renewables, including ethanol and biodiesel, were 6.8% of the total in 2024.

Table 2.4
Distribution of Transportation Energy Consumption by Source, 1950–2024

Year	Petroleum[a]	Natural gas[b]	Coal	Renewables	Electricity[c]	Total (trillion Btu)
1950	79.0%	1.5%	18.5%	0.0%	1.0%	8,468.7
1955	92.2%	2.7%	4.4%	0.0%	0.7%	9,539.2
1960	95.6%	3.4%	0.7%	0.0%	0.3%	10,591.2
1965	95.5%	4.2%	0.1%	0.0%	0.2%	12,428.3
1970	95.1%	4.6%	0.0%	0.0%	0.2%	16,094.4
1975	96.6%	3.3%	0.0%	0.0%	0.2%	18,241.4
1980	96.5%	3.3%	0.0%	0.0%	0.2%	19,693.7
1985	97.0%	2.6%	0.0%	0.2%	0.2%	20,084.3
1990	96.5%	3.0%	0.0%	0.3%	0.2%	22,415.2
1995	96.3%	3.0%	0.0%	0.5%	0.2%	23,808.2
1996	96.4%	3.0%	0.0%	0.3%	0.2%	24,415.3
1997	96.2%	3.2%	0.0%	0.4%	0.2%	24,718.6
1998	96.7%	2.6%	0.0%	0.4%	0.2%	25,221.0
1999	96.7%	2.6%	0.0%	0.5%	0.2%	25,912.5
2000	96.7%	2.5%	0.0%	0.5%	0.2%	26,512.4
2001	96.7%	2.5%	0.0%	0.5%	0.2%	26,239.4
2002	96.5%	2.6%	0.0%	0.6%	0.2%	26,804.7
2003	96.5%	2.3%	0.0%	0.9%	0.3%	26,877.1
2004	96.5%	2.2%	0.0%	1.0%	0.3%	27,822.5
2005	96.3%	2.2%	0.0%	1.2%	0.3%	28,256.6
2006	95.9%	2.2%	0.0%	1.7%	0.3%	28,692.5
2007	95.3%	2.3%	0.0%	2.1%	0.3%	28,810.9
2008	94.2%	2.5%	0.0%	3.0%	0.3%	27,417.1
2009	93.5%	2.7%	0.0%	3.5%	0.3%	26,587.2
2010	93.1%	2.7%	0.0%	4.0%	0.3%	26,970.5
2011	92.6%	2.8%	0.0%	4.4%	0.3%	26,597.7
2012	92.3%	3.0%	0.0%	4.5%	0.3%	26,127.1
2013	91.5%	3.3%	0.0%	4.9%	0.3%	26,613.5
2014	92.0%	2.8%	0.0%	4.9%	0.3%	26,875.4
2015	92.0%	2.7%	0.0%	5.0%	0.3%	27,252.8
2016	91.7%	2.7%	0.0%	5.3%	0.2%	27,810.0
2017	91.7%	2.8%	0.0%	5.3%	0.2%	28,047.5
2018	91.3%	3.4%	0.0%	5.1%	0.2%	28,503.7
2019	90.7%	3.9%	0.0%	5.2%	0.2%	28,669.6
2020	89.7%	4.5%	0.0%	5.5%	0.2%	24,452.8
2021	89.7%	4.6%	0.0%	5.5%	0.2%	27,073.9
2022	89.2%	4.9%	0.0%	5.7%	0.2%	27,676.4
2023	88.6%	4.8%	0.0%	6.4%	0.2%	28,063.3
2024	88.2%	4.9%	0.0%	6.8%	0.2%	28,150.9

Source:
U.S. Department of Energy, Energy Information Administration, *Monthly Energy Review*, July 2025, Washington, DC, Table 2.5. (Additional resources: www.eia.doe.gov)

[a] In transportation, the petroleum category contains some blending agents which are not petroleum.
[b] Includes supplemental gaseous fuels. Transportation sector includes pipeline fuel and natural gas vehicle use.
[c] Includes electrical system energy losses.

Transportation energy use was 30%-40% of all energy use for 27 states in 2023. Hawaii had the highest share of transportation use at 59%. Transportation energy use in Texas and California was over 3 quads in 2023.

Table 2.5
Transportation Energy Consumption by State, 1960-2023

State	(trillion Btu)								Share of transportation use to all energy use, 2023
	1960	1970	1980	1990	2000	2010	2020	2023	
Alabama	176	268	350	398	473	478	498	544	29%
Alaska	27	76	90	169	220	193	165	204	27%
Arizona	117	194	266	326	460	516	509	558	37%
Arkansas	105	167	204	228	294	290	271	287	27%
California	1,224	1,833	2,364	2,834	3,017	2,933	2,353	3,036	45%
Colorado	104	195	251	271	366	421	378	447	33%
Connecticut	117	183	185	206	228	239	197	219	32%
Delaware	44	50	54	63	70	80	73	81	30%
District of Columbia	29	33	27	27	28	19	16	17	13%
Florida	348	608	951	1,137	1,404	1,556	1,419	1,772	41%
Georgia	209	401	550	682	860	988	824	922	32%
Hawaii	62	125	147	155	125	157	109	162	59%
Idaho	42	66	83	91	124	138	158	170	34%
Illinois	504	791	821	788	968	981	802	892	26%
Indiana	265	378	442	582	659	588	526	568	22%
Iowa	151	210	238	236	271	305	277	297	21%
Kansas	173	251	279	280	270	275	258	274	28%
Kentucky	154	261	324	380	441	470	456	501	31%
Louisiana	257	392	647	691	854	613	606	751	18%
Maine	67	88	83	115	120	118	98	118	36%
Maryland	173	273	319	331	403	459	386	419	35%
Massachusetts	220	349	358	407	453	457	360	427	33%
Michigan	387	593	620	684	816	746	649	704	28%
Minnesota	181	274	332	339	513	465	404	455	27%
Mississippi	129	216	261	291	359	336	332	356	33%
Missouri	254	391	411	477	555	576	511	551	33%
Montana	58	68	89	82	106	117	117	115	30%
Nebraska	94	139	141	152	173	207	191	199	24%
Nevada	42	73	116	133	205	253	227	270	39%
New Hampshire	34	51	58	73	102	105	90	103	35%
New Jersey	338	493	566	798	906	787	576	668	34%
New Mexico	91	138	176	230	226	196	218	230	34%
New York	799	1,096	1,025	925	968	1,208	907	1,163	34%
North Carolina	232	364	444	537	703	763	737	832	34%
North Dakota	42	54	72	65	81	100	128	138	20%
Ohio	485	674	787	803	985	895	818	868	26%
Oklahoma	151	241	308	340	426	454	427	462	30%
Oregon	111	183	240	280	320	317	279	321	37%
Pennsylvania	536	718	818	843	999	958	785	845	23%
Rhode Island	61	63	52	58	65	63	50	57	31%
South Carolina	126	199	248	309	379	459	434	472	29%
South Dakota	41	54	63	66	85	94	97	99	29%
Tennessee	174	308	409	466	583	616	615	666	32%
Texas	798	1,212	1,802	2,155	2,563	2,664	2,850	3,324	24%
Utah	65	92	127	149	221	226	253	285	33%
Vermont	19	29	34	42	52	50	39	43	38%
Virginia	290	446	482	584	683	766	693	758	31%
Washington	180	291	416	571	626	555	507	630	39%
West Virginia	85	108	147	147	186	172	170	198	24%
Wisconsin	180	271	329	341	419	435	404	440	27%
Wyoming	41	57	88	81	109	121	107	107	21%
Total	10,592	16,090	19,694	22,419	26,517	26,982	24,356	28,049	30%

Source:
U.S. Energy Information Administration, State Energy Data System, June 27, 2025.

Ethanol is an oxygenate blended with gasoline in amounts up to 10% to be used in conventional vehicles and is blended in higher amounts up to 85% for use in flex-fuel vehicles. Ethanol production exceeded 16 billion gallons in 2018, fell in 2019–2020, and reached a record 16.2 billion gallons in 2024. Since 2010, the United States has exported more fuel ethanol than it imports. Biodiesel is a renewable fuel typically made from vegetable oils or animal fats. It can be burned in standard diesel engines and is often blended with petroleum diesel. In 2024, about 1.9 billion gallons of biodiesel were consumed.

Table 2.6
Fuel Ethanol and Biodiesel Production, Net Imports, and Consumption, 1981–2024
(million gallons)

	Fuel ethanol			Biodiesel		
Year	Production	Net imports	Consumption	Production	Net imports	Consumption
1981	83.1	[a]	83.1	[a]	[a]	[a]
1985	617.1	[a]	617.1	[a]	[a]	[a]
1990	747.7	[a]	747.7	[a]	[a]	[a]
1995	1,357.7	16.3	1,382.6	[a]	[a]	[a]
1996	973.5	13.1	991.7	[a]	[a]	[a]
1997	1,288.3	3.6	1,255.8	[a]	[a]	[a]
1998	1,405.0	2.8	1,387.6	[a]	[a]	[a]
1999	1,465.0	3.7	1,442.7	[a]	[a]	[a]
2000	1,622.3	4.9	1,653.4	[a]	[a]	[a]
2001	1,765.2	13.2	1,740.7	8.6	1.7	10.3
2002	2,140.2	12.9	2,073.1	10.5	5.9	16.4
2003	2,804.4	12.3	2,826.0	14.2	(0.7)	13.5
2004	3,404.4	148.8	3,552.2	28.0	(1.1)	26.8
2005	3,904.4	135.8	4,058.6	90.8	0.0	90.8
2006	4,884.3	731.1	5,481.2	250.4	10.5	260.9
2007	6,521.0	439.2	6,885.7	489.8	(136.1)	353.7
2008	9,308.8	529.6	9,683.4	678.1	(374.6)	303.6
2009	10,937.8	198.2	11,036.6	515.8	(194.9)	321.8
2010	13,297.9	(382.8)	12,858.5	343.4	(85.0)	260.1
2011	13,929.1	(1,023.3)	12,893.3	967.5	(38.1)	886.2
2012	13,218.0	(247.4)	12,881.9	990.7	(92.5)	899.0
2013	13,292.7	(242.0)	13,215.6	1,359.5	146.0	1,428.8
2014	14,312.8	(771.6)	13,444.0	1,279.0	109.4	1,416.9
2015	14,807.2	(740.5)	13,946.7	1,263.3	264.9	1,494.2
2016	15,413.2	(1,134.1)	14,356.3	1,567.7	620.8	2,085.4
2017	15,936.3	(1,313.2)	14,485.1	1,595.7	300.1	1,985.3
2018	16,091.3	(1,655.2)	14,420.4	1,857.3	62.9	1,903.7
2019	15,778.5	(1,271.6)	14,551.7	1,724.5	56.6	1,812.8
2020	13,941.0	(1,163.1)	12,680.8	1,814.7	51.5	1,876.3
2021	15,015.7	(1,181.7)	13,944.4	1,708.8	23.2	1,710.1
2022	15,360.7	(1,244.5)	14,023.4	1,622.0	11.7	1,658.1
2023	15,580.2	(1,381.6)	14,230.0	1,696.8	241.9	1,930.1
2024	16,219.4	(1,923.7)	14,263.4	1,671.5	234.9	1,918.0
			Average annual percentage change			
1981-2024	13.0%	[a]	12.7%	[a]	[a]	[a]
2014-2024	1.3%	[a]	0.6%	2.7%	a	3.1%

Note: Net imports are total imports minus exports.

Source:
U.S. Department of Energy, Energy Information Administration, *Monthly Energy Review*, July 2025, Washington, DC, Table 10.3 and Table 10.4. (Additional resources: www.eia.doe.gov)

[a] Data are not available.

As data about alternative fuel use becomes available, an attempt is made to incorporate it into this table. Sometimes assumptions must be made in order to use the data. Please see Appendix A for a description of the methodology used to develop these data. See Table 1.17 for transportation petroleum use in thousand barrels per day.

Table 2.7
Domestic Consumption of Transportation Energy by Mode and Fuel Type, 2023[a]
(trillion Btu)

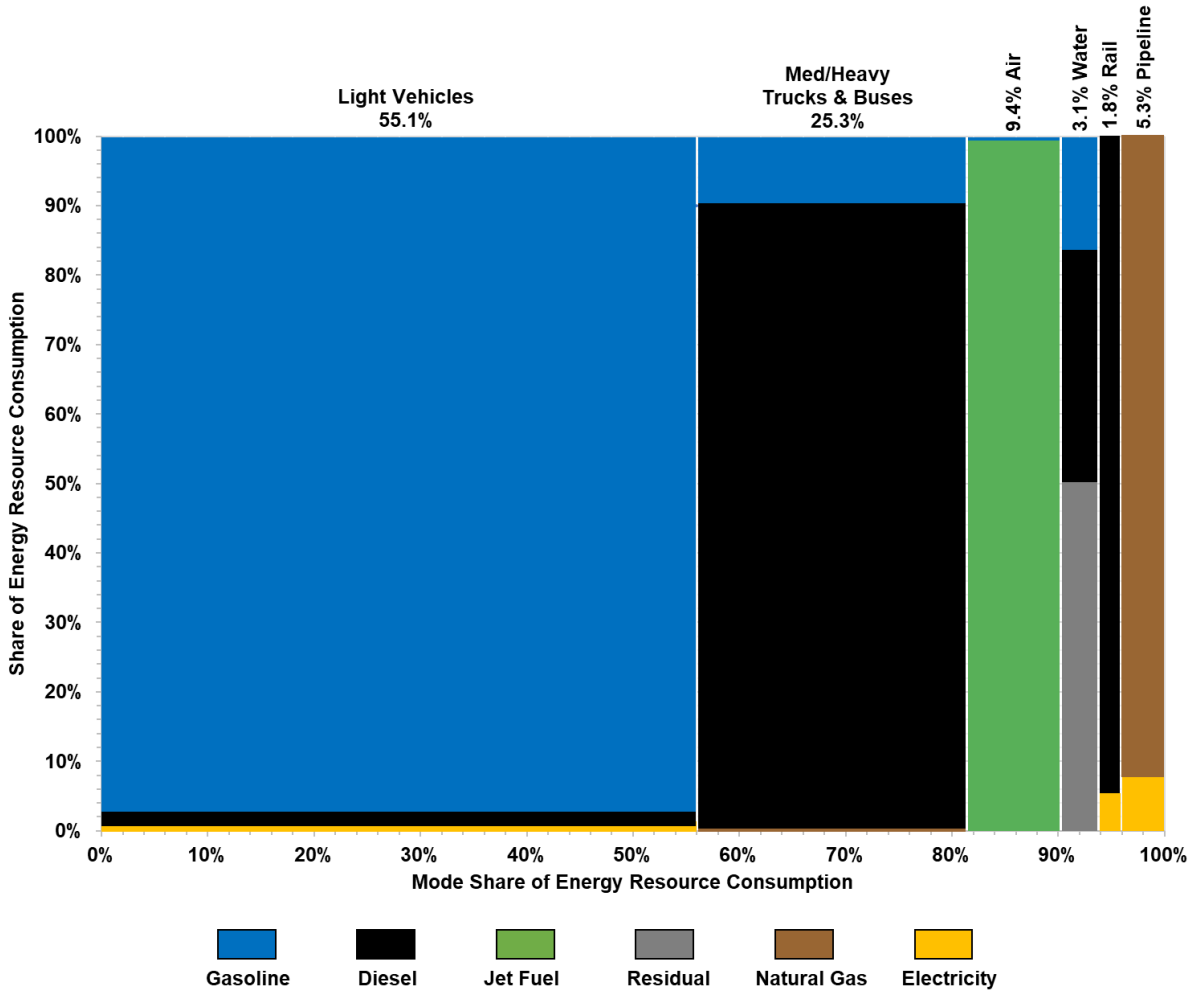
	Gasoline	Diesel fuel	Liquefied petroleum gas	Jet fuel	Residual fuel oil	Natural gas	Electricity[b]	Total[c]
HIGHWAY	**14,264.2**	**6,533.4**	**4.4**	**-**	**-**	**26.1**	**153.3**	**20,981.4**
Light-Duty vehicles	**13,871.0**	**349.1**	**-**	**-**	**-**	**-**	**153.1**	**14,373.1**
Cars	4,726.4	27.2					32.4	4,786.0
Light-Duty trucks[d]	9,087.2	321.9	-				120.7	9,529.7
Motorcycles	57.4							57.4
Buses	**10.0**	**172.1**	**0.2**	**-**	**-**	**26.1**	**0.2**	**208.5**
Transit	1.4	48.4	0.2			26.1	0.2	76.5
Intercity		38.3						38.3
School	8.6	85.4						93.9
Medium/heavy-duty trucks	**383.3**	**6,012.2**	**4.2**	**-**	**-**	**-**	**-**	**6,399.8**
Class 3-6 trucks	**352.6**	**841.7**	**4.2**					**1,198.5**
Class 7-8 trucks	**30.7**	**5,170.5**	**0.0**					**5,201.2**
NONHIGHWAY	**202.8**	**699.4**	**-**	**2,436.2**	**384.4**	**1,282.4**	**115.1**	**5,120.3**
Air	**29.2**	**-**	**-**	**2,436.2**	**-**	**-**	**-**	**2,465.4**
General aviation	29.2			240.3				269.4
Domestic air carriers				1,729.5				1,729.5
International air carriers[e]				466.4				466.4
Water	**173.7**	**250.8**	**-**	**-**	**384.4**	**-**	**-**	**808.8**
Freight		206.6			384.4			591.0
Recreational	173.7	44.2						217.9
Pipeline	**-**	**-**	**-**	**-**	**-**	**1,282.4**	**93.2**	**1,375.6**
Rail	**-**	**448.6**	**-**	**-**	**-**	**-**	**21.9**	**470.4**
Freight (Class I)		427.8						427.8
Passenger		20.8					21.9	42.7
Transit							14.6	14.6
Commuter		13.0					5.7	18.7
Intercity		7.8					1.6	9.4
TOTAL HWY & NONHWY[c]	**14,467.0**	**7,232.7**	**4.4**	**2,436.2**	**384.4**	**1,308.5**	**268.3**	**26,101.6**

Source:
See Appendix A, Section 2. Energy Use Sources.

[a] Civilian consumption only. Totals may not include all possible uses of fuels for transportation (e.g., snowmobiles).
[b] Only end-use energy was counted for electricity.
[c] Totals may not sum due to rounding.
[d] Two-axle, four-tire trucks.
[e] One half of fuel used by domestic carriers in international operation.

The gasoline and diesel used in highway modes accounted for the majority of transportation energy use (80.4%) and nearly all highway use in 2023.

Figure 2.3. Transportation Energy Use by Mode and Fuel Type, 2023[a]



Note: Residual fuel oil is heavier oil which can be used in vessel bunkering.

Source:
See Table 2.7 or Appendix A, Section 2. Energy Use Sources.

[a] Civilian consumption only. Totals may not include all possible uses of fuel for transportation (e.g., snowmobiles). Only end-use energy was counted for electricity.

Nonhighway modes were responsible for 19.6% of all transportation energy use in 2023. See Table 1.17 for transportation energy use in thousand barrels per day.

Table 2.8
Transportation Energy Use by Mode, 2022–2023[a]

	Trillion Btu		Percentage of total based on Btus	
	2022	**2023**	**2022**	**2023**
HIGHWAY	**20,743.3**	**20,981.4**	**80.5%**	**80.4%**
Light-duty vehicles	**14,276.5**	**14,373.1**	**55.4%**	**55.1%**
Cars	4,996.2	4,786.0	19.4%	18.3%
Light-duty trucks[b]	9,212.8	9,529.7	35.8%	36.5%
Motorcycles	67.6	57.4	0.3%	0.2%
Buses	**213.2**	**208.5**	**0.8%**	**0.8%**
Transit	75.0	76.5	0.3%	0.3%
Intercity	40.0	38.3	0.2%	0.1%
School	98.1	93.9	0.4%	0.4%
Medium/heavy-duty trucks	**6,253.6**	**6,399.8**	**24.3%**	**24.5%**
Class 3-6 trucks	1,171.2	1,198.5	4.5%	4.6%
Class 7-8 trucks	5,082.5	5,201.2	19.7%	19.9%
NONHIGHWAY	**5,024.3**	**5,120.3**	**19.5%**	**19.6%**
Air	**2,315.6**	**2,465.4**	**9.0%**	**9.4%**
General aviation	303.8	269.4	1.2%	1.0%
Domestic air carriers	1,602.4	1,729.5	6.2%	6.6%
International air	409.4	466.4	1.6%	1.8%
Water	**847.9**	**808.8**	**3.3%**	**3.1%**
Freight	631.3	591.0	2.4%	2.3%
Recreational	216.6	217.9	0.8%	0.8%
Pipeline	**1,383.5**	**1,375.6**	**5.4%**	**5.3%**
Rail	**477.3**	**470.4**	**1.9%**	**1.8%**
Freight (Class I)	436.1	427.8	1.7%	1.6%
Passenger	41.2	42.7	0.2%	0.2%
Transit	14.5	14.6	0.1%	0.1%
Commuter	18.4	18.7	0.1%	0.1%
Intercity	8.4	9.4	0.0%	0.0%
HWY & NONHWY TOTAL	**25,767.6**	**26,101.6**	**100.0%**	**100.0%**
Off-highway[c]	**2,295.9**	**2,326.8**		

Source:
See Appendix A, Section 2. Energy Use Sources.

[a] Civilian consumption only. Totals may not include all possible uses of fuels for transportation (e.g., snowmobiles). Only end-use energy was counted for electricity.

[b] Two-axle, four-tire trucks.

[c] Includes equipment that does not travel on roads, such as equipment from agriculture, construction, and airports.

Light-duty trucks include pick-ups, minivans, sport-utility vehicles, and vans. See Table 1.15 for highway petroleum use in thousand barrels per day.

Table 2.9
Highway Transportation Energy Consumption by Mode, 1970–2023
(trillion Btu)

Year	Cars	Light-duty trucks	Light-duty vehicles subtotal	Motor-cycles	Buses	Class 3-6 trucks	Class 7-8 trucks	Heavy-duty trucks subtotal	Highway subtotal	Total transportation[a]
1970	8,479	1,539	10,018	7	129	333	1,220	1,553	11,707	15,192
1975	9,298	2,384	11,682	14	124	430	1,574	2,003	13,823	17,204
1980	8,800	2,975	11,775	26	143	929	1,757	2,686	14,630	18,760
1985	8,932	3,413	12,345	23	153	986	1,897	2,883	15,404	19,017
1990	8,688	4,451	13,139	24	167	891	2,442	3,334	16,664	21,383
1991	8,029	4,774	12,803	23	177	895	2,507	3,402	16,405	20,985
1992	8,169	5,117	13,286	24	184	897	2,570	3,468	16,962	21,646
1993	8,368	5,356	13,724	25	183	906	2,671	3,577	17,509	22,125
1994	8,470	5,515	13,985	26	182	936	2,842	3,778	17,971	22,729
1995	8,489	5,695	14,184	25	183	954	2,983	3,937	18,329	23,263
1996	8,634	5,917	14,551	24	186	958	3,088	4,045	18,806	23,773
1997	8,710	6,169	14,879	25	192	945	3,141	4,086	19,182	24,126
1998	8,936	6,303	15,239	26	196	967	3,251	4,218	19,679	24,461
1999	9,134	6,602	15,736	26	202	1,054	3,584	4,638	20,602	25,760
2000	9,100	6,607	15,707	26	208	1,085	3,734	4,819	20,760	26,071
2001	9,161	6,678	15,839	24	196	1,074	3,738	4,813	20,872	25,741
2002	9,391	6,883	16,274	24	191	1,114	3,921	5,035	21,524	26,329
2003	9,255	7,551	16,806	24	190	1,074	3,822	4,896	21,917	26,511
2004	9,331	7,861	17,192	25	194	988	3,551	4,539	21,950	26,968
2005	9,579	7,296	16,875	24	196	1,099	3,994	5,094	22,189	27,379
2006	9,316	7,550	16,866	28	198	1,113	4,088	5,201	[b] 22,293	27,554
2007	9,221	7,679	16,900	59	195	1,374	5,098	6,472	23,627	29,016
2008	8,831	7,572	16,404	61	199	1,377	5,164	6,541	23,206	28,380
2009	8,209	7,635	15,843	60	199	1,268	4,809	6,077	22,180	26,894
2010	7,657	7,971	15,628	53	190	1,278	4,900	6,178	22,050	26,968
2011	7,336	8,104	15,440	53	194	1,193	4,626	5,819	21,508	26,377
2012	7,121	8,180	15,301	61	200	1,182	4,633	5,815	21,378	25,988
2013	7,048	8,077	15,125	58	204	1,198	4,749	5,947	21,336	25,894
2014	6,893	8,448	15,340	57	206	1,208	4,840	6,047	21,653	25,978
2015	6,718	8,655	15,374	56	210	1,190	4,821	6,011	21,653	26,118
2016	6,582	8,892	15,474	58	214	1,211	4,962	6,173	21,921	26,524
2017	6,346	8,983	15,329	57	220	1,229	5,093	6,322	21,931	26,655
2018	6,223	8,980	15,202	57	226	1,230	5,156	6,385	21,873	26,899
2019	5,911	9,239	15,151	56	224	1,199	5,084	6,283	21,716	26,760
2020	5,035	8,178	13,213	51	190	1,102	4,728	5,830	19,286	23,198
2021	5,162	8,987	14,149	56	198	1,228	5,330	6,558	20,961	25,530
2022	4,996	9,213	14,209	68	213	1,171	5,082	6,254	20,743	25,767
2023	4,786	9,530	14,316	57	209	1,199	5,201	6,400	20,982	26,102
						Average annual percentage change				
1970-2023	-1.1%	3.5%	0.7%	4.0%	0.9%	2.4%	2.8%	2.7%	1.1%	1.0%
2013-2023	-3.8%	1.7%	-0.5%	-0.2%	0.2%	0.0%	0.9%	0.7%	-0.2%	0.1%

Note: Totals may not add due to rounding.

Source:
See Appendix A, Section 2.1 Highway Energy Use.

[a] Total transportation figures do not include military and off-highway energy use and may not include all possible uses of fuel for transportation (e.g., snowmobiles). Only end-use energy was counted for electricity.

[b] Due to changes in the FHWA fuel use methodology, motorcycle, bus, and heavy-duty truck data are not comparable with data before the year 2007. Car and light-duty truck data changed after 2008; see Appendix A for car/light-duty truck shares.

About 19% of transportation energy use was for nonhighway modes in 2023. Air travel accounted for 48% of nonhighway energy use in 2023. See Table 1.16 for nonhighway petroleum use in thousand barrels per day.

Table 2.10
Nonhighway Transportation Energy Consumption by Mode, 1970–2023
(trillion Btu)

Year	Air	Water	Pipeline	Rail	Nonhighway subtotal	Total transportation[a]
1970	1,287	836	826	537	3,486	15,192
1975	1,234	927	680	540	3,381	17,204
1980	1,434	1,393	734	570	4,130	18,760
1985	1,677	871	597	468	3,613	19,017
1990	2,046	1,442	760	471	4,719	21,383
1991	1,916	1,523	699	442	4,580	20,985
1992	1,945	1,599	685	455	4,684	21,646
1993	1,986	1,437	723	469	4,615	22,125
1994	2,075	1,394	787	502	4,758	22,729
1995	2,141	1,468	803	523	4,935	23,263
1996	2,206	1,411	814	536	4,967	23,773
1997	2,300	1,250	856	537	4,943	24,126
1998	2,275	1,232	735	540	4,782	24,461
1999	2,483	1,370	745	560	5,158	25,760
2000	2,554	1,455	742	559	5,311	26,071
2001	2,397	1,187	724	561	4,870	25,741
2002	2,229	1,246	768	563	4,805	26,329
2003	2,260	1,071	689	575	4,594	26,511
2004	2,456	1,293	662	607	5,018	26,968
2005	2,532	1,363	681	613	5,190	27,379
2006	2,511	1,442	681	626	5,260	27,554
2007	2,509	1,550	720	610	5,389	29,016
2008	2,396	1,444	748	586	5,174	28,380
2009	2,127	1,323	771	492	4,714	26,894
2010	2,149	1,460	775	533	4,918	26,968
2011	2,157	1,362	790	560	4,869	26,377
2012	2,077	1,148	835	549	4,610	25,988
2013	2,037	1,017	942	562	4,558	25,894
2014	2,060	876	803	587	4,326	25,978
2015	2,118	1,005	780	563	4,465	26,118
2016	2,178	1,116	789	520	4,603	26,524
2017	2,231	1,130	826	537	4,724	26,655
2018	2,359	1,120	987	560	5,026	26,899
2019	2,370	1,012	1,135	528	5,045	26,760
2020	1,496	819	1,139	459	3,912	23,198
2021	2,006	833	1,256	473	4,569	25,530
2022	2,316	848	1,383	477	5,024	25,767
2023	2,465	809	1,376	470	5,120	26,102
			Average annual percentage change			
1970-2023	1.2%	-0.1%	1.0%	-0.2%	0.7%	1.0%
2013-2023	1.9%	-2.3%	3.9%	-1.8%	1.2%	0.1%

Note: Totals may not add due to rounding.

Source:
See Appendix A, Section 2.3 Nonhighway Energy Use.

[a] Total transportation figures do not include military and off-highway energy use and may not include all possible uses of fuel for transportation (e.g., snowmobiles). Only end-use energy was counted for electricity.

The Environmental Protection Agency's MOVES model estimates fuel use for different types of nonroad equipment and off-highway vehicles. Most of these vehicles and equipment use diesel fuel. Recreational equipment, such as off-highway motorcycles, snowmobiles, and all-terrain vehicles, are mainly fueled by gasoline.

Table 2.11
Off-Highway Transportation-Related Fuel Consumption, 2023
(trillion Btu)

	Gasoline	Diesel	LPG	CNG	Total
Agricultural equipment *Tractors, mowers, combines, balers, and other farm equipment which has utility in its movement.*	8.0	519.6	0.0	1.5	529.2
Airport ground equipment	0.3	12.2	0.2	[a]	12.7
Construction and mining equipment *Pavers, rollers, drill rigs, graders, backhoes, excavators, cranes, mining equipment*	22.9	965.3	2.6	0.0	990.8
Industrial equipment *Forklifts, terminal tractors, sweeper/scrubbers*	57.5	303.7	265.1	38.9	665.2
Logging equipment *Feller/buncher/skidder*	1.0	18.2	[a]	[a]	19.2
Railroad maintenance equipment	0.2	3.6	0.0	[a]	3.8
Recreational equipment *Off-road motorcycles, snowmobiles, all-terrain vehicles, golf carts, specialty vehicles*	103.9	1.9	0.1	[a]	105.9
Total	194.0	1,824.3	268.1	40.4	2,326.8

Source:
Environmental Protection Agency, MOVES4.0.1, queried September 2025, www.epa.gov/moves.

[a] No equipment is listed for this fuel type.

In 2023, about one-quarter of the fuel used on the nation's roads was diesel fuel. The Federal Highway Administration (FHWA) cautions that data from 1993-on may not be directly comparable to earlier years.

Table 2.12
Highway Usage of Gasoline and Diesel, 1973–2023
(billion gallons)

Year	Total gasoline[a]	Diesel[b]	Percent diesel	Total highway fuel use
1973	100.6	9.8	8.9%	110.5
1975	99.4	9.6	8.8%	109.0
1980	101.2	13.8	12.0%	115.0
1985	103.6	17.8	14.6%	121.3
1990	110.2	21.4	16.3%	131.6
1991	107.9	20.7	16.1%	128.6
1992	111.0	22.0	16.5%	132.9
1993	113.7	23.5	17.1%	137.2
1994	115.0	25.1	17.9%	140.1
1995	117.1	26.2	18.3%	143.3
1996	119.5	27.2	18.5%	146.7
1997	120.9	29.4	19.6%	150.3
1998	124.7	30.2	19.5%	154.9
1999	128.7	31.9	19.9%	160.7
2000	128.9	33.4	20.6%	162.3
2001	129.7	33.4	20.5%	163.1
2002	133.0	34.8	20.7%	167.8
2003	134.1	35.5	20.9%	169.6
2004	136.5	37.4	21.5%	173.9
2005	135.2	39.1	22.4%	174.3
2006	134.8	40.1	22.9%	174.9
2007	135.4	40.7	23.1%	176.1
2008	132.2	38.6	22.6%	170.8
2009	132.9	35.3	21.0%	168.1
2010	133.1	36.6	21.6%	169.7
2011	131.5	37.1	22.0%	168.6
2012	130.9	37.4	22.2%	168.3
2013	131.3	38.4	22.6%	169.7
2014	136.5	39.7	22.5%	176.2
2015	132.2	40.5	23.5%	172.9
2016	136.3	41.6	23.4%	177.9
2017	135.3	42.7	24.0%	177.9
2018	137.2	43.5	24.1%	180.7
2019	136.1	43.9	24.4%	180.0
2020	117.3	41.9	26.3%	159.2
2021	128.9	45.2	26.0%	174.1
2022	140.7	45.2	24.3%	186.0
2023	131.7	45.1	25.5%	176.8
		Average annual percentage change		
1973-2023	0.5%	3.1%		0.9%
2013-2023	0.0%	1.6%		0.4%

Source:
U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics 2023*, Washington, DC, 2025, Table MF-27 and previous editions. (Additional resources: www.fhwa.dot.gov)

[a] Includes gasoline with ethanol up to 15%.
[b] Includes small quantities of other fuels, such as liquefied petroleum gas or E85.

Great care should be taken when comparing modal energy intensity data among modes. Because of the inherent differences among the transportation modes in the nature of services, routes available, and many additional factors, it is not possible to obtain truly comparable national energy intensities among modes. These values are averages, and there is a great deal of variability even within a mode.

Table 2.13
Passenger Travel and Energy Use, 2023[a]

	Number of vehicles (thousands)	Vehicle miles (millions)	Passenger-miles (millions)	Load factor (persons/ vehicle)	Energy intensities (Btu per vehicle-mile)	Energy intensities (Btu per passenger-mile)	Energy use (trillion Btu)
Cars	**96,901.6**	**1,180,421**	**1,712,605**	**1.5**	**4,054**	**2,795**	**4,786.0**
Personal trucks	**142,139.7**	**1,379,822**	**2,301,047**	**1.7**	**5,629**	**3,375**	**7,767.0**
Motorcycles	**9,516.9**	**20,181**	**20,704**	**1.0**	**2,843**	**2,772**	**57.4**
Demand response[b]	**68.8**	**1,430.9**	**1,247**	**0.9**	**16,886**	**19,373**	**24.2**
Buses	[c]	[c]	[c]	[c]	[c]	[c]	**208.8**
Transit	71.8	2,276	13,639	6.0	33,622	5,612	76.5
Intercity[d]	[c]	[c]	[c]	[c]	[c]	[c]	38.3
School[d]	967.5	[c]	[c]	[c]	[c]	[c]	93.9
Air	[c]	[c]	[c]	[c]	[c]	[c]	**1,998.9**
Certificated route[e]	[c]	6,011	774,031	128.8	287,714	2,234	1,729.5
General aviation	214.2	[c]	[c]	[c]	[c]	[c]	269.4
Recreational boats	**13,079.3**	[c]	[c]	[c]	[c]	[c]	217.9
Rail	**21.7**	**1,354**	**26,265**	**19.4**	**31,533**	**1,625**	**42.7**
Intercity (Amtrak)	0.4	199	6,056	30.4	47,278	1,556	9.4
Transit	13.5	786	12,917	16.4	18,508	1,127	14.6
Commuter	7.8	368	7,292	19.8	50,831	2,566	18.7

Source:
See Appendix A, Section 3. Passenger Travel and Energy Use.

[a] Only end-use energy was counted for electricity.

[b] Includes passenger cars, vans, and small buses operating in response to calls from passengers to the transit operator who dispatches the vehicles.

[c] Data are not available.

[d] Energy use is estimated.

[e] Only domestic service and domestic energy use are shown on this table. These energy intensities may be inflated because all energy use is attributed to passengers–cargo energy use is not taken into account.

Great care should be taken when comparing modal energy intensity data among modes. Because of the inherent differences among the transportation modes in the nature of services, routes available, and many additional factors, it is not possible to obtain truly comparable national energy intensities among modes. These values are averages, and there is a great deal of variability even within a mode.

Table 2.14
Energy Intensities of Highway Passenger Modes, 1970–2023[a]

	Cars		Light-duty trucks[b]		Transit Buses[c]	
Year	(Btu per vehicle-mile)	(Btu per passenger-mile)	(Btu per vehicle-mile)	(Btu per passenger-mile)	(Btu per vehicle-mile)	(Btu per passenger-mile)
1970	9,250	4,868	12,479	6,568	31,796	2,472
1975	8,993	4,733	11,879	6,496	33,748	2,814
1980	7,916	4,279	10,224	5,548	36,553	2,813
1985	7,164	4,110	8,730	4,737	38,876	3,423
1990	6,169	3,856	7,746	4,557	37,374	3,794
1995	5,902	3,689	7,208	4,505	36,936	4,271
1996	5,874	3,683	7,247	4,473	37,238	4,315
1997	5,797	3,646	7,251	4,421	38,622	4,407
1998	5,767	3,638	7,260	4,373	41,062	4,374
1999	5,821	3,684	7,327	4,361	40,351	4,320
2000	5,687	3,611	7,158	4,211	41,466	4,506
2001	5,626	3,583	7,080	4,116	38,320	4,123
2002	5,662	3,612	7,125	4,101	37,340	4,110
2003	5,535	3,537	7,673	4,374	36,900	4,191
2004	5,489	3,513	7,653	4,320	37,665	4,342
2005	5,607	3,594	7,009	3,919	37,244	4,229
2006	5,511	3,538	6,974	3,862	39,397	4,297
2007	5,513	3,546	6,904	3,787	39,748	4,352
2008	5,466	3,520	6,830	3,712	39,726	4,328
2009	5,239	3,380	7,159	3,895	39,073	4,233
2010	5,117	3,304	6,919	3,769	35,858	4,107
2011	5,032	3,252	6,795	3,706	37,648	4,232
2012	4,950	3,201	6,675	3,645	37,037	4,023
2013	4,874	3,155	6,557	3,585	37,273	4,052
2014	4,798	3,108	6,631	3,630	35,237	3,810
2015	4,648	3,013	6,487	3,556	36,322	4,059
2016	4,529	2,939	6,368	3,495	36,826	4,283
2017	4,456	2,893	6,182	3,397	36,468	4,535
2018	4,383	2,902	6,078	3,396	35,075	4,560
2019	4,301	2,905	5,962	3,389	34,877	4,634
2020	4,254	2,932	5,886	3,405	33,817	5,889
2021	4,189	2,948	5,848	3,444	33,220	7,949
2022	4,116	2,958	5,726	3,434	33,343	6,581
2023	4,054	2,914	5,610	3,364	33,622	5,612
			Average annual percentage change			
1970-2023	-1.5%	-1.0%	-1.5%	-1.3%	0.1%	1.6%
2013-2023	-1.8%	-0.8%	-1.5%	-0.6%	-1.0%	3.3%

Source:
See Appendix A, Section 4. Highway Passenger Mode Energy Intensities.

[a] Only end-use energy was counted for electricity.
[b] All two-axle, four-tire trucks.
[c] Series not continuous between 1983 and 1984 because of a change in data source by the American Public Transportation Association (APTA).

Great care should be taken when comparing modal energy intensity data among modes. Because of the inherent differences between the transportation modes in the nature of services, routes available, and many additional factors, it is not possible to obtain truly comparable national energy intensities among modes.

Table 2.15
Energy Intensities of Nonhighway Passenger Modes, 1970–2023[a]

	Air	Rail		
Year	Certificated air carriers[b] (Btu per passenger-mile)	Intercity Amtrak (Btu per passenger-mile)	Rail transit (Btu per passenger-mile)	Commuter rail (Btu per passenger-mile)
1970	10,115	[c]	712	[c]
1975	7,625	3,311	866	[c]
1980	5,561	2,859	763	[c]
1985	5,053	2,237	927	1,720
1990	4,797	2,052	998	1,622
1995	4,349	2,071	1,102	1,580
1996	4,199	2,194	996	1,541
1997	4,173	2,289	943	1,630
1998	3,987	2,246	931	1,612
1999	4,108	2,362	919	1,670
2000	3,960	2,651	923	1,542
2001	3,943	2,690	925	1,533
2002	3,718	2,537	948	1,542
2003	3,614	2,145	936	1,542
2004	3,505	2,068	907	1,536
2005	3,346	2,025	919	1,658
2006	3,250	1,948	893	1,539
2007	3,153	1,824	851	1,543
2008	3,055	1,745	832	1,579
2009	2,901	1,773	830	1,714
2010	2,825	1,668	832	1,753
2011	2,772	1,628	812	1,681
2012	2,633	1,561	791	1,703
2013	2,568	1,608	793	1,676
2014	2,506	1,629	786	1,638
2015	2,477	1,589	777	1,661
2016	2,449	1,551	761	1,705
2017	2,415	1,524	788	1,657
2018	2,398	1,579	844	1,580
2019	2,360	1,506	851	1,583
2020	3,739	3,074	1,437	3,294
2021	2,719	1,989	1,715	5,054
2022	2,420	1,641	1,295	2,984
2023	2,364	1,556	1,127	2,566
		Average annual percentage change		
1970-2023	-2.7%	-1.5%[d]	0.9%	0.7%[d]
2013-2023	-0.8%	-0.3%	3.6%	4.3%

Source:
See Appendix A, Section 5. Nonhighway Passenger Mode Energy Intensities.

[a] Only end-use energy was counted for electricity.
[b] These data differ from the data on Table 2.13 because they include half of international services. These energy intensities may be inflated because all energy use is attributed to passengers–cargo energy use is not taken into account.
[c] Data are not available.
[d] Average annual percentage calculated to earliest year possible.

Great care should be taken when comparing modal energy intensity data among modes. Because of the inherent differences between the transportation modes in the nature of services, routes available, and many additional factors, it is not possible to obtain truly comparable national energy intensities among modes.

Table 2.16
Energy Intensities of Freight Modes, 1970–2023

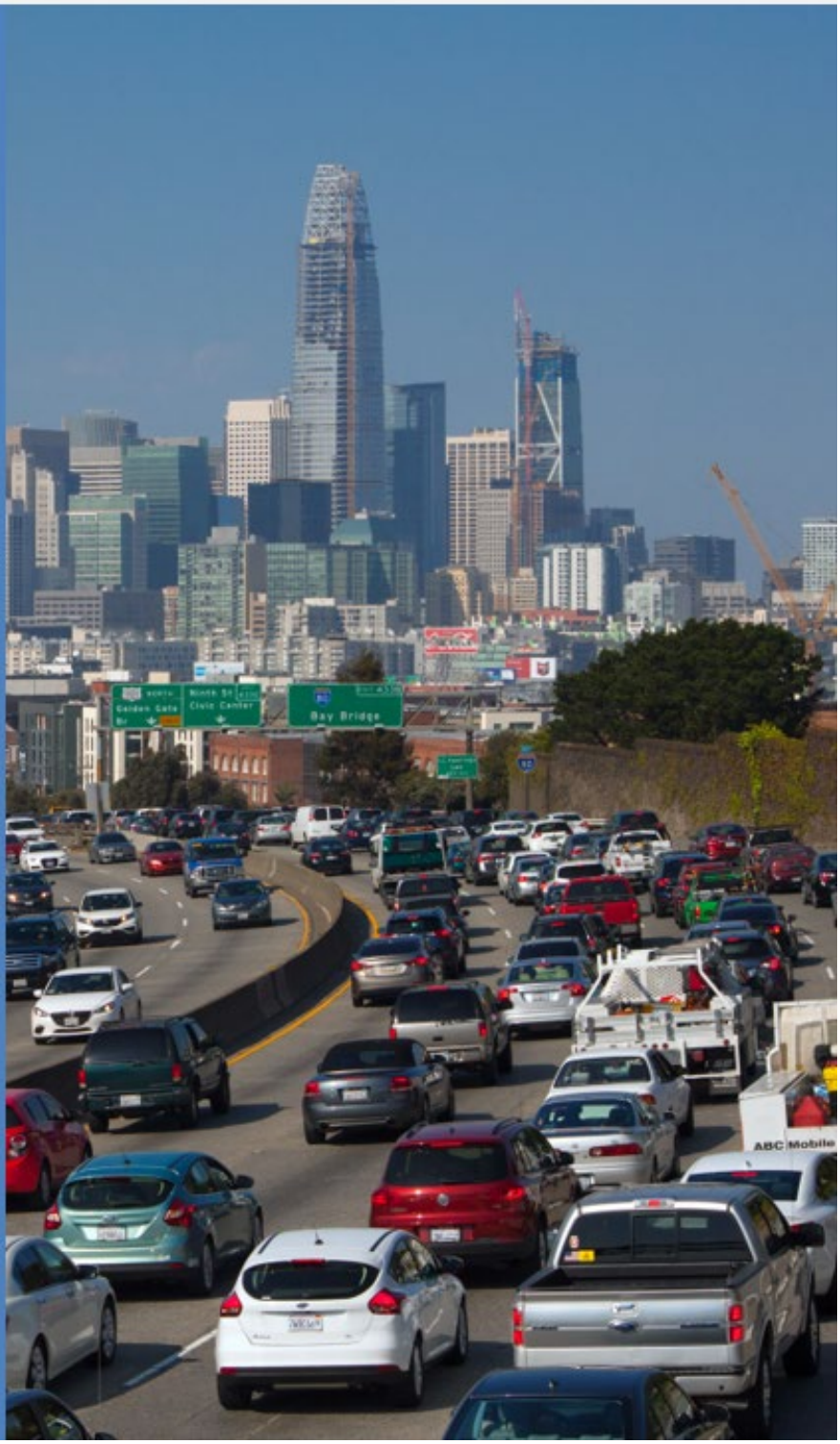
Year	Heavy single-unit and combination trucks (Btu per vehicle-mile)	Class I freight railroad (Btu per freight car-mile)	Class I freight railroad (Btu per ton-mile)	Waterborne commerce on taxable waterways (Btu per ton-mile)
1970	24,960	17,669	691	[a]
1975	24,631	18,739	687	[a]
1980	24,758	18,742	597	[a]
1985	23,343	17,500	497	[a]
1990	22,795	16,619	420	[a]
1991	22,749	15,835	391	[a]
1992	22,609	16,043	393	[a]
1993	22,373	16,056	389	[a]
1994	22,193	16,340	388	[a]
1995	22,097	15,992	372	[a]
1996	22,109	15,747	368	[a]
1997	21,340	15,784	370	266
1998	21,516	15,372	365	256
1999	22,884	15,363	363	266
2000	23,449	14,917	352	270
2001	23,024	15,108	346	253
2002	23,462	15,003	345	253
2003	22,470	15,016	344	251
2004	20,556	15,274	341	241
2005	22,892	15,152	337	241
2006	23,375[b]	14,990	330	235
2007	28,505	14,846	320	225
2008	28,760	14,573	305	252
2009	21,080	13,907	291	225
2010	21,564	13,733	289	217
2011	21,750	14,043	298	211
2012	21,605	13,800	294	211
2013	21,629	14,607	296	233
2014	21,671	14,533	292	214
2015	21,487	14,405	297	[a]
2016	21,448	14,557	299	[a]
2017	21,251	14,400	293	[a]
2018	20,952	14,644	296	[a]
2019	20,946	14,453	298	[a]
2020	19,594	14,175	289	[a]
2021	20,053	13,960	282	[a]
2022	18,878	14,119	284	[a]
2023	19,402	14,004	286	[a]
		Average annual percentage change		
1970-2023	-0.5%	-0.4%	-1.6%	[a]
2013-2023	-1.1%	-0.4%	-0.3%	[a]

Source:
See Appendix A, Section 6. Freight Mode Energy Intensities.

[a] Data are not available.
[b] Due to changes in the FHWA fuel use methodology, truck data are not comparable with data before the year 2007.

ALL HIGHWAY VEHICLES & CHARACTERISTICS

Chapter 3



Credit: Lightvision, LLC/Moment

The top countries producing the world's cars and trucks have changed over the last 23 years. In 2023, China was the largest producer of cars and trucks. In 2000, Japan produced the most cars, and the United States produced the most trucks (includes light-duty trucks). The United States was the second largest producer of trucks in 2023 and the seventh largest producer of cars.

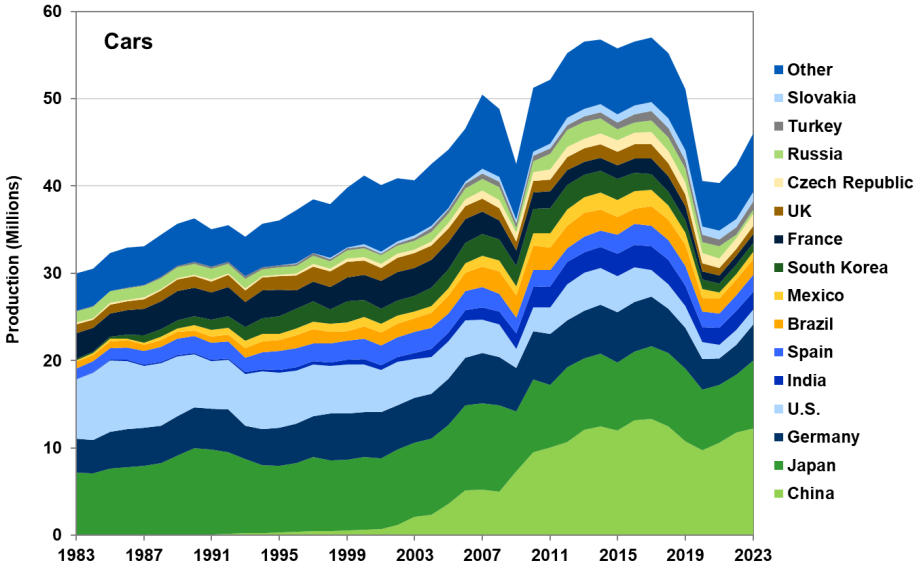
Table 3.1
World Production of Cars and Trucks, 2000 and 2023
(thousands)

Cars	2000	2023	Percent change 2000-2023
China	605	12,258	1927%
Japan	8,363	7,767	-7%
Germany	5,132	4,100	-20%
India	605	2,035	236%
Spain	2,366	1,907	-19%
Brazil	1,362	1,782	31%
U.S.	5,542	1,741	-69%
Czech Republic	428	1,398	226%
Slovakia	123	1,060	762%
France	2,880	1,027	-64%
South Korea	1,881	1,026	-45%
All other countries	11,941	9,895	-17%
Total World	41,229	45,995	12%
Trucks[a]	2000	2023	Percent change 2000-2023
China	1,464	17,886	1121%
U.S.	7,263	8,899	23%
India	283	3,809	1244%
South Korea	513	3,218	527%
Mexico	792	3,104	292%
Japan	1,781	1,239	-30%
Thailand	315	1,198	280%
Canada	1,411	1,177	-17%
All other countries	3,893	5,392	39%
Total World	17,717	45,921	159%

Source:
Ward's Communications, www.wardsauto.com, 2025.

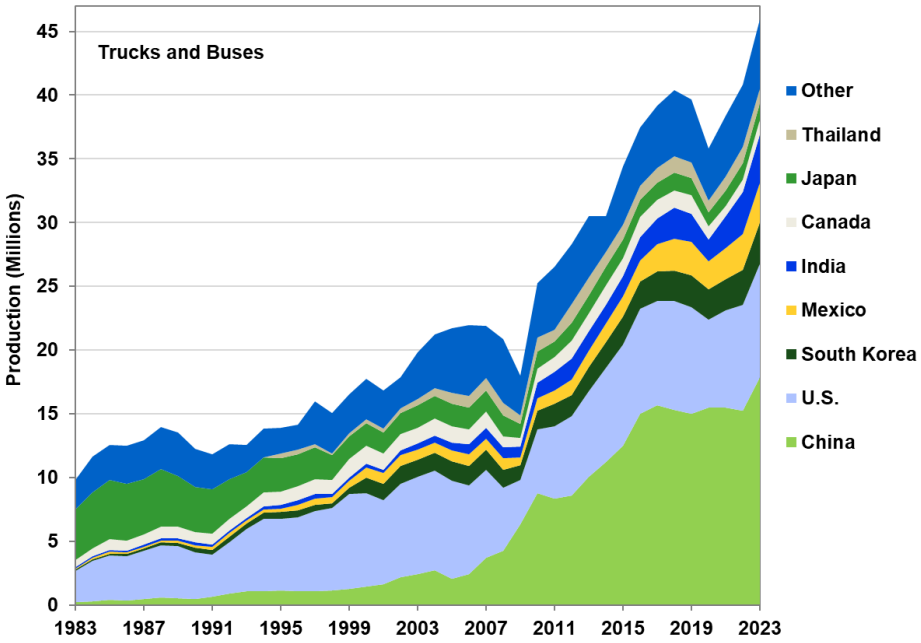
[a] Includes light-duty trucks, heavy-duty trucks, and buses.

Figure 3.1. World Car Production, 1983–2023[a]



Source:
Ward's Communications, www.wardsauto.com, 2025.

Figure 3.2. World Truck and Bus Production, 1983–2023[a]



Source:
Ward's Communications, www.wardsauto.com, 2025.

[a] Note that the scales of the two figures differ.

Use caution comparing historical data because of disconnects in data series and definitional differences among countries. The United States uses light-duty trucks (SUVs, minivans, pickups) for personal travel which are not counted as cars in this table. China's light-duty trucks were not counted in this table until 2014, when a reclassification of vehicle types added them as cars. The U.S. share of world cars was less than 10% in 2023. The growth in the World total comes mainly from countries, like China, Indonesia, India, Malaysia, Pakistan and South Korea.

Table 3.2
Car Registrations for Selected Countries, 1960–2023
(thousands)

Country	1960	1970	1980	1990	2000	2010	2020	2023	Average annual percentage change 1990-2023
Argentina	474	1,482	3,112	4,284	5,060	7,605	10,617	10,793	2.8%
Brazil	[a]	[a]	[a]	12,127	15,393	25,541	37,862	39,987	3.7%
Canada[b]	4,104	6,602	10,256	12,622	16,832	20,121	9,683	9,342	-0.9%
China[c]	[a]	[a]	351	1,897	3,750	34,430	226,914	259,353	16.1%
France	4,950	11,860	18,440	23,550	28,060	31,300	38,481	38,872	1.5%
Germany[d]	4,856	14,376	23,236	35,512	43,772	42,302	48,249	49,099	1.0%
India	[a]	[a]	[a]	2,300	5,150	13,300	38,189	43,955	9.4%
Indonesia	[a]	[a]	[a]	1,200	[a]	8,891	15,804	18,285	8.6%
Japan	457	8,779	23,660	34,924	52,437	58,347	62,194	63,451	1.8%
Malaysia	[a]	[a]	[a]	1,811	4,213	9,115	15,241	17,266	7.1%
Pakistan	[a]	[a]	[a]	738	375	1,726	3,834	4,388	5.6%
Russia	[a]	[a]	[a]	[a]	20,353	34,350	56,001	59,256	[a]
South Korea	[a]	[a]	[a]	2,075	8,084	13,632	19,861	20,944	7.3%
United Kingdom	5,650	11,802	15,438	22,528	27,185	31,258	35,083	35,695	1.4%
United States	61,671	89,244	121,601	143,550	127,721	129,053	116,261	115,217	-0.7%
U.S. percentage of world	62.7%	46.1%	38.0%	32.3%	23.3%	17.8%	10.6%	9.8%	-3.5%
World total	98,305	193,479	320,390	444,900	548,558	723,567	1,097,627	1,175,650	3.0%

Source:
Ward's Communications, www.wardsauto.com, 2025.

[a] Data are not available.
[b] Data from 2000 and later are not comparable to prior data. Canada reclassified autos and trucks prior to 2000.
[c] Light-duty trucks were reclassified into the car category in 2014.
[d] Data for 1990 and prior include West Germany only. Kraftwagen are included with automobiles.

Use caution comparing historical data because of disconnects in data series and definitional differences among countries. The United States totals include SUVs, minivans, and light-duty trucks, many of which are used for personal travel. Thus, countries that only use trucks for freight movement will not be comparable to the United States. China's light-duty trucks were included in this table until a reclassification in 2014.

Table 3.3
Truck and Bus Registrations for Selected Countries, 1960–2023
(thousands)

Country	1960	1970	1980	1990	2000	2010	2020	2023	Average annual percentage change 1990-2023
Argentina	392	788	1,217	1,501	1,554	2,511	3,408	3,496	2.6%
Brazil	[a]	[a]	[a]	936	3,917	6,524	7,860	8,145	6.8%
Canada[b]	1,056	1,481	2,955	3,931	739	933	15,308	16,697	4.5%
China[c]	[a]	[a]	1,480	4,314	9,650	43,590	46,476	60,578	8.3%
France	1,650	1,850	2,550	4,910	5,733	6,444	6,958	5,591	0.4%
Germany[d]	786	1,228	1,617	2,764	3,534	2,960	4,027	4,403	1.4%
India	[a]	[a]	[a]	2,050	2,390	9,500	30,791	38,693	9.3%
Indonesia	[a]	[a]	[a]	1,391	2,373	6,938	5,324	6,362	4.7%
Japan	896	8,803	14,197	22,773	20,211	15,512	16,268	14,177	-1.4%
Malaysia	[a]	[a]	[a]	616	1,030	1,138	1,510	1,692	3.1%
Pakistan	[a]	[a]	[a]	172	385	538	549	732	4.5%
Russia	[a]	[a]	[a]	7,200	5,041	6,304	9,231	9,615	0.9%
South Korea	[a]	[a]	[a]	1,320	3,956	4,310	4,505	5,180	4.2%
United Kingdom	1,534	1,769	1,920	3,774	3,361	4,220	5,268	5,710	1.3%
United States	12,186	19,175	34,195	45,106	85,579	119,179	172,776	189,496	4.4%
U.S. percentage of world	42.6%	36.2%	37.7%	32.7%	42.1%	38.5%	40.1%	39.5%	
World total	28,583	52,899	90,592	138,082	203,272	309,395	431,057	479,418	3.8%

Source:
Ward's Communications, www.wardsauto.com, 2025.

[a] Data are not available.
[b] Data from 2000 and later are not comparable to prior data. Canada reclassified autos and trucks prior to 2000.
[c] Light-duty trucks were reclassified into the car category in 2014.
[d] Data for 1990 and prior include West Germany only. Kraftwagen are included with automobiles.

The graphs below show the number of motor vehicles per thousand people for various countries. The data for the United States are displayed in the line which goes from 1900 to 2023. The points labeled on that line show data for the other countries/regions around the world and how their vehicles per thousand people compare to the United States at two different points in time, 2013 and 2023. For example, the graph shows that in 2013, Eastern Europe's vehicles per thousand people was about where the United States was in 1951, but by 2023 it is about where the United States was in 1965. The lower part of the graph (1900-1940) is shown enlarged on the facing page.

Figure 3.3. Vehicles per Thousand People: U.S. (Over Time) Compared to Other Countries (in 2013 and 2023)

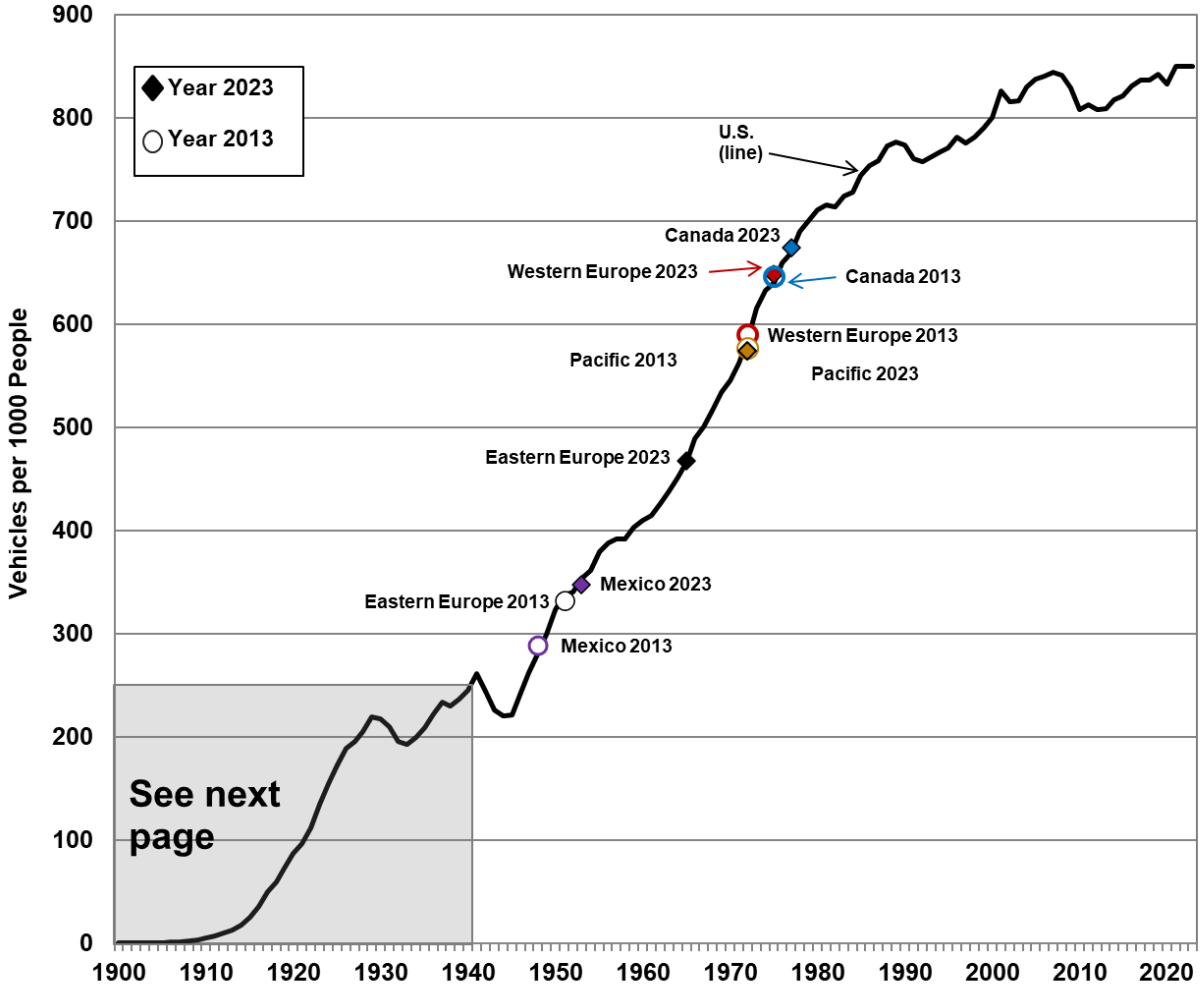
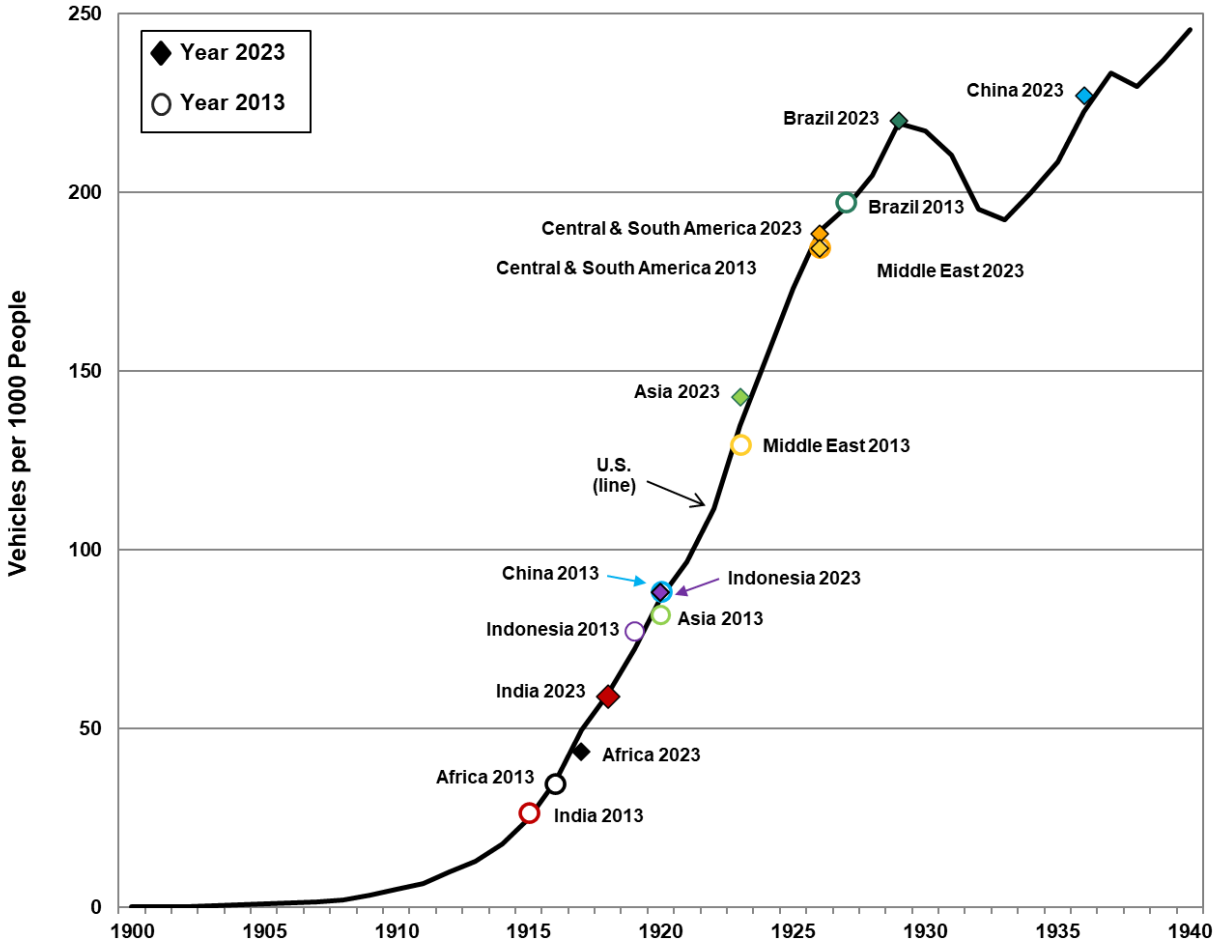


Figure 3.4. Inset for Vehicles per Thousand People: U.S. (Over Time) Compared to Other Countries (in 2013 and 2023)



Source:
See Tables 3.4 and 3.5.

Though some countries are listed separately in this table, those countries are also included in the regional total. For instance, China is listed separately, but is also included in the Asia, Far East region.

Table 3.4
Vehicles per Thousand People in Selected Countries/Regions, 2013 and 2023

	Vehicles per 1,000 people	
Country/Region	**2013**	**2023**
Africa	34.6	43.6
Asia, Far East	81.9	142.7
Asia, Middle East	129.5	184.4
Brazil	197.5	220.1
Canada	646.1	674.1
Central & South America	184.6	188.5
China	88.6	227.0
Europe, East	332.4	467.7
Europe, West	589.6	648.8
India	26.6	59.1
Indonesia	77.2	88.2
Mexico	289.3	347.6
Pacific	576.2	573.8
United States	809.1	849.8

Sources:
2023 population – U.S. Census Bureau, Population Division, International Data Base (IDB) World, March 2025. (Additional resources: www.census.gov/programs-surveys/international-programs)
2023 vehicles – United States: See Table 3.5. All other countries: Ward's Communications, www.wardsauto.com, 2025.
2013 data – Oak Ridge National Laboratory, *Transportation Energy Data Book: Edition 34*, ORNL-6991, 2015.

The number of vehicles per thousand people in the United States has grown tremendously since 1900. After a peak in 2007 at 844.5, the number declined but began rising again in 2013. By 2021, the number surpassed the earlier peak and has remained over 849 vehicles per thousand people in the United States since.

Table 3.5
Vehicles per Thousand People in the United States, 1900–2023

Year	U.S. vehicles per 1,000 people	Year	U.S. vehicles per 1,000 people	Year	U.S. vehicles per 1,000 people	Year	U.S. vehicles per 1,000 people	Year	U.S. vehicles per 1,000 people
1900	0.1	1925	173.3	1950	323.7	1975	640.1	2000	800.3
1901	0.2	1926	189.1	1951	337.1	1976	659.5	2001	825.8
1902	0.3	1927	195.8	1952	340.6	1977	669.0	2002	815.7
1903	0.4	1928	204.9	1953	353.7	1978	690.2	2003	816.1
1904	0.7	1929	219.3	1954	361.4	1979	700.4	2004	829.9
1905	0.9	1930	217.3	1955	379.8	1980	710.7	2005	837.2
1906	1.3	1931	210.4	1956	387.6	1981	715.2	2006	840.7
1907	1.6	1932	195.4	1957	392.1	1982	714.0	2007	844.5
1908	2.2	1933	192.4	1958	392.2	1983	724.3	2008	841.6
1909	3.4	1934	199.9	1959	402.8	1984	728.2	2009	828.7
1910	5.1	1935	208.6	1960	410.4	1985	744.5	2010	808.4
1911	6.8	1936	222.6	1961	415.1	1986	753.3	2011	812.5
1912	9.9	1937	233.3	1962	426.1	1987	758.6	2012	807.8
1913	12.9	1938	229.6	1963	438.7	1988	772.9	2013	809.1
1914	17.8	1939	236.9	1964	451.6	1989	777.0	2014	817.1
1915	24.8	1940	245.6	1965	466.9	1990	773.4	2015	821.1
1916	35.5	1941	261.6	1966	489.3	1991	760.2	2016	831.2
1917	49.6	1942	244.7	1967	500.7	1992	758.0	2017	836.6
1918	59.7	1943	225.9	1968	516.5	1993	761.9	2018	836.3
1919	72.5	1944	220.2	1969	533.4	1994	766.9	2019	842.3
1920	86.8	1945	221.8	1970	545.3	1995	771.0	2020	832.3
1921	96.7	1946	243.1	1971	562.5	1996	781.2	2021	849.9
1922	111.5	1947	262.6	1972	585.6	1997	776.0	2022	850.4
1923	134.9	1948	280.2	1973	615.2	1998	781.2	2023	849.8
1924	154.4	1949	299.6	1974	632.3	1999	790.1		

Sources:
Population – U.S. Census Bureau, Population Division, International Data Base (IDB) World, March 2025. (Additional resources: www.census.gov/programs-surveys/international-programs.html)
Vehicles – U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics 2023,* Washington, DC, 2025. (Additional resources: www.fhwa.dot.gov)

The Federal Highway Administration publishes the number of motor vehicle registrations by vehicle type each year. Trucks include pickups, SUVs, and vans in addition to medium-duty and heavy-duty trucks. The total number of registered vehicles in 2023 is nearly 285 million vehicles.

Table 3.6
U.S. Motor Vehicle Registrations, 1970–2023
(thousands)

Year	Cars	Motorcycles	Buses	Trucks	Total
1970	89,243	2,824	378	18,797	111,242
1975	106,706	4,964	462	25,781	137,913
1980	121,601	5,694	529	33,667	161,490
1985	127,885	5,444	593	43,210	177,133
1986	130,004	5,199	594	45,103	180,899
1987	131,482	4,886	602	46,826	183,796
1988	133,836	4,584	616	49,941	188,977
1989	134,559	4,420	625	52,172	191,777
1990	133,700	4,259	627	54,470	193,057
1991	128,300	4,177	631	59,206	192,314
1992	126,581	4,065	645	63,136	194,427
1993	127,327	3,978	654	66,082	198,041
1994	127,883	3,757	670	69,491	201,802
1995	128,387	3,767	686	72,458	205,297
1996	129,728	3,871	697	75,940	210,236
1997	129,749	3,826	698	77,307	211,580
1998	131,839	3,879	716	79,062	215,496
1999	132,432	4,152	729	83,148	220,461
2000	133,621	4,346	746	87,108	225,821
2001	137,633	4,903	750	92,045	235,331
2002	135,921	5,004	761	92,939	234,625
2003	135,670	5,370	777	94,944	236,760
2004	136,431	5,781	795	100,017	243,024
2005	136,568	6,227	807	103,819	247,421
2006	135,400	6,679	822	107,944	250,845
2007	135,933	7,138	834	110,497	254,403
2008	137,080	7,753	843	110,242	255,918
2009	134,880	7,930	842	110,561	254,213
2010	130,892	8,010	846	110,322	250,070
2011	125,657	8,438	666	118,483	253,244
2012	111,290	8,455	765	133,130	253,639
2013	113,676	8,405	865	132,931	255,876
2014	113,899	8,418	872	137,531	260,720
2015	112,864	8,601	889	141,256	263,610
2016	112,961	8,679	976	146,182	268,799
2017	111,177	8,664	983	149,301	270,126
2018	111,242	8,660	992	152,702	273,596
2019	108,548	8,596	995	158,352	276,491
2020	105,135	8,347	1,010	161,443	275,936
2021	102,724	9,425	944	168,093	281,185
2022	99,666	9,186	958	172,364	282,175
2023	96,902	9,517	968	177,228	284,614
			Average annual percentage change		
1970-2023	0.2%	2.3%	1.8%	4.3%	1.8%
2013-2023	-1.6%	1.3%	1.1%	2.9%	1.1%

Sources:
1970-2008: FHWA, U.S. Department of Transportation, *Highway Statistics (annual editions through 2008), Table VM-1 2008*
2009-2023: FHWA, Highway Statistics 2009-2023 editions, Tables MV-1, and MV-9
(Additional resources: www.fhwa.dot.gov)

While California and Texas have the largest number of trucks registered, North Dakota, Alaska, and Wyoming have the largest share of trucks to total vehicle registrations (each over 75%).

Table 3.7
Motor Vehicle Registrations by State and Vehicle Type, 2023
(thousands)

State	Cars	Motorcycles	Trucks[a]	Buses	All Motor Vehicles
Alabama	1,922	124	3,397	3	5,447
Alaska	129	26	518	9	681
Arizona	2,272	285	3,868	22	6,447
Arkansas	935	101	2,292	11	3,338
California	13,428	776	16,758	96	31,057
Colorado	1,402	178	3,619	13	5,212
Connecticut	1,089	86	1,653	10	2,837
Delaware	155	25	263	3	445
Dist. of Columbia	176	4	156	8	344
Florida	7,450	627	11,385	59	19,520
Georgia	3,289	220	5,648	39	9,196
Hawaii	436	25	799	2	1,263
Idaho	542	65	1,448	2	2,058
Illinois	3,531	276	6,293	40	10,140
Indiana	1,762	203	3,778	32	5,775
Iowa	1,042	193	2,583	9	3,828
Kansas	767	86	1,619	2	2,473
Kentucky	1,517	94	2,929	11	4,551
Louisiana	1,408	106	2,975	34	4,522
Maine	375	51	939	1	1,367
Maryland	1,972	101	2,846	16	4,935
Massachusetts[b]	1,842	144	3,238	15	5,239
Michigan	2,714	272	6,920	2	9,907
Minnesota	1,664	226	3,944	14	5,848
Mississippi	789	31	1,401	9	2,229
Missouri	1,735	136	3,611	23	5,505
Montana	495	423	1,433	5	2,357
Nebraska[b]	578	51	1,337	9	1,974
Nevada	991	78	1,605	7	2,682
New Hampshire	415	86	901	3	1,405
New Jersey	2,272	141	3,554	25	5,992
New Mexico	601	57	1,244	7	1,909
New York	2,827	1,034	5,419	82	9,362
North Carolina	3,083	190	5,447	33	8,753
North Dakota	221	44	793	4	1,061
Ohio	3,915	422	6,871	34	11,242
Oklahoma[b]	1,013	140	2,256	2	3,411
Oregon	1,348	143	2,722	18	4,230
Pennsylvania	3,603	363	6,846	54	10,866
Rhode Island	322	25	474	2	822
South Carolina	1,866	125	3,278	14	5,283
South Dakota	294	145	924	23	1,385
Tennessee	2,270	204	4,455	22	6,951
Texas	7,501	333	15,579	64	23,477
Utah	981	211	1,884	8	3,085
Vermont	165	34	429	1	629
Virginia	2,914	192	4,779	36	7,922
Washington	2,604	212	4,607	21	7,444
West Virginia[b]	422	50	1,044	0	1,516
Wisconsin	1,684	324	3,784	9	5,801
Wyoming	176	28	685	1	891
Total	96,902	9,517	177,228	968	284,614

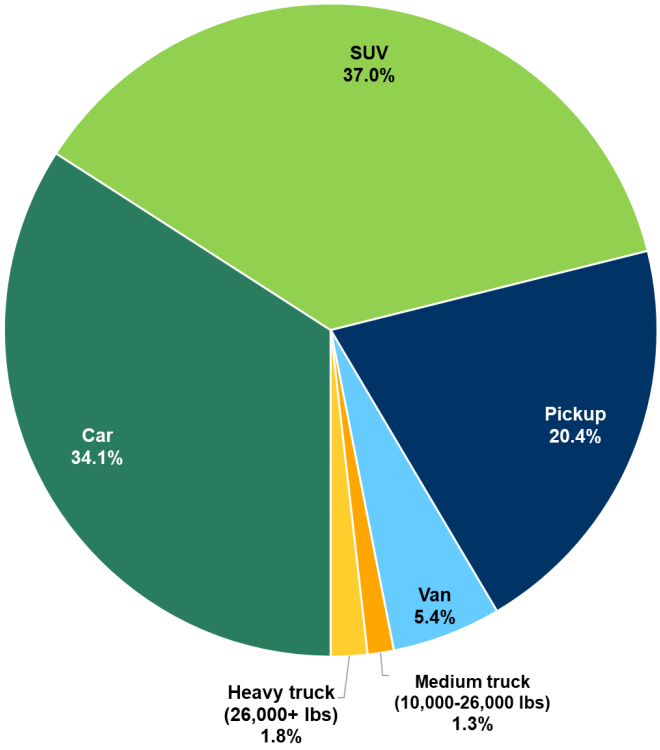
Source:
U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics 2023*, Washington, DC, 2025, Tables MV-1 and MV-9. (Additional resources: www.fhwa.dot.gov)

[a] Includes pickups, vans, sport-utility vehicles and other light-duty trucks in addition to medium/heavy trucks.

[b] Estimated by FHWA based on State reported data or data from secondary sources.

There were more sport utility vehicles (SUV) in the United States than any other vehicle type in 2023 (37%). Cars were the next largest at 34%, with pickups at 20%.

Figure 3.5. Share of Vehicle Population by Vehicle Type, 2023



Source:
Data analyzed by Argonne National Laboratory from Experian Automotive Vehicles in Operation Data, December 31, 2023.

In 2023, 10% of the heavy truck population and 9% of the SUV population were less than 1 year old.

Table 3.8
Vehicle Population Share by Vehicle Age, 2023

	Car		SUV		Pickup		Van		Medium truck (10,000-26,000 lb)		Heavy truck (26,000+ lb)	
Age	Share	Cumulative	Share	Cumulative	Share	Cumulative	Share	Cumulative	Percentage	Cumulative	Percentage	Cumulative
< 1	3.4%	3.4%	9.2%	9.2%	4.3%	4.3%	4.1%	4.1%	5.7%	5.7%	10.1%	10.1%
1	2.7%	6.2%	6.7%	15.9%	4.8%	9.1%	3.5%	7.6%	6.0%	11.7%	4.8%	14.9%
2	2.8%	9.0%	7.3%	23.2%	4.4%	13.6%	3.5%	11.1%	4.5%	16.2%	3.7%	18.6%
3	3.4%	12.4%	6.7%	30.0%	4.1%	17.7%	4.0%	15.1%	5.0%	21.1%	5.7%	24.4%
4	4.2%	16.6%	7.3%	37.3%	5.3%	23.0%	5.5%	20.7%	7.1%	28.3%	5.5%	29.9%
5	4.7%	21.3%	7.0%	44.3%	4.6%	27.6%	4.7%	25.4%	4.8%	33.0%	4.4%	34.3%
6	5.5%	26.9%	6.7%	51.0%	4.4%	32.1%	5.6%	30.9%	5.7%	38.7%	3.8%	38.1%
7	5.7%	32.5%	5.9%	56.9%	4.2%	36.2%	5.5%	36.4%	5.3%	44.0%	5.2%	43.3%
8	6.2%	38.7%	5.6%	62.4%	4.1%	40.3%	5.2%	41.6%	4.2%	48.1%	4.4%	47.7%
9	5.9%	44.6%	4.4%	66.9%	3.6%	43.9%	4.9%	46.6%	3.4%	51.5%	3.4%	51.1%
10	6.1%	50.8%	3.9%	70.8%	3.1%	47.0%	4.0%	50.6%	3.0%	54.6%	3.2%	54.3%
11	5.3%	56.1%	3.2%	74.0%	2.8%	49.8%	4.4%	55.0%	3.5%	58.1%	2.9%	57.2%
12	4.0%	60.1%	3.2%	77.2%	2.9%	52.7%	3.4%	58.4%	2.6%	60.7%	1.8%	59.0%
13	4.0%	64.2%	2.4%	79.6%	2.2%	54.9%	3.2%	61.6%	1.2%	61.9%	1.5%	60.5%
14	3.5%	67.7%	1.6%	81.2%	1.7%	56.6%	2.1%	63.8%	1.4%	63.4%	1.9%	62.4%
15	4.1%	71.8%	2.6%	83.8%	3.1%	59.7%	3.9%	67.7%	3.1%	66.5%	1.6%	64.0%
16	4.1%	75.9%	2.6%	86.4%	3.3%	63.1%	3.7%	71.4%	3.6%	70.1%	4.0%	68.0%
17	3.6%	79.5%	2.0%	88.4%	3.6%	66.7%	4.7%	76.0%	4.1%	74.2%	3.0%	71.1%
18	3.2%	82.7%	2.0%	90.4%	3.5%	70.1%	4.3%	80.3%	3.0%	77.2%	2.8%	73.9%
19	2.5%	85.2%	2.0%	92.4%	3.7%	73.9%	2.9%	83.2%	2.9%	80.1%	1.9%	75.8%
20	2.3%	87.5%	1.6%	94.0%	3.3%	77.1%	2.5%	85.8%	2.4%	82.4%	1.7%	77.5%
21	1.9%	89.5%	1.3%	95.3%	3.0%	80.2%	2.2%	88.0%	2.1%	84.5%	1.4%	78.9%
22	1.6%	91.1%	1.0%	96.3%	3.0%	83.1%	1.8%	89.8%	2.0%	86.6%	1.9%	80.8%
23	1.5%	92.6%	0.8%	97.0%	2.5%	85.7%	2.0%	91.9%	2.7%	89.3%	2.6%	83.4%
24	1.1%	93.7%	0.7%	97.8%	2.1%	87.8%	1.5%	93.3%	2.7%	92.0%	2.1%	85.6%
25	0.9%	94.6%	0.5%	98.2%	1.6%	89.5%	1.1%	94.4%	1.1%	93.0%	1.7%	87.2%
26	0.7%	95.4%	0.4%	98.6%	1.7%	91.2%	0.9%	95.3%	1.5%	94.6%	1.4%	88.6%
27	0.5%	95.9%	0.2%	98.9%	1.2%	92.4%	0.7%	96.0%	0.8%	95.4%	1.4%	90.0%
28	0.5%	96.4%	0.2%	99.1%	1.2%	93.6%	0.8%	96.8%	1.0%	96.4%	1.6%	91.6%
29	0.4%	96.8%	0.2%	99.2%	1.1%	94.7%	0.5%	97.3%	0.6%	97.0%	1.2%	92.8%
30	0.3%	97.2%	0.1%	99.4%	0.8%	95.5%	0.4%	97.8%	0.5%	97.5%	1.0%	93.8%
31	0.3%	97.4%	0.1%	99.4%	0.6%	96.0%	0.3%	98.1%	0.4%	97.9%	0.8%	94.6%
32	0.3%	97.7%	0.1%	99.5%	0.5%	96.5%	0.3%	98.4%	0.4%	98.2%	0.8%	95.4%
33	0.2%	97.9%	0.1%	99.6%	0.5%	97.0%	0.3%	98.6%	0.4%	98.7%	0.9%	96.3%
34	0.2%	98.1%	0.1%	99.7%	0.5%	97.5%	0.3%	98.9%	0.3%	99.0%	0.8%	97.0%
35	0.2%	98.3%	0.1%	99.7%	0.4%	97.9%	0.2%	99.1%	0.3%	99.3%	0.7%	97.7%
36	0.2%	98.5%	0.1%	99.8%	0.3%	98.2%	0.2%	99.4%	0.2%	99.5%	0.6%	98.4%
37	0.1%	98.6%	0.0%	99.8%	0.4%	98.6%	0.2%	99.5%	0.2%	99.6%	0.5%	98.9%
38	0.1%	98.7%	0.0%	99.8%	0.2%	98.8%	0.1%	99.6%	0.1%	99.7%	0.5%	99.3%
39	0.1%	98.8%	0.0%	99.9%	0.2%	99.0%	0.1%	99.7%	0.1%	99.8%	0.3%	99.6%
40	0.0%	98.8%	0.0%	99.9%	0.1%	99.1%	0.1%	99.8%	0.1%	99.9%	0.1%	99.8%
> 40	1.2%	100.0%	0.1%	100.0%	0.9%	100.0%	0.2%	100.0%	0.1%	100.0%	0.2%	100.0%

Notes: Data include all 50 states, Washington D.C., and Puerto Rico. “Under 1” includes model year 2023 and model year 2024 vehicles.

Source:
Data analyzed by Argonne National Laboratory from Experian Automotive Vehicles in Operation Data, December 31, 2023.

The average age of cars and light-duty trucks has grown to 12.8 years in 2025. Light-duty trucks, which include pickups, vans, and sport utility vehicles, had a lower average age than cars since 2023 likely due to the greater amount of new light -duty trucks sold since that time.

Table 3.9
U.S. Average Vehicle Age, 1970–2025

Calendar Year	Passenger cars	Light-Duty trucks	All Light-Duty vehicles
1970	5.6	7.3	[a]
1975	6.0	6.9	[a]
1980	6.6	7.1	[a]
1985	7.6	8.1	[a]
1990	7.8	8.0	[a]
1995	8.4	8.3	8.4
1996	8.5	8.3	8.5
1997	8.7	8.5	8.6
1998	8.9	8.5	8.8
1999	9.1	8.5	8.8
2000	9.1	8.4	8.9
2001	9.3	8.4	8.9 [b]
2002	9.8	9.4	9.6
2003	9.9	9.0	9.7
2004	10.0	9.5	9.8
2005	10.1	9.5	9.8
2006	10.2	9.5	9.9
2007	10.3	9.6	10.0
2008	10.4	9.8	10.1
2009	10.5	10.1	10.3
2010	10.8	10.5	10.6
2011	11.1	10.8	10.9
2012	11.3	11.1	11.2
2013	11.4	11.3	11.4
2014	11.4	11.4	11.4
2015	11.5	11.5	11.5
2016	11.6	11.6	11.6
2017	[a]	[a]	11.7
2018	11.9	11.7	11.8
2019	[a]	[a]	11.9
2020	[a]	[a]	12.1
2021	[a]	[a]	12.1
2022	[a]	[a]	12.2
2023	13.6	11.8	12.5
2024	14.0	11.9	12.6
2025	14.5	11.9	12.8

Source:
S&P Global (formerly IHS Automotive, formerly R.L. Polk and Company), Automotive Insights, 2025, and earlier annual press releases.

[a] Data are not available.
[b] Data may not be comparable from 2001 to 2002 due to methodology change.

Total vehicle miles traveled increased each year from 2020 to 2023. The trend of using two-axle, four-tire trucks, such as pickups, vans, and sport-utility vehicles, for personal travel is evident in these data; two-axle, four-tire trucks accounted for more than half of all vehicle miles of travel in 2023 with cars accounting for another 36%.

Table 3.10
Shares of Highway Vehicle-Miles Traveled by Vehicle Type, 1970–2023

Year	Cars	Motorcycles	Two-axle, four-tire trucks	Other single-unit trucks	Combination trucks	Buses	Total vehicle-miles traveled (million miles)
1970	82.6%	0.3%	11.1%	2.4%	3.2%	0.4%	1,109,724
1975	77.9%	0.4%	15.1%	2.6%	3.5%	0.5%	1,327,664
1980	72.8%	0.7%	19.0%	2.6%	4.5%	0.4%	1,527,295
1985	70.2%	0.5%	22.0%	2.6%	4.4%	0.3%	1,774,826
1990	65.7%	0.4%	26.8%	2.4%	4.4%	0.3%	2,144,362
1991	62.5%	0.4%	29.9%	2.4%	4.4%	0.3%	2,172,050
1992	61.0%	0.4%	31.5%	2.4%	4.4%	0.3%	2,247,151
1993	59.9%	0.4%	32.5%	2.5%	4.5%	0.3%	2,296,378
1994	59.6%	0.4%	32.4%	2.6%	4.6%	0.3%	2,357,588
1995	59.4%	0.4%	32.6%	2.6%	4.8%	0.3%	2,422,696
1996	59.1%	0.4%	32.8%	2.6%	4.8%	0.3%	2,485,848
1997	58.7%	0.4%	33.2%	2.6%	4.9%	0.3%	2,561,695
1998	58.9%	0.4%	33.0%	2.6%	4.9%	0.3%	2,631,522
1999	58.3%	0.4%	33.5%	2.6%	4.9%	0.3%	2,691,056
2000	58.3%	0.4%	33.6%	2.6%	4.9%	0.3%	2,746,925
2001	58.2%	0.3%	33.7%	2.6%	4.9%	0.3%	2,797,287
2002	58.1%	0.3%	33.8%	2.7%	4.9%	0.2%	2,855,508
2003	57.8%	0.3%	34.0%	2.7%	4.8%	0.2%	2,890,412
2004	57.3%	0.3%	34.6%	2.6%	4.8%	0.2%	2,964,788
2005	57.1%	0.3%	34.8%	2.6%	4.8%	0.2%	2,989,430
2006	56.1%	0.4%	35.9%	2.7%	4.7%	0.2%	3,014,369 [a]
2007	55.2%	0.4%	36.7%	2.7%	4.8%	0.2%	3,032,399
2008	54.3%	0.5%	37.3%	2.8%	4.8%	0.2%	2,973,509
2009	53.0%	0.7%	36.1%	4.1%	5.7%	0.5%	2,956,764
2010	50.4%	0.6%	38.8%	3.7%	5.9%	0.5%	2,967,266
2011	49.4%	0.6%	40.4%	3.5%	5.6%	0.5%	2,950,402
2012	48.4%	0.7%	41.3%	3.6%	5.5%	0.5%	2,969,433
2013	48.4%	0.7%	41.2%	3.6%	5.6%	0.5%	2,988,280
2014	47.5%	0.7%	42.1%	3.6%	5.6%	0.5%	3,025,656
2015	46.7%	0.6%	43.1%	3.5%	5.5%	0.5%	3,095,373
2016	45.8%	0.6%	44.0%	3.6%	5.5%	0.5%	3,174,408
2017	44.3%	0.6%	45.2%	3.6%	5.6%	0.5%	3,212,347
2018	43.8%	0.6%	45.6%	3.7%	5.7%	0.6%	3,240,326
2019	42.1%	0.6%	47.5%	3.8%	5.4%	0.6%	3,261,772
2020	40.8%	0.6%	47.9%	4.1%	6.2%	0.5%	2,903,622
2021	39.3%	0.6%	49.1%	4.2%	6.2%	0.5%	3,132,411
2022	38.0%	0.7%	50.3%	4.3%	6.1%	0.6%	3,196,191
2023	36.4%	0.6%	52.3%	4.1%	6.0%	0.5%	3,246,817
			Average annual percentage change				
1970-2023							2.0%
2013-2023							0.8%

Source:
U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics 2023*, Washington, DC, 2025, Table VM-1 and annual. (Additional resources: www.fhwa.dot.gov). 2009-2023 cars and 2-axle 4-tire trucks – see Section 7 in Appendix A.

[a] Due to FHWA methodology changes, data from 2007-on are not comparable with previous data.

The majority of vehicle miles of travel (VMT) in each state is on streets and roads instead of interstates. Interstate travel accounted for 35% of VMT in the United States in 2023.

Table 3.11
Vehicle Miles of Travel by State, 2023
(million vehicle miles)

State	Rural Interstate[a]	Rural streets and roads[b]	Urban Interstate[a]	Urban Streets and Roads[b]	Total
Alabama	6,903	22,327	10,283	32,776	72,289
Alaska	863	1,604	784	2,367	5,617
Arizona	7,869	10,250	18,646	38,532	75,297
Arkansas	5,066	13,789	7,229	13,017	39,101
California	22,879	36,803	128,929	128,001	316,612
Colorado	5,418	11,742	15,525	21,969	54,654
Connecticut	766	2,347	14,058	13,331	30,503
Delaware	402	2,123	2,205	4,988	9,718
Dist. of Columbia	-	0	874	2,607	3,481
Florida	15,097	26,798	51,030	146,262	239,188
Georgia	8,695	23,244	29,972	64,429	126,339
Hawaii	-	1,839	2,297	6,300	10,435
Idaho	3,414	8,043	2,072	6,190	19,718
Illinois	9,564	15,266	24,963	53,077	102,871
Indiana	9,195	23,611	12,986	39,417	85,209
Iowa	5,328	14,778	3,107	10,041	33,254
Kansas	5,258	10,016	6,402	10,152	31,828
Kentucky	10,526	16,095	7,723	14,650	48,993
Louisiana	7,490	13,500	11,674	22,897	55,560
Maine	2,255	8,132	1,417	3,084	14,888
Maryland	2,659	7,854	21,506	25,336	57,356
Massachusetts	922	2,200	22,100	35,525	60,748
Michigan	8,373	23,029	22,516	44,370	98,289
Minnesota	3,955	19,617	13,288	21,186	58,046
Mississippi	5,031	19,250	4,792	11,871	40,944
Missouri	13,527	22,841	20,452	24,005	80,825
Montana	2,914	6,775	596	3,416	13,700
Nebraska	4,150	7,478	3,034	6,612	21,275
Nevada	2,464	3,394	6,365	15,553	27,777
New Hampshire	1,259	4,161	3,461	4,634	13,515
New Jersey	1,750	3,091	28,347	44,819	78,007
New Mexico	5,209	11,899	2,775	8,286	28,169
New York	6,925	18,209	37,747	57,186	120,067
North Carolina	14,586	38,352	22,240	47,079	122,258
North Dakota	1,729	5,121	564	2,482	9,896
Ohio	11,219	23,474	31,192	47,338	113,224
Oklahoma	6,224	16,538	8,789	14,208	45,760
Oregon	4,084	10,556	7,023	15,153	36,816
Pennsylvania	11,487	20,764	23,154	44,721	100,126
Rhode Island	350	548	2,936	3,730	7,564
South Carolina	7,513	15,258	10,931	27,092	60,794
South Dakota	2,852	4,379	991	2,124	10,345
Tennessee	9,914	17,778	19,241	36,472	83,405
Texas	21,504	58,051	97,558	123,225	300,338
Utah	4,092	5,834	9,171	15,486	34,584
Vermont	1,151	3,953	630	1,439	7,172
Virginia	8,193	18,621	24,777	36,140	87,730
Washington	6,614	10,109	18,581	24,500	59,804
West Virginia	1,664	6,481	2,652	5,165	15,962
Wisconsin	7,598	26,735	11,935	20,980	67,248
Wyoming	2,616	4,380	571	1,952	9,519
U.S. Total	309,518	699,042	832,090	1,406,167	3,246,817

Source:

U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics 2023*, Washington, DC, 2025, Table VM-2. (Additional resources: www.fhwa.dot.gov)

[a] Includes Interstates, freeways, and expressways.

[b] Includes other principal arterial, minor arterial, major collector, minor collector and local streets and roads.

From 2014 to 2024, new retail car sales declined by an average of 9.1% annually while light truck sales increased by an average of 3.9% annually. Heavy-duty truck sales grew an average of 3.1% annually in the same period.

Table 3.12
New Retail Vehicle Sales, 1970–2024
(thousands)

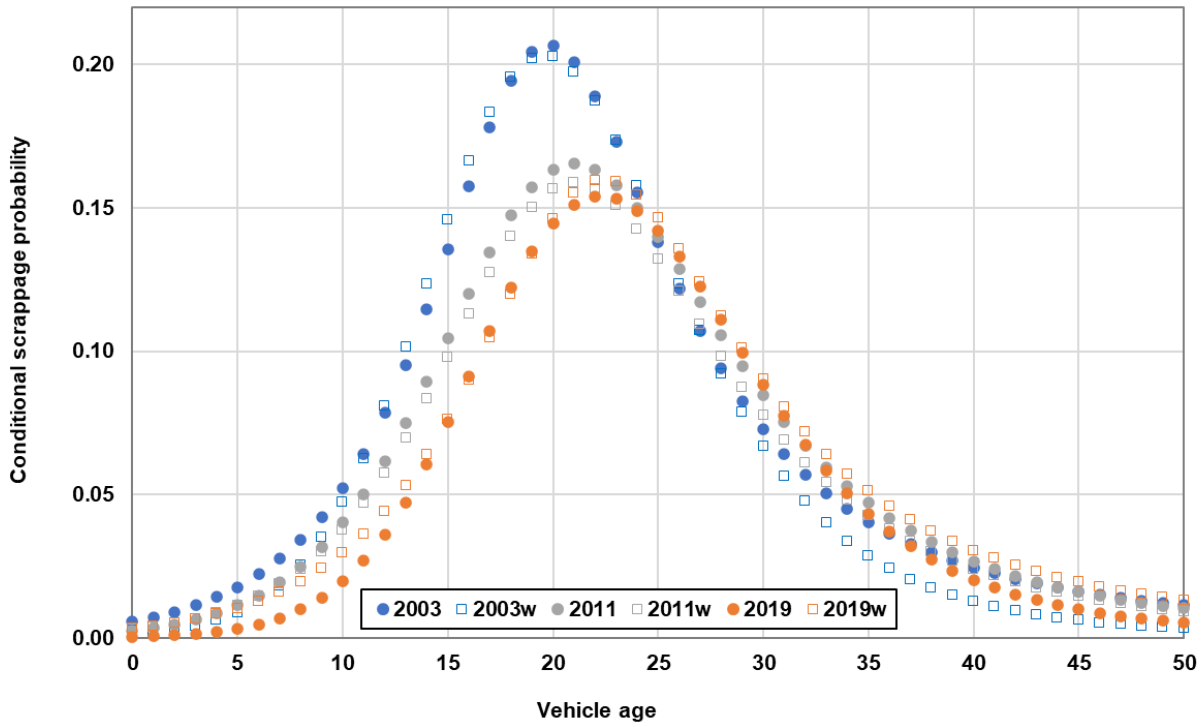
Calendar year	Cars	Light-duty trucks[a]	Light-duty vehicle subtotal	Heavy-duty trucks	Total vehicle sales
1970	8,321	1,457	9,778	334	10,112
1975	8,486	2,053	10,539	298	10,837
1980	8,949	1,960	10,909	271	11,180
1985	10,979	3,688	14,667	295	14,962
1990	9,301	4,548	13,849	297	14,146
1991	8,185	4,122	12,307	242	12,549
1992	8,213	4,629	12,842	276	13,118
1993	8,518	5,351	13,869	330	14,199
1994	8,991	6,033	15,024	387	15,411
1995	8,620	6,053	14,673	428	15,101
1996	8,479	6,519	14,998	411	15,409
1997	8,217	6,797	15,014	430	15,444
1998	8,085	7,299	15,384	526	15,910
1999	8,638	8,073	16,711	641	17,352
2000	8,778	8,386	17,164	579	17,743
2001	8,352	8,598	16,950	452	17,402
2002	8,042	8,633	16,675	402	17,077
2003	7,556	8,938	16,494	420	16,914
2004	7,483	9,254	16,737	538	17,275
2005	7,660	9,114	16,774	664	17,438
2006	7,762	8,574	16,336	694	17,030
2007	7,562	8,305	15,867	537	16,404
2008	6,769	6,246	13,015	432	13,447
2009	5,402	4,834	10,236	312	10,548
2010	5,636	5,758	11,394	378	11,772
2011	6,093	6,449	12,542	500	13,042
2012	7,245	6,975	14,220	569	14,789
2013	7,586	7,693	15,279	606	15,884
2014	7,708	8,484	16,192	671	16,862
2015	7,529	9,578	17,107	732	17,839
2016	6,883	10,296	17,179	697	17,876
2017	6,089	10,738	16,827	732	17,559
2018	5,310	11,609	16,919	789	17,708
2019	4,720	11,911	16,630	854	17,485
2020	3,402	10,721	14,123	758	14,882
2021	3,350	11,217	14,567	841	15,409
2022	2,859	10,563	13,422	803	14,225
2023	3,117	12,000	15,117	878	15,995
2024	2,984	12,452	15,436	913	16,349
			Average annual percentage change		
1970-2024	-1.9%	4.1%	0.8%	1.9%	0.9%
2014-2024	-9.1%	3.9%	-0.5%	3.1%	-0.3%

Source:
Ward's Communications, www.wardsauto.com, 2025.

[a] Includes light-duty trucks of 10,000 lb gross vehicle weight and less.

A study on vehicle scrappage rates determined that U.S. light-duty vehicles have been lasting longer for the last few decades and that scrappage was different depending on the vehicle type. The median lifetime for cars was about 17 years, for SUVs was about 20 years, and for pickups was about 25 years.

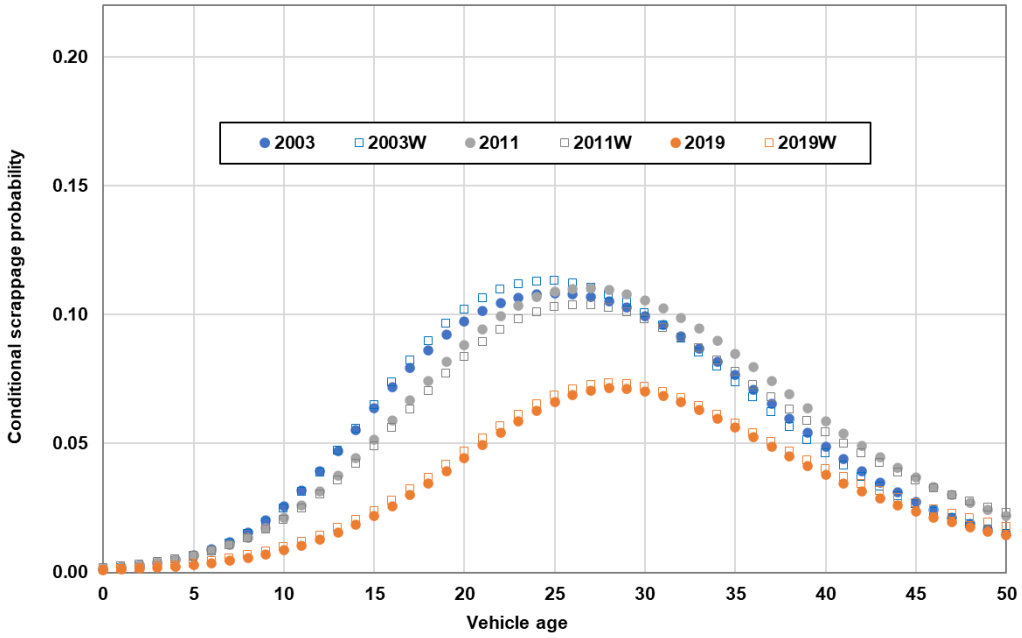
Figure 3.6. Logistic Conditional Scrappage Probabilities: Cars



Note: "W" indicates that the estimates are based on observations weighted by vehicles in operation.

Source:
Greene, David L, and Benjamin Leard, Howard H. Baker Jr. Center for Public Policy, *A Statistical Analysis of Trends in Light duty Vehicle Scrappage and Survival: 2003-2020*, June 2022.

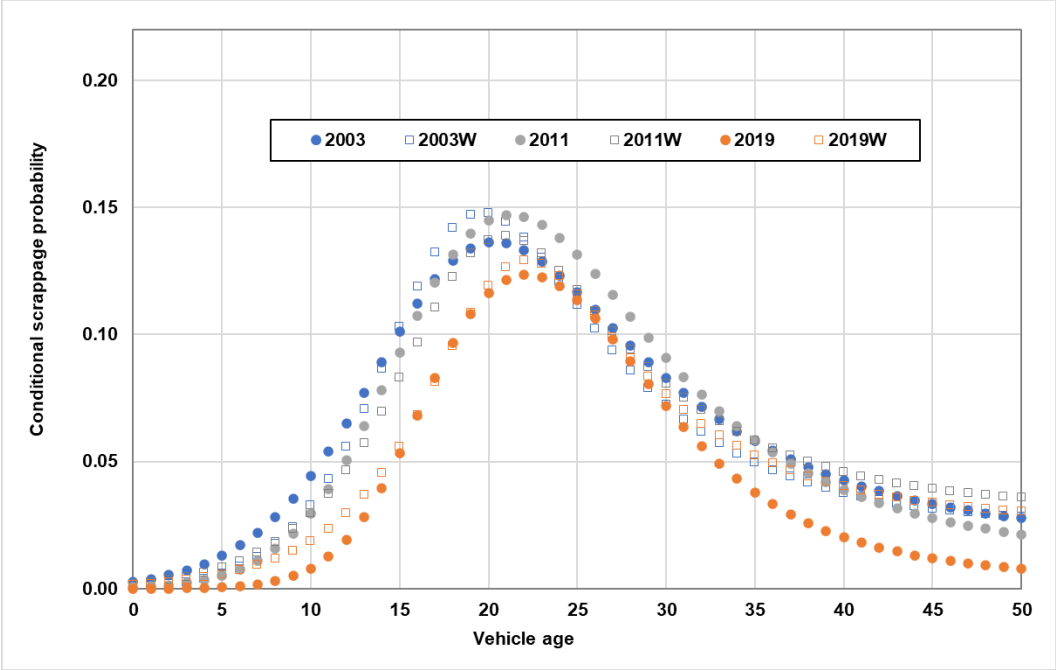
Figure 3.7. Logistic Conditional Scrappage Probabilities: Pickups



Note: "W" indicates that the estimates are based on observations weighted by vehicles in operation.

Source:
Greene, David L, and Benjamin Leard, Howard H. Baker Jr. Center for Public Policy, *A Statistical Analysis of Trends in Light duty Vehicle Scrappage and Survival: 2003-2020*, June 2022.

Figure 3.8. Logistic Conditional Scrappage Probabilities: SUV and Vans



Note: "W" indicates that the estimates are based on observations weighted by vehicles in operation.

Source:
Greene, David L, and Benjamin Leard, Howard H. Baker Jr. Center for Public Policy, *A Statistical Analysis of Trends in Light duty Vehicle Scrappage and Survival: 2003-2020*, June 2022.

There were four times as many trucks (Trucks = 19,500 or less pounds) as there are cars in commercial fleets in 2023. More than three-fourths of all commercial vehicles (both fleet and non-fleet) are trucks. Data for 2022 are not available.

Table 3.13
Commercial Fleet and Non-fleet Vehicles in Service, 2015-2023
(thousands of vehicles)

	Commercial Fleet			Commercial Non-Fleet			Commercial Fleet and Non Fleet		
Year	Cars	Trucks	Total	Cars	Trucks	Total	Cars	Trucks	Total
2015	648.7	2,306.9	2,955.6	982.5	2,250.3	3,232.8	5,483.1	8,715.9	14,199.0
2016	679.0	2,476.5	3,155.5	1,015.5	2,376.7	3,392.2	5,768.9	9,161.0	14,929.9
2017	628.0	2,377.7	3,005.7	971.4	2,370.0	3,341.4	5,711.4	9,052.8	14,764.2
2018	602.5	2,423.8	3,026.3	952.0	2,410.0	3,362.0	5,772.0	9,134.0	14,906.0
2019	635.0	2,587.6	3,222.6	1,040.0	2,570.0	3,610.0	6,180.0	9,790.0	15,970.0
2020	605.0	2,472.5	3,077.5	985.0	2,340.0	3,325.0	5,665.0	8,990.0	14,655.0
2021	554.0	2,258.0	2,812.0	874.0	2,120.0	2,994.0	5,114.0	8,108.0	13,222.0
2022	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
2023	554.0	2,258.0	2,812.0	875.0	2,400.0	3,275.0	1,429.0	4,658.0	6,087.0
				Average Annual Percentage Change					
2015-2023	-2.0%	-0.3%	-0.6%	-1.4%	0.8%	0.2%	-15.5%	-7.5%	-10.0%

Note: Fleets consist of 15 or more vehicles in operation or five or more fleet vehicles purchased annually. Commercial vehicles with fewer vehicles in operation are considered non-fleet.

Source:
Bobit Publishing Company, Automotive Fleet Research Department, *Automotive Fleet Factbook 2024*, and previous editions, Redondo Beach, CA, 2024. (Additional resources: www.automotive-fleet.com/issues)

[a] Data are not available.

The Federal Government vehicle inventory included 33% more light-duty trucks than passenger vehicles in 2023, up from 21% in 2020.

Table 3.14
Federal Government Vehicle Inventory, FY 2001-2023

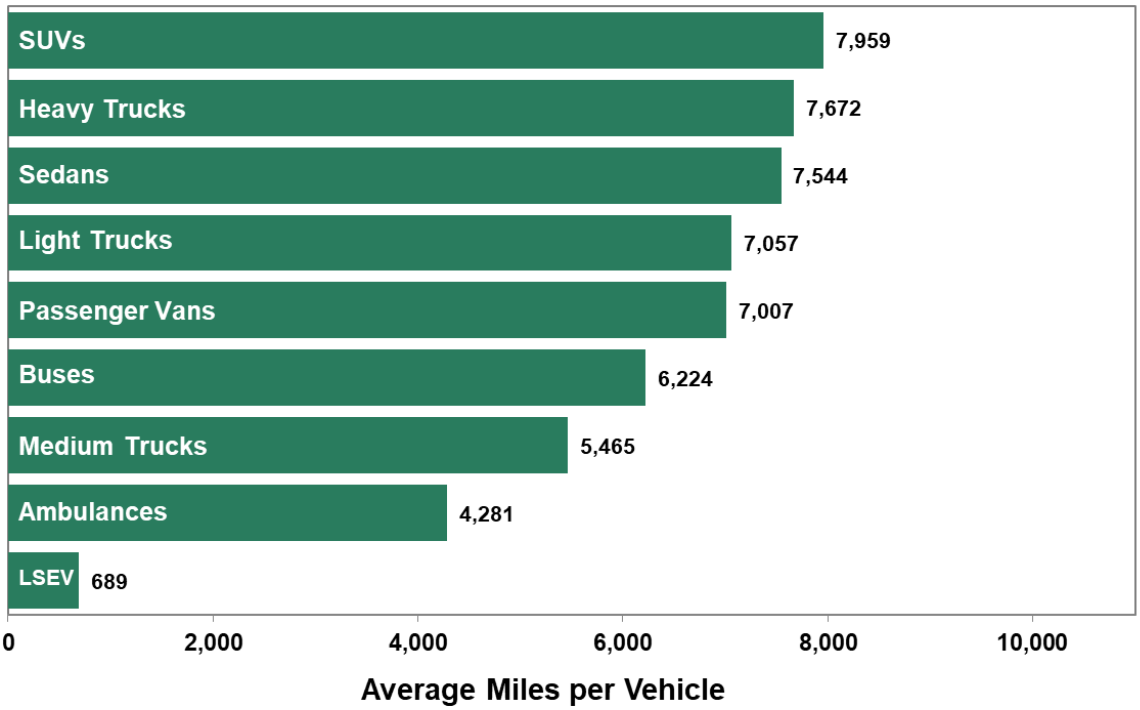
Vehicle Type	2001	2005	2010	2015	2020	2022	2023
Passenger vehicles							
Low-speed electric vehicle	0	0	3,029	3,686	2,664	2,141	2,065
Subcompact	5,462	2,401	6,797	27,356	25,098	24,008	23,655
Compact	60,938	58,284	46,489	38,766	39,808	35,730	33,721
Midsize	36,921	36,656	48,242	24,775	22,595	19,406	17,784
Large	11,107	15,966	10,063	7,150	2,288	1,700	1,400
Limousines	116	191	412	83	7	6	5
Light-duty passenger vans	56,563	42,109	41,676	37,448	32,512	30,573	29,456
Medium-duty passenger vans	727	13,252	15,218	14,617	15,803	16,076	17,283
Light-duty SUVs	40,842	50,445	66,316	73,203	82,846	84,610	90,679
Medium-duty SUVs	0	6,096	11,117	8,235	5,237	4,588	4,678
Total passenger vehicles	**212,676**	**225,400**	**249,359**	**235,319**	**228,858**	**218,838**	**220,726**
Trucks and other vehicles							
Light-duty trucks 4x2	227,937	243,477	241,011	232,914	219,755	225,606	233,897
Light-duty trucks 4x4	29,975	35,417	40,105	49,079	57,522	57,562	60,240
Medium-duty trucks	88,993	83,747	89,253	79,421	103,215	107,704	108,875
Heavy-duty trucks	27,988	35,230	32,760	34,049	39,246	38,247	38,472
Ambulances	1,819	1,580	1,480	1,349	853	790	943
Buses	6,726	7,837	8,186	8,173	8,057	7,747	7,925
Total trucks and other vehicles	**383,438**	**407,288**	**412,795**	**404,985**	**428,648**	**437,656**	**450,352**
GRAND TOTAL ALL VEHICLES	**596,114**	**632,688**	**662,154**	**640,304**	**657,506**	**656,494**	**671,078**

Note: Light-duty trucks = less than 8,500 pounds gross vehicle weight rating (GVWR).
Medium-duty trucks = 8,501-23,999 pounds GVWR.
Heavy-duty trucks = 24,000 pounds GVWR or more.

Source:
U.S. General Services Administration, Federal Supply Service, *FY 2023 Federal Fleet Open Data Set*, Washington, DC, 2024, Tables 2-5T and 2-6T and previous editions. (Additional resources: www.gsa.gov)

These data, which apply to domestic Federal fleet vehicles, indicate that sport utility vehicles (SUVs) have the highest average annual miles per vehicle, followed by heavy trucks.

Figure 3.9. Average Miles per Domestic Federal Vehicle by Vehicle Type, 2023



Note: Light-duty trucks = less than 8,500 pounds gross vehicle weight (GVW).
Medium-duty trucks = 8,501-23,999 pounds GVW.
Heavy-duty trucks = 24,000 pounds GVW or more.
LSEVs = low-speed electric vehicles.

Source:
U.S. General Services Administration, Federal Vehicle Policy Division, *FY 2023 Federal Fleet Open Data Set*, Washington, DC, 2024, Table 4-2. (Additional resources: www.gsa.gov)

Table 3.15
Federal Fleet Vehicle Acquisitions
by Fuel Type, FY 2002–2023

Fuel type	2002	2005	2010	2015	2016	2020	2022	2023
Gasoline	44,850	41,247	26,547	17,080	30,311	28,055	25,121	37,844
Gasoline hybrid	[a]	222	4,853	2,500	3,147	3,533	843	2,488
Gasoline LE[b]	0	0	0	0	38	1488	309	1,491
Gasoline plug-in hybrid	0	0	0	263	86	188	659	4,234
Diesel	8,107	6,049	4,136	6,215	6,136	5,551	3,988	3,462
Diesel hybrid	[c]	1	27	7	11	12	2	4
Diesel LE[b]	0	0	0	0	0	0	0	10
CNG	1,267	188	60	241	67	11	8	8
E-85	8,054	16,892	26,789	24,651	27,243	10,366	7,166	6,360
Electric	7	13	1,376	231	180	111	53	124
LNG	3	0	0	0	0	0	0	0
LPG	59	1	2	6	9	0	0	0
M-85	25	0	0	0	0	0	0	0
Hydrogen	0	0	4	0	0	0	0	1
Grand total	62,372	64,613	63,794	51,194	67,228	49,315	38,149	56,026

Source:
U.S. General Services Administration, Federal Vehicle Policy Division, *FY 2023 Federal Fleet Open Data Set*, Washington, DC, 2024, Table 5-4. (Additional resources: www.gsa.gov)

Table 3.16
Fuel Consumed by Federal Government Fleets, FY 2000–2023
(thousand gasoline equivalent gallons)

	2000	2005	2009	2010	2015	2016	2020	2022	2023
Gasoline	284,480	300,261	301,437	322,023	310,416	315,043	297,382	311,260	333,743
Diesel	70,181	53,363	76,456	75,329	66,736	69,990	66,651	60,255	59,300
CNG	865	1,245	499	504	400	397	140	45	34
Electricity	1	6	4	36	197	86	42	43	97
Biodiesel (B20)	569	8,052	7,393	8,258	4,722	4,404	1,298	1,286	844
Biodiesel (B100)[d]	0	0	5	0	11	0	44	11	157
Methanol/M-85	14	0	0	0	0	19	60	74	288
LPG	34	231	208	195	0	0		0	0
Ethanol/E-85	347	3,060	7,923	8,201	150	231	117	134	184
LNG	0	102	35	0	13,512	11,942	6,016	5,795	5,458
Hydrogen	0	0	0	1	7	4	0	0	0
Total	356,491	366,320	393,961	414,548	396,151	402,116	371,750	378,903	400,105

Source:
U.S. General Services Administration, Federal Vehicle Policy Division, *FY 2023 Federal Fleet Open Data Set*, Washington, DC, 2024, Table 5-1. (Additional resources: www.gsa.gov)

[a] Combined with gasoline.
[b] Low emissions.
[c] Combined with diesel.
[d] B100 cannot be separated from B20 from 2000-2007.

The U.S. Postal Service owned 45.5% of all federal light-duty trucks.

Table 3.17
Federal Government Vehicles by Agency, FY 2023

Department or agency	Cars	Light-duty trucks	Medium-duty trucks	Heavy-duty trucks	Total
CIVILIAN					
American Battle Monuments Commission	20	29	3	0	52
Consumer Product Safety Commission	50	42	0	0	92
Court Services and Offender Supervision Agency	46	16	0	0	62
Department of Agriculture	3,594	23,365	9,263	2,480	38,702
Department of Commerce	204	1,149	419	53	1,825
Department of Education	34	41	0	0	75
Department of Energy	652	8,050	4,191	2,398	15,291
Department of Health and Human Services	1,347	2,458	300	117	4,222
Department of Homeland Security	7,538	37,198	4,028	1,340	50,104
Department of Housing and Urban Development	169	82	0	0	251
Department of Justice	13,320	31,736	1,751	1,541	48,348
Department of Labor	830	2,169	219	340	3,558
Department of State	1,325	10,216	786	680	13,007
Department of the Interior	1,359	13,941	8,396	3,114	26,810
Department of the Treasury	1,049	1,993	12	6	3,060
Department of Transportation	843	3,870	1,086	155	5,954
Department of Veterans Affairs	6,318	12,951	1,487	2,122	22,878
Environmental Protection Agency	146	623	121	42	932
Equal Employment Opportunity Commission	0	0	0	0	0
Federal Communications Commission	0	2	0	0	2
Federal Housing Finance Agency	0	55	0	0	55
Federal Maritime Commission	2	3	0	0	5
Federal Trade Commission	3	2	0	0	5
General Services Administration	0	0	2	0	2
Government Publishing Office	355	393	10	0	758
Library of Congress	3	4	1	6	14
National Aeronautics and Space Administration	271	1,182	392	304	2,149
National Archives and Records Administration	1	36	8	8	53
National Gallery of Art	1	6	3	4	14
National Labor Relations Board	10	2	0	0	12
National Science Foundation	3	127	136	63	329
National Transportation Safety Board	0	2	0	0	2
Nuclear Regulatory Commission	5	19	0	2	26
Office of Personnel Management	10	22	0	0	32
Peace Corps	24	554	4	9	591
Pretrial Services Agency for the District of Columbia	2	1	0	0	3
Small Business Administration	79	105	1	0	185
Smithsonian Institution	12	335	72	44	463
Social Security Administration	132	232	2	17	383
Tennessee Valley Authority	290	1,166	1,078	161	2,695
U.S. Agency for Global Media	0	88	13	16	117
U.S. Agency for International Development	54	412	11	5	482
U.S. International Trade Commission	0	1	0	0	1
TOTAL CIVILIAN AGENCIES	**40,101**	**154,678**	**33,795**	**15,027**	**243,601**
MILITARY					
Corps of Engineers, Civil Works	402	4,046	1,923	731	7,102
Defense Agencies	3,281	4,466	894	1,106	9,747
Department of the Air Force	4,981	24,773	13,819	9,111	52,684
Department of the Army	12,191	26,581	11,590	7,120	57,482
Department of the Navy	6,341	17,891	7,729	4,021	35,982
U.S. Marine Corps	2,922	5,294	1,954	1,750	11,920
TOTAL MILITARY AGENCIES	**30,118**	**83,051**	**37,909**	**23,839**	**174,917**
U. S. POSTAL SERVICE	6,346	198,504	38,114	7,531	**250,495**
TOTAL ALL FLEETS	**76,565**	**436,233**	**109,818**	**46,397**	**669,013**

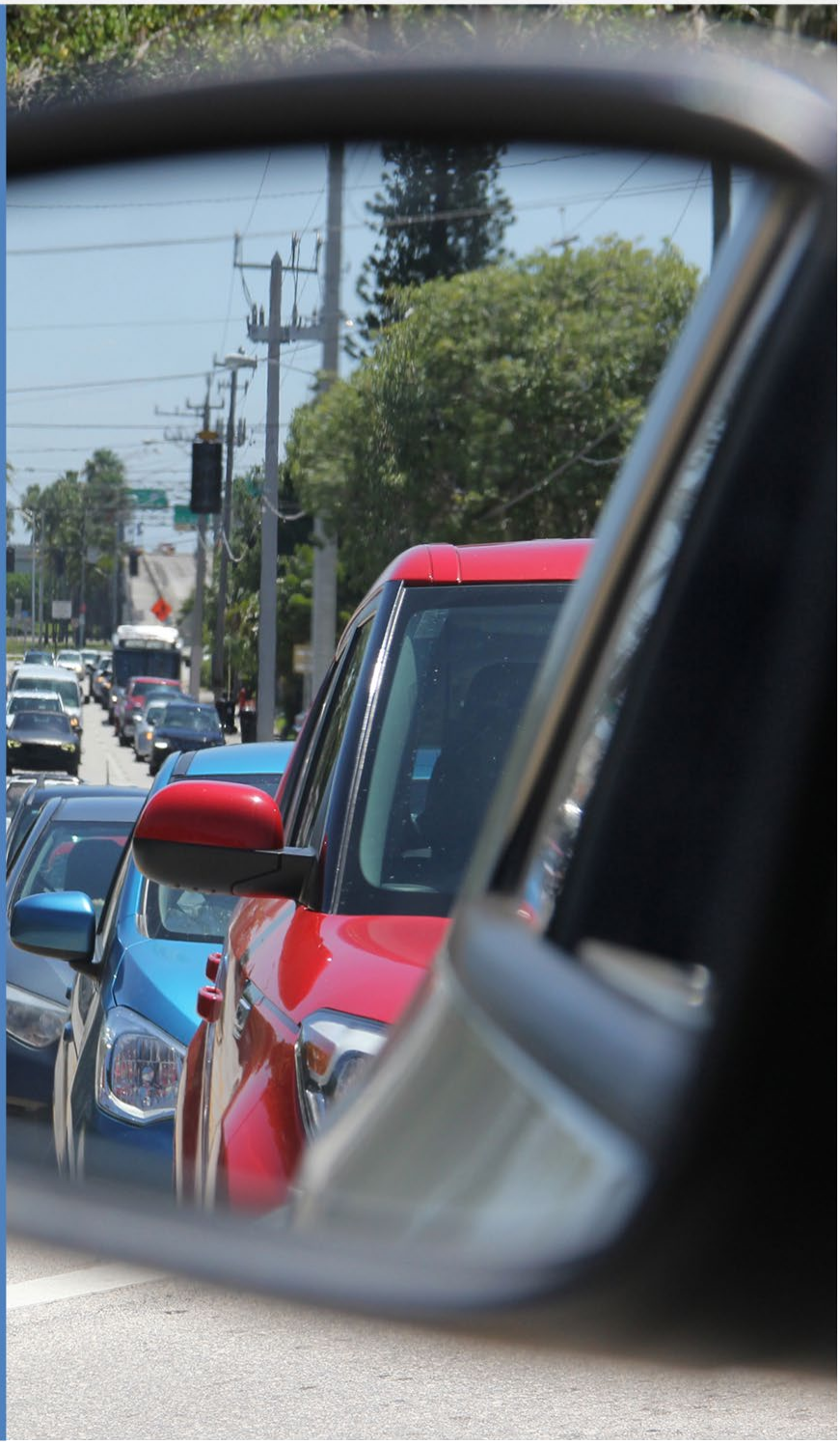
Note: Light-duty trucks include SUVs, vans, and pickups less than 8,500 lb gross vehicle weight (GVW). Medium-duty trucks are 8,501-23,999 lb GVW and include ambulances. Heavy-duty trucks are 24,000 lb GVW or more and include buses. Does not include low-speed vehicles.

Source:

U.S. General Services Administration, Federal Supply Service, *FY 2023 Federal Fleet Open Data Set*, Washington, DC, 2024, Table 2-1. (Additional resources: www.gsa.gov)

LIGHT-DUTY VEHICLES & CHARACTERISTICS

Chapter 4



Credit: Image by Marie LaFauci/Moment/Getty Images

Definition of Light-Duty Truck

Often for regulatory purposes, agencies within the federal government have differing definitions for the term "light-duty truck." Thus, depending on the data source, the definition in this document can be different.

The data in Table 4.2 are from the Federal Highway Administration (FHWA). From 1970 to 2008 the FHWA defined light-duty trucks as two-axle, four-tire trucks, including pickups, vans, SUVs, and other two-axle, four-tire trucks under 10,000 lb gross vehicle weight rating (GVWR). In 2009, the FHWA changed methodologies and no longer publishes vehicle miles, fuel use, and fuel economy of light-duty trucks separately from cars. They continue to publish vehicle registrations for pickups, vans, SUVs and other two-axle, four tire trucks under 10,000 lb The methodology used by Oak Ridge National Laboratory (ORNL) to continue the data series on Table 4.2 after 2008 is based on the FHWA data for all light-duty vehicles, thus uses the same definition of light-duty trucks. See Section 7.2 in Appendix A for the methodology of light-duty truck data on Table 4.2 after 2008. Data on energy use in Tables 2.7 through 2.9 also use the FHWA definition of light-duty truck.

Tables 3.12 and 4.7 are light-duty truck sales based on Ward's Communications data. Ward's definition of light-duty trucks includes pickups, vans, SUVs, and specialty purpose vehicles up to 14,000 lb GVWR. However, in most cases, data are available by individual GVWR and ORNL summarized only light-duty trucks that were 10,000 lb GVWR or less and did not include the heavier trucks. Thus, the definition on these tables is nearly identical to the FHWA definition.

The Environmental Protection Agency (EPA) and the U. S. Department of Transportation, National Highway Traffic Safety Administration (NHTSA) both use a regulatory definition of light truck. Light-duty trucks include 1) pickups and cargo vans less than 8,500 lb GVWR and 2) passenger vans and SUVs up to 10,000 lb GVWR. SUVs are further separated into Car SUV and Truck SUV categories. Thus, data are categorized as cars, car SUVs, truck SUVs, pickups and vans. Table 4.10 gives a list of which SUVs are considered car SUVs for an individual model year. Data on tables 4.9 through 4.19 are based on EPA data and thus use this definition of cars and light-duty trucks. The CAFE data on Table 4.25 apply to cars only through 2011 and cars plus car SUVs after that. The CAFE data on Table 4.26 are for trucks up to 8,500 lb GVWR through 2011 and after that are for truck SUVs and passenger vans up to 10,000 lb GVWR, and pickup trucks and cargo vans up to 8,500 lb GVWR.

Because of these different definitions, caution is advised when comparing light-duty truck data from different sources.

The data in this table from 1985–on DOES NOT include minivans, pickups, or sport utility vehicles. Much of the data for 2009-on was estimated; the FHWA no longer publishes travel and fuel data for cars. Methodology changes for the number of cars registered affected the series in 2012.

Table 4.1
Summary Statistics for Cars, 1970–2023

Year	Registrations (thousands)	Vehicle travel (billion miles)	Average annual miles per vehicle	Fuel use (million gallons)	Average fuel economy[a] per vehicle (miles per gallon)	
1970	89,244	916.7	10,272	67,820	13.5	
1975	106,706	1,034.0	9,690	74,140	13.9	
1980	121,601	1,111.6	9,141	69,981	15.9	
1985[b]	127,885	1,246.8	9,749	71,518	17.4	
1990	133,700	1,408.3	10,533	69,568	20.2	
1995	128,387	1,438.3	11,203	68,072	21.1	
1996	129,728	1,469.9	11,330	69,221	21.2	
1997	129,749	1,502.6	11,580	69,892	21.5	
1998	131,839	1,549.6	11,754	71,695	21.6	
1999	132,432	1,569.1	11,848	73,283	21.4	
2000	133,621	1,600.3	11,976	73,065	21.9	
2001	137,633	1,628.3	11,831	73,559	22.1	
2002	135,921	1,658.5	12,202	75,471	22.0	
2003	135,670	1,672.1	12,325	74,590	22.4	
2004	136,431	1,699.9	12,460	75,402	22.5	
2005	136,568	1,708.4	12,510	77,418	22.1	
2006	135,400	1,690.5	12,485	75,009	22.5	
2007	135,933	1,672.5	12,304	74,377	22.5	
2008	137,080	1,615.9	11,788	71,497	22.6	[c]
2009	134,880	1,566.8	11,616	66,587	23.5	
2010	130,892	1,496.4	11,432	62,245	24.0	
2011	125,657	1,457.8	11,601	59,646	24.4	
2012	111,290	1,438.6	12,928	57,899	24.9	
2013	113,676	1,446.0	12,720	57,290	25.2	
2014	113,899	1,436.6	12,613	56,470	25.4	
2015	112,864	1,445.4	12,807	55,212	26.2	
2016	112,961	1,453.4	12,866	54,248	26.8	
2017	111,177	1,424.3	12,811	52,268	27.3	
2018	111,242	1,420	12,761	51,174	27.7	
2019	108,548	1,374	12,661	48,579	28.3	
2020	105,135	1,184	11,258	41,427	28.6	
2021	102,724	1,232	11,995	42,431	29.0	
2022	99,666	1,214	12,178	41,047	29.6	
2023	96,902	1,180	12,182	39,230	30.1	
			Average annual percentage change			
1970-2023	0.2%	0.5%	0.3%	-1.0%	1.5%	
2013-2023	-1.6%	-2.0%	-0.4%	-3.7%	1.8%	

Source:
1970-2008: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics 2009*, Washington, DC, 2011, Table VM-1 and previous editions. 2009-on: See Section 7.1 in Appendix A. (Additional resources: www.fhwa.dot.gov)

[a] Average fuel economy for all cars.
[b] Beginning in this year the data were revised to exclude minivans, pickups and sport utility vehicles which may have been previously included.
[c] Due to FHWA methodology changes, data from 2009-on are not comparable with previous data.

Much of the data for 2009-on were estimated; the FHWA no longer publishes travel and fuel use data for two-axle, four-tire trucks. Methodology changes for the number of registrations affected the data series in 2012.

Table 4.2
Summary Statistics for Two-Axle, Four-Tire Trucks, 1970–2023

Year	Registrations (thousands)	Vehicle travel (billion miles)	Average annual miles per vehicle	Fuel use (million gallons)	Average fuel economy[a] per vehicle (miles per gallon)	
1970	14,211	123.3	8,675	12,313	10.0	
1975	20,418	200.7	9,830	19,081	10.5	
1980	27,876	290.9	10,437	23,796	12.2	
1985[b]	37,214	391.0	10,506	27,363	14.3	
1990	48,275	574.6	11,902	35,611	16.1	
1995	65,738	790.0	12,018	45,605	17.3	
1996	69,134	816.5	11,811	47,354	17.2	
1997	70,224	850.7	12,115	49,389	17.2	
1998	71,330	868.3	12,173	50,462	17.2	
1999	75,356	901.0	11,957	52,859	17.0	
2000	79,085	923.1	11,672	52,939	17.4	
2001	84,188	943.2	11,204	53,522	17.6	
2002	85,011	966.0	11,364	55,220	17.5	
2003	87,187	984.1	11,287	60,758	16.2	
2004	91,845	1,027.2	11,184	63,417	16.2	
2005	95,337	1,041.1	10,920	58,869	17.7	
2006	99,125	1,082.5	10,920	60,685	17.8	
2007	101,470	1,112.3	10,962	61,836	18.0	
2008	101,235	1,108.6	10,951	61,199	18.1	[c]
2009	100,154	1,066.5	10,649	61,824	17.3	
2010	102,702	1,152.1	11,218	64,687	17.8	
2011	105,571	1,192.7	11,298	65,786	18.1	
2012	120,847	1,225.5	10,142	66,395	18.5	
2013	120,523	1,231.8	10,220	65,555	18.8	
2014	124,681	1,274.0	10,218	69,012	18.5	
2015	128,553	1,334.3	10,448	70,933	18.8	
2016	132,716	1,396.4	10,521	73,107	19.1	
2017	137,749	1,453.1	10,549	73,835	19.7	
2018	138,357	1,478	10,679	73,802	20.0	
2019	145,266	1,550	10,668	75,856	20.4	
2020	148,544	1,389	9,354	66,927	20.8	
2021	154,270	1,537	9,962	73,425	20.9	
2022	158,075	1,609	10,178	75,043	21.4	
2023	162,337	1,699	10,464	77,352	22.0	
			Average annual percentage change			
1970-2023	4.7%	5.1%	0.4%	3.5%	1.5%	
2013-2023	3.0%	3.3%	0.2%	1.7%	1.6%	

Source:
1970-2008: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics 2009*, Washington, DC, 2011, Table MV-9. Previous years Table VM-1. 2009-on: See Section 7.2 in Appendix A. (Additional resources: www.fhwa.dot.gov)

[a] Average fuel economy for all two-axle, four-tire trucks.
[b] Beginning in this year the data were revised to include all vans (including mini vans), pickups and sport utility vehicles.
[c] Due to FHWA methodology changes, data from 2009-on are not comparable with previous data.

These data are the combination of the car and two-axle, four-tire truck data from Tables 4.1 and 4.2 thus the data may not match exactly with the FHWA VM-1 table's light-duty vehicle data. The methodology change after 2008 affects these data as well.

Table 4.3
Summary Statistics for Light-Duty Vehicles, 1970–2023

Year	Registrations (thousands)	Vehicle travel (billion miles)	Average annual miles per vehicle	Fuel use (million gallons)	Average fuel economy[a] per vehicle (miles per gallon)	
1970	103,455	1,040	10,053	80,133	13.0	
1975	127,124	1,235	9,712	93,221	13.2	
1980	149,477	1,403	9,383	93,777	15.0	
1985[b]	165,099	1,638	9,920	98,881	16.6	
1990	181,975	1,983	10,896	105,179	18.9	
1991	181,333	2,008	11,071	102,535	19.6	
1992	183,672	2,078	11,316	106,365	19.5	
1993	187,321	2,120	11,320	109,898	19.3	
1994	190,787	2,171	11,378	111,986	19.4	
1995	194,125	2,228	11,479	113,677	19.6	
1996	198,862	2,286	11,497	116,575	19.6	
1997	199,973	2,353	11,768	119,281	19.7	
1998	203,169	2,418	11,901	122,157	19.8	
1999	207,788	2,470	11,888	126,142	19.6	
2000	212,706	2,523	11,863	126,004	20.0	
2001	221,821	2,572	11,593	127,081	20.2	
2002	220,932	2,625	11,879	130,691	20.1	
2003	222,857	2,656	11,919	135,348	19.6	
2004	228,276	2,727	11,946	138,819	19.6	
2005	231,905	2,749	11,856	136,287	20.2	
2006	234,525	2,773	11,824	135,694	20.4	
2007	237,403	2,785	11,730	136,213	20.4	
2008	238,315	2,724	11,432	132,696	20.5	[c]
2009	235,034	2,633	11,204	128,411	20.5	
2010	233,594	2,648	11,338	126,932	20.9	
2011	231,228	2,650	11,463	125,432	21.1	
2012	232,137	2,664	11,476	124,294	21.4	
2013	234,199	2,678	11,434	122,845	21.8	
2014	238,580	2,711	11,361	125,482	21.6	
2015	241,417	2,780	11,514	122,940	22.6	
2016	245,677	2,850	11,599	127,355	22.4	
2017	248,926	2,877	11,559	126,103	22.8	
2018	249,599	2,897	11,607	124,976	23.2	
2019	253,814	2,924	11,520	124,436	23.5	
2020	253,679	2,573	10,143	108,355	23.7	
2021	256,995	2,769	10,775	115,857	23.9	
2022	257,741	2,823	10,952	116,089	24.3	
2023	259,238	2,879	11,106	116,582	24.7	
			Average annual percentage change			
1970-2023	1.7%	1.9%	0.2%	0.7%	1.2%	
2013-2023	1.0%	0.7%	-0.3%	-0.5%	1.3%	

Sources:
Tables 4.1 and 4.2.

[a] Average fuel economy for all light-duty vehicles.
[b] Beginning in this year the data were revised to include all vans (including mini-vans), pickups and sport utility vehicles.
[c] Due to FHWA methodology changes, data from 2009-on are not comparable with previous data.

The 2021 VIUS includes data on Class 2b trucks which are between 8,500 and 10,000 lb gross vehicle weight rating. These trucks are often used as work trucks and have different characteristics than class 1 and 2a trucks. Although there are fewer class 2b trucks than Class 2a, there is a greater share of diesel vehicles in the Class 2b population. Class 2b trucks have an older average age, lower fuel economy, and slightly higher average annual miles.

Table 4.4
Summary Statistics on Class 1, Class 2a, and Class 2b Light-Duty Trucks, 2021

Class (truck weight)	2021 truck population (millions)	Percent diesel trucks in population	Average age (years)	Annual miles (billions)	Average annual miles per truck	Fuel use (billion gallons)	Fuel economy (miles per gallon)
Class 1 (0-6,000 lb)	94.4	0.2%	10.6	914.4	9,700	33.4	27.4
Class 2a (6,001 – 8,500 lb)	62.3	1.6%	11.0	618.5	9,900	29.5	20.9
Class 2b (8,501 – 10,000 lb)	11.9	28.8%	11.9	119.2	10,000	7.0	17.0

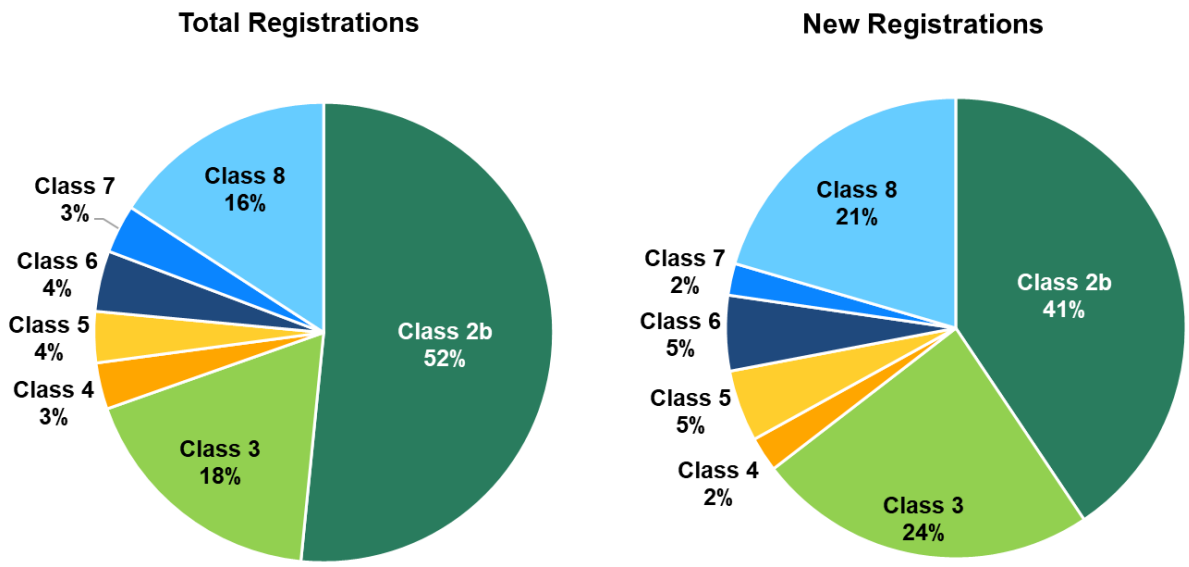
Source:
U.S. Department of Transportation, Bureau of Transportation Statistics; and U.S. Department of Commerce, Census Bureau. (2023-10-02), 2021 Vehicle Inventory and Use Survey Public Use File. (Additional resources: www.bts.gov/vius)

Table 4.5
Examples of Class 2b Vehicle Models

Manufacturer	Model	Type
Chevrolet	Silverado 2500HD	Pickup
Chevrolet	Express 2500, 3500	Van
Stellantis	Ram 2500	Pickup
Stellantis	Ram ProMaster 1500	Van
Ford	E-Series 350	Van
Ford	F-250, F-350	Pickup
Ford	F-250, F-350 CC	Chassis Cab
Ford	Transit 150, 250, 350, 350HD	Van
Ford	Transit CC / CA 150, 250, 350, 350HD	Chassis Cab / Cutaway Van
GMC	Savana 2500	Van
GMC	Sierra 2500	Pickup
GMC	Yukon 2500	SUV
Mercedes-Benz	Sprinter	Van

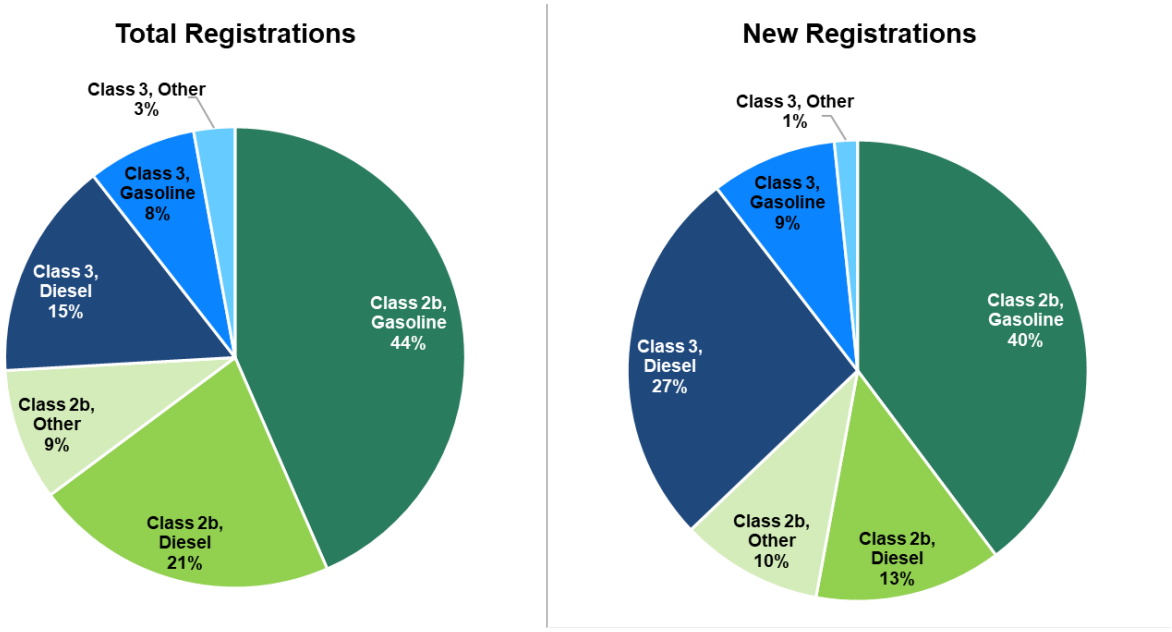
Source:
Birky, Alicia, et al., *Electrification Beyond Light-Duty: Class 2b-3 Commercial Vehicles*, ORNL/TM-2017/744, December 2017 and personal conversation with Alicia Birky, July 2025.

Figure 4.1. Truck Registrations by Class and Type, 2021



Source:
U.S. Department of Transportation, Bureau of Transportation Statistics; and U.S. Department of Commerce, Census Bureau. (2023-10-02), 2021 Vehicle Inventory and Use Survey Public Use File. (Additional resources: www.bts.gov/vius)

Figure 4.2. Class 2b and 3 Registrations by Fuel Type, 2021



Source:
U.S. Department of Transportation, Bureau of Transportation Statistics; and U.S. Department of Commerce, Census Bureau. (2023-10-02), 2021 Vehicle Inventory and Use Survey Public Use File. (Additional resources: www.bts.gov/vius)

Car sales in 2024 fell below 3 million for only the second time in this series, likely due to increased sport utility vehicle demand. Imports were over 30% of 2024 new car sales for the first time since 2011.

Table 4.6
New Retail Car Sales in the United States, 1970–2024

Calendar year	Domestic[a]	Import[b]	Total[c]	Percentage imports
	(thousands)			
1970	7,112	1,209	8,321	14.5%
1975	6,945	1,541	8,486	18.2%
1980	6,580	2,369	8,949	26.5%
1985	8,205	2,775	10,979	25.3%
1990	6,917	2,384	9,301	25.6%
1995	7,114	1,506	8,620	17.5%
1996	7,206	1,272	8,479	15.0%
1997	6,862	1,355	8,217	16.5%
1998	6,705	1,380	8,085	17.1%
1999	6,919	1,719	8,638	19.9%
2000	6,762	2,016	8,778	23.0%
2001	6,254	2,098	8,352	25.1%
2002	5,817	2,226	8,042	27.7%
2003	5,473	2,083	7,556	27.6%
2004	5,333	2,149	7,483	28.7%
2005	5,473	2,187	7,660	28.5%
2006	5,417	2,345	7,762	30.2%
2007	5,197	2,365	7,562	31.3%
2008	4,491	2,278	6,769	33.7%
2009	3,558	1,843	5,402	34.1%
2010	3,791	1,844	5,636	32.7%
2011	4,146	1,947	6,093	32.0%
2012	5,120	2,125	7,245	29.3%
2013	5,433	2,153	7,586	28.4%
2014	5,610	2,098	7,708	27.2%
2015	5,595	1,933	7,529	25.7%
2016	5,146	1,738	6,883	25.2%
2017	4,593	1,496	6,089	24.6%
2018	4,087	1,223	5,310	23.0%
2019	3,544	1,176	4,720	24.9%
2020	2,560	842	3,402	24.8%
2021	2,376	974	3,350	29.1%
2022	2,043	815	2,858	28.5%
2023	2,252	864	3,117	27.7%
2024	2,035	949	2,984	31.8%
	Average annual percentage change			
1970-2024	-2.3%	-0.4%	-1.9%	
2011-2024	-5.3%	-5.4%	-5.3%	

Source:
1970–97: American Automobile Manufacturers Association, *Motor Vehicle Facts and Figures 1998*, Detroit, MI, 1998, p. 15, and previous editions. 1998–2024: Ward's Communications, www.wardsauto.com, 2025.

[a] Any vehicle built in North America regardless of manufacturer.
[b] Any vehicle built outside of North America regardless of manufacturer. Does not include import tourist deliveries.
[c] Sums may not add to totals due to rounding.

Light-duty trucks, which include pick-ups, minivans, sport-utility vehicles, and other trucks less than 10,000 pounds gross vehicle weight (GVW), have grown more popular and by 2024 accounted for nearly 81% of all light-duty vehicle sales. Imports accounted for only 22% of 2024 light-duty truck sales.

Table 4.7
New Retail Sales of Trucks 10,000 Pounds GVW and Less in the United States, 1970–2024

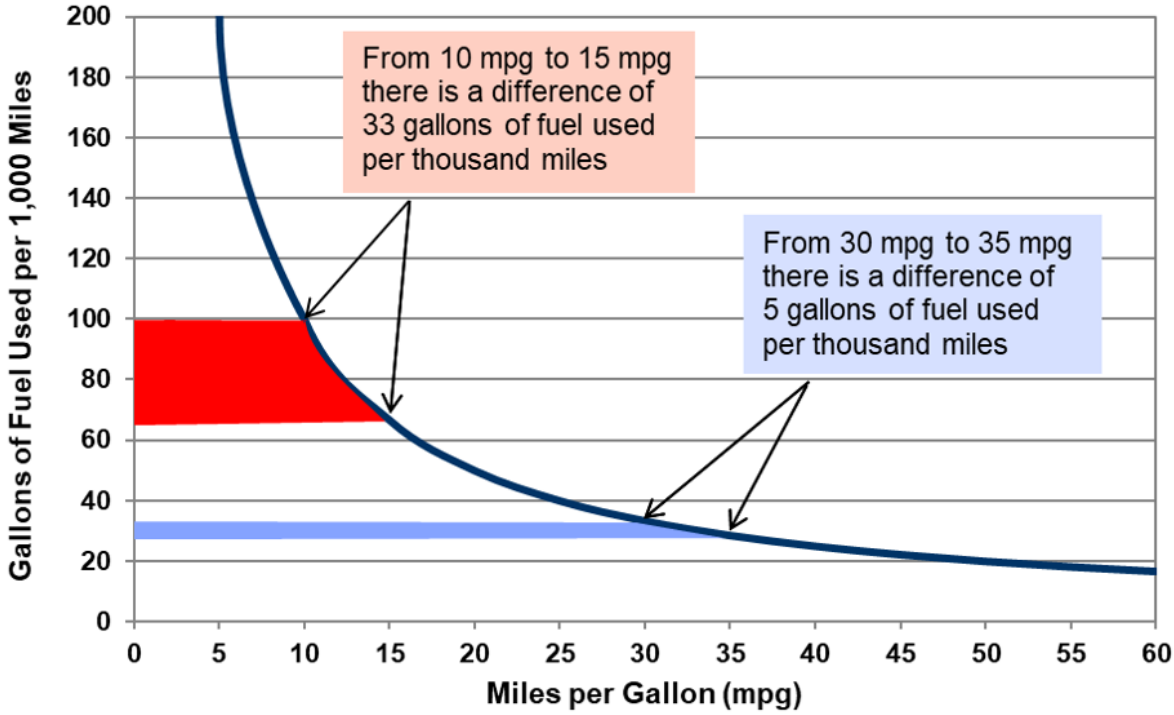
		Percentages			
Calendar year	Light-duty truck sales[a] (thousands)	Import[b]	Diesel[c]	Light-duty trucks of all light-duty vehicle sales[d]	Light-duty trucks of total truck sales
1970	1,457	4.5%	[e]	14.8%	77.8%
1975	2,053	10.0%	[e]	20.9%	78.6%
1980	1,960	24.4%	4.0%	17.5%	78.1%
1985	3,688	22.6%	4.0%	25.1%	77.7%
1990	4,548	13.5%	2.3%	32.8%	93.8%
1995	6,053	6.6%	3.8%	41.3%	93.2%
2000	8,386	10.2%	3.4%	48.9%	92.8%
2001	8,598	11.4%	2.9%	50.7%	94.3%
2002	8,633	12.4%	2.7%	51.8%	94.9%
2003	8,938	13.7%	2.9%	54.2%	95.0%
2004	9,254	13.5%	2.8%	55.3%	94.3%
2005	9,114	13.3%	2.7%	54.3%	93.1%
2006	8,574	15.7%	2.8%	52.5%	92.3%
2007	8,305	16.7%	3.2%	52.3%	93.3%
2008	6,246	17.6%	3.4%	48.0%	92.9%
2009	4,834	18.3%	4.2%	47.2%	93.0%
2010	5,758	15.6%	4.9%	50.5%	93.8%
2011	6,449	15.2%	5.4%	51.4%	92.7%
2012	6,975	15.2%	5.5%	49.0%	92.6%
2013	7,693	16.1%	5.3%	50.3%	92.7%
2014	8,484	16.0%	5.4%	52.4%	92.7%
2015	9,578	18.6%	5.5%	56.0%	92.7%
2016	10,296	20.9%	5.4%	60.0%	93.7%
2017	10,738	22.4%	4.4%	63.8%	93.6%
2018	11,609	23.8%	4.2%	68.6%	93.6%
2019	11,911	22.0%	3.3%	71.6%	93.3%
2020	10,721	22.9%	4.1%	75.9%	93.4%
2021	11,217	23.3%	4.3%	77.0%	93.0%
2022	10,563	20.0%	5.7%	78.7%	92.9%
2023	12,000	20.9%	3.0%	79.4%	93.1%
2024	12,452	21.6%	3.5%	80.7%	93.2%
		Average annual percentage change			
1970-2024	4.1%				
2014-2024	3.9%				

Source:
Ward's Communications, www.wardsauto.com, 2025.

[a] Includes all trucks of 10,000 pounds gross vehicle weight and less sold in the United States.
[b] Excluding transplants.
[c] Based on model year factory installations from 1970-2016. Based on retail sales thereafter.
[d] Includes cars and light-duty trucks up to 10,000 lb gross vehicle weight.
[e] Indicates less than 1 percent.

The relationship between gallons used over a given distance and miles per gallon (mpg) is not linear. Thus, an increase in fuel economy by 5 mpg does not translate to a constant fuel savings amount. Replacing a low-mpg car or truck with one that has slightly better fuel economy will save more fuel than replacing a high-mpg car or truck with a more efficient vehicle. For example, replacing a truck that gets 10 mpg for a new one that gets 15 mpg will save 33 gallons of fuel for every 1,000 miles driven. In contrast, replacing a 30-mpg car with a new car that gets 35 mpg will save 5 gallons of fuel for every 1,000 miles driven.

Figure 4.3. Fuel Use versus Fuel Economy



Note: Each category on the horizontal axis shows a five-mile per gallon improvement in fuel economy.

Source:
Calculated by Oak Ridge National Laboratory using data from U.S. Department of Energy fuel economy data www.fueleconomy.gov.

The fuel economy values that manufacturers must use to comply with the Corporate Average Fuel Economy (CAFE) standards are not the same as fuel economy values on new vehicle window stickers. Nor are they the same as the real-world estimates published in Tables 4.9, 4.11, and 4.12. The number of test cycles used, and the weighting of city and highway mileage differs with these three fuel economy metrics. The example of a 2024 Toyota Prius shows a combined fuel economy of 80 miles per gallon (mpg) for CAFE purposes, 57 mpg for the window sticker, and 56 mpg as the best real-world estimate. The fuel economy difference is not constant among vehicle models.

Table 4.8
Fuel Economy Comparison Among CAFE, Window Sticker, and Real-World Estimates for the 2024 Toyota Prius

Fuel economy metric	Purpose	City/highway weighting	Test basis	Fuel economy value (miles per gallon)		
				City	Hwy	Combined City/Hwy
CAFE unadjusted 2-cycle test	Basis for manufacturer compliance with CAFE standards	55%/45%	2-cycle	83	78	80
New vehicle window sticker	Consumer information to compare individual vehicles	55%/45%	5-cycle	57	56	57
Estimated real-world	Best estimate of real-world performance	43%/57%	5-cycle	57	56	56

Notes: CAFE = Corporate Average Fuel Economy. CAFE estimates and standards are shown in Tables 4.27-4.28.

Source:
U.S. Environmental Protection Agency, *The 2024 EPA Automotive Trends Report*, EPA-420-R-24-022, November 2024. (Additional resources: www.epa.gov/fuel-economy-trends)

The production-weighted fuel economy of cars increased dramatically from 1975 (13.5 mpg) to 1985 (23.0 mpg) but rose only 0.5 mpg from 1985 to 2005. Since 2005, fuel economy rose 10.8 mpg—from 23.5 mpg in 2005 to 34.3 mpg in 2024. The fuel economy values have been adjusted to provide the best estimate of real-world performance.

Table 4.9
Production, Production Shares, and Production-Weighted Fuel Economies of New Domestic and Import Cars, Model Years 1975-2024[a]

	Car			Car SUV		
Model year	Production (thousands)	Production share (%)[b]	Fuel economy (mpg)	Production (thousands)	Production share (%)[b]	Fuel economy (mpg)
1975	8,237	99.9%	13.5	10	0.1%	11.1
1980	9,443	100.0%	20.0	0	0.0%	14.6
1990	8,810	99.3%	23.3	65	0.7%	18.8
1995	9,396	97.7%	23.4	220	2.3%	17.8
1996	7,890	96.5%	23.3	287	3.5%	18.4
1997	8,334	95.8%	23.4	361	4.2%	19.2
1998	7,971	94.6%	23.4	454	5.4%	18.2
1999	8,376	94.5%	23.0	488	5.5%	18.5
2000	9,125	93.7%	22.9	617	6.3%	17.9
2001	8,405	91.9%	23.0	743	8.1%	18.8
2002	8,301	93.2%	23.1	603	6.8%	19.3
2003	7,921	93.2%	23.3	575	6.8%	19.9
2004	7,537	92.2%	23.1	639	7.8%	20.0
2005	8,027	90.8%	23.5	813	9.2%	20.2
2006	7,993	91.4%	23.3	751	8.6%	20.5
2007	8,082	89.8%	24.1	919	10.2%	20.6
2008	7,319	88.8%	24.3	924	11.2%	21.2
2009	5,636	90.3%	25.3	608	9.7%	22.0
2010	6,061	86.9%	26.2	915	13.1%	23.0
2011	5,743	82.6%	25.8	1,207	17.4%	23.5
2012	7,393	85.4%	27.6	1,265	14.6%	23.3
2013	8,226	84.5%	28.4	1,514	15.5%	24.3
2014	7,639	83.0%	28.4	1,566	17.0%	24.4
2015	7,899	82.3%	29.0	1,701	17.7%	25.1
2016	7,131	79.2%	29.2	1,870	20.8%	26.2
2017	6,979	78.1%	30.2	1,961	21.9%	26.2
2018	5,962	76.5%	30.8	1,831	23.5%	27.3
2019	5,279	73.6%	30.9	1,891	26.4%	27.5
2020	4,245	70.4%	31.7	1,785	29.6%	28.4
2021	3,548	69.3%	32.2	1,572	30.7%	31.0
2022	3,414	71.9%	33.2	1,335	28.1%	33.4
2023	3,555	66.7%	34.1	1,771	33.3%	40.5
2024[c]	[d]	58.0%	34.3	[d]	42.0%	40.3

Note: See Table 4.12 for all cars (car + car SUV). See Table 4.10 for car SUV listing.

Source:
U.S. Environmental Protection Agency, *The 2024 EPA Automotive Trends Report*, EPA-420-R-24-022, November 2024. (Additional resources: www.epa.gov/fuel-economy-trends)

[a] The fuel economy data on this table are adjusted to provide the best estimate of real-world performance. These data are typically 20-25% lower than Corporate Average Fuel Economy data.
[b] Production share is based on total of cars plus car SUVs. Percentages may not sum to totals due to rounding.
[c] Data for 2024 are preliminary.
[d] Data are not available.

A vehicle classification was created to match the Corporate Average Fuel Economy (CAFE) methodology. Under CAFE, two-wheel and all-wheel drive sport utility vehicles that are under 6,000 lb gross vehicle weight and do not have off road capabilities will be held to the same standards as cars. The Environmental Protection Agency has labeled these vehicles as "car SUVs."

Table 4.10
Listing of Car Sport Utility Vehicles in Model Year 2023

BMW X3 sDrive30i	Mercedes EQB
Fisker Ocean	Mercedes EQB 4Matic
Ford Escape FWD	Mercedes EQE 4MATIC
Ford Mustang Mach-E AWD	Mercedes EQE
Ford Mustang Mach-E RWD	Mercedes GLA 250
Lincoln Corsair AWD	Mercedes GLB 250
Lincoln Corsair FWD	Mercedes GLC 300
Lincoln Nautilus FWD	Mitsubishi Eclipse Cross 2WD
Buick Encore GX FWD	Mitsubishi Outlander Sport 2WD
Buick Envision FWD	Infiniti QX50
Cadillac Lyriq	Nissan Rogue FWD
Cadillac Lyriq AWD	Alfa Romeo Stelvio
Cadillac XT4 FWD	Tesla Model X
Chevrolet Equinox FWD	Tesla Model Y AWD
Chevrolet Trailblazer FWD	Tesla Model Y RWD
GMC Terrain FWD	Lexus NX
Acura RDX FWD	Lexus NX AWD
Honda CR-V FWD	Lexus RX 350
Genesis Electrified GV70	Toyota bZ4X
Genesis GV70 AWD	Toyota Corolla Cross
Hyundai Ioniq 5 AWD	Toyota RAV4
Hyundai Ioniq 5 RWD	Volvo C40 Recharge twin
Hyundai Kona AWD	Volvo XC40
Hyundai Kona FWD	Volvo XC60
Hyundai Kona Electric	Audi Q4 e-tron
Hyundai NEXO	VW Atlas Cross Sport
Hyundai	VW ID.4
Hyundai Tucson FWD	VW Taos
Kia Seltos FWD	VW Taos 4Motion

Note: 2WD = two-wheel drive. AWD = All-wheel drive. FWD = Front-wheel drive. RWD = Rear-wheel drive.

Source:
Personal communication with the U.S. Environmental Protection Agency, 2025.
(Additional resources: www.epa.gov/fuel-economy-trends)

Production of sport utility vehicles (SUVs) has grown substantially since 1975. The production-weighted fuel economy of truck SUVs was 26.0 mpg in 2024. Estimates show 74% of all light-duty trucks produced in 2024 were truck SUVs, 24% were pickups, and 3% were vans.

Table 4.11
Production, Production Shares, and Production-Weighted Fuel Economies of New Domestic and Import Light-Duty Trucks, Model Years 1975-2024[a]

	Pickup			Van			Truck SUV		
Model Year	Production (Thousands)	Share (%)[b]	Fuel Economy (mpg)	Production (Thousands)	Share (%)[b]	Fuel Economy (mpg)	Production (Thousands)	Share (%)[b]	Fuel Economy (mpg)
1975	1,343	67.9%	11.9	457	23.1%	11.1	177	9.0%	11.0
1980	1,437	77.1%	16.5	242	13.0%	14.1	184	9.9%	13.2
1985	2,078	58.0%	18.2	855	23.9%	16.5	648	18.1%	16.5
1990	1,835	49.1%	17.4	1,262	33.7%	17.8	643	17.2%	16.4
1995	2,271	41.1%	16.9	1,662	30.1%	18.1	1,596	28.9%	16.0
1996	1,955	39.4%	17.1	1,409	28.4%	18.3	1,603	32.3%	16.2
1997	2,408	41.8%	16.8	1,265	22.0%	18.2	2,089	36.3%	16.1
1998	2,415	40.0%	17.0	1,489	24.7%	18.7	2,127	35.3%	16.2
1999	2,544	40.1%	16.3	1,463	23.0%	18.3	2,342	36.9%	16.1
2000	2,612	38.2%	16.7	1,691	24.8%	18.6	2,526	37.0%	16.0
2001	2,519	39.0%	16.0	1,232	19.1%	18.0	2,707	41.9%	16.4
2002	2,380	33.0%	15.8	1,243	17.2%	18.7	3,588	49.8%	16.3
2003	2,474	34.0%	16.1	1,232	16.9%	19.0	3,571	49.1%	16.4
2004	2,505	33.3%	15.7	953	12.7%	19.2	4,075	54.1%	16.5
2005	2,300	32.6%	15.8	1,481	21.0%	19.3	3,272	46.4%	16.7
2006	2,188	34.4%	16.1	1,166	18.3%	19.5	3,006	47.3%	17.2
2007	2,113	33.7%	16.2	847	13.5%	19.5	3,314	52.8%	17.7
2008	1,794	31.7%	16.5	790	14.0%	19.8	3,072	54.3%	18.2
2009	989	32.2%	16.9	368	12.0%	20.1	1,714	55.8%	19.3
2010	1,276	30.8%	16.9	559	13.5%	20.1	2,305	55.7%	19.7
2011	1,479	29.2%	17.2	521	10.3%	20.9	3,069	60.5%	19.8
2012	1,357	28.3%	17.2	662	13.8%	21.3	2,771	57.9%	20.0
2013	1,577	28.9%	17.5	571	10.5%	21.1	3,310	60.6%	20.8
2014	1,929	30.6%	18.0	672	10.6%	21.3	3,706	58.8%	21.6
2015	1,786	25.0%	18.8	655	9.2%	21.8	4,697	65.8%	21.9
2016	1,907	26.2%	18.9	630	8.7%	21.7	4,741	65.1%	22.2
2017	2,054	25.5%	18.9	617	7.7%	22.2	5,391	66.9%	22.3
2018	2,259	26.7%	19.1	508	6.0%	22.8	5,692	67.3%	23.1
2019	2,521	28.1%	19.0	555	6.2%	22.4	5,893	65.7%	23.5
2020	1,976	25.7%	19.2	402	5.2%	23.4	5,313	69.1%	23.8
2021	2,224	25.6%	19.3	298	3.4%	27.3	6,169	71.0%	24.1
2022	2,105	25.9%	20.0	374	4.6%	26.0	5,633	69.4%	24.2
2023	2,083	23.5%	20.5	351	4.0%	25.9	6,437	72.6%	24.7
2024[c]	[d]	23.5%	21.0	[d]	2.8%	26.3	[d]	73.6%	26.0

Note: Data include pickups, vans, and truck SUV less than 8,500 lb Beginning with 2011, truck SUV and passenger vans up to 10,000 lb were also included. See Table 4.12 for all light-duty trucks (pickup + van + truck SUV).

Source:
U.S. Environmental Protection Agency, *The 2024 EPA Automotive Trends Report*, EPA-420-R-24-022, November 2024. (Additional resources: www.epa.gov/fuel-economy-trends)

[a] The fuel economy data on this table are adjusted to provide the best estimate of real world performance. These data are typically 20-25% lower than Corporate Average Fuel Economy data.

[b] Production share is based on the total of pickups, plus vans and truck SUVs. Percentages may not sum to totals due to rounding.

[c] Data for 2024 are preliminary.

[d] Data are not available.

The average fuel economy of cars nearly tripled from 1975 to 2024 while the average fuel economy of light-duty trucks doubled in that same period. This was not steady annual growth, but growth in the 1970's and early 1980's followed by a long period with little improvement. Growth resumed around 2008-2009.

Table 4.12
Production and Production-Weighted Fuel Economies of New Domestic and Import Cars, Light-Duty Trucks and Light-Duty Vehicles, Model Years 1975-2024[a]

Model Year	All Cars[b]		All Light-Duty Trucks		All Light-Duty Vehicles	
	Production (Thousands)	Fuel Economy (mpg)	Production (Thousands)	Fuel Economy (mpg)	Production (Thousands)	Fuel Economy (mpg)
1975	8,247	13.5	1,977	11.6	10,224	13.1
1980	9,444	20.0	1,863	15.8	11,307	19.2
1985	10,879	23.0	3,581	17.5	14,460	21.3
1990	8,875	23.3	3,740	17.4	12,615	21.2
1995	9,616	23.3	5,529	17.0	15,145	20.5
2000	9,742	22.5	6,829	16.8	16,571	19.8
2001	9,148	22.6	6,458	16.5	15,606	19.6
2002	8,904	22.8	7,211	16.5	16,115	19.5
2003	8,496	23.0	7,277	16.7	15,773	19.6
2004	8,176	22.9	7,533	16.5	15,709	19.3
2005	8,839	23.1	7,053	16.9	15,892	19.9
2006	8,744	23.0	6,360	17.2	15,104	20.1
2007	9,001	23.7	6,275	17.4	15,276	20.6
2008	8,243	23.9	5,656	17.8	13,898	21.0
2009	6,244	25.0	3,071	18.5	9,316	22.4
2010	6,976	25.7	4,141	18.8	11,116	22.6
2011	6,949	25.4	5,069	19.1	12,018	22.3
2012	8,659	26.9	4,790	19.3	13,449	23.6
2013	9,740	27.7	5,458	19.8	15,198	24.2
2014	9,205	27.6	6,307	20.3	15,512	24.1
2015	9,601	28.2	7,138	21.1	16,739	24.6
2016	9,001	28.5	7,277	21.2	16,278	24.7
2017	8,954	29.2	8,061	21.3	17,016	24.9
2018	7,800	29.9	8,459	21.9	16,259	25.1
2019	7,171	29.9	8,969	22.0	16,139	24.9
2020	6,030	30.7	7,691	22.4	13,721	25.4
2021	5,120	31.8	8,692	22.7	13,812	25.4
2022	4,748	33.3	8,111	23.0	12,860	26.0
2023	5,326	36.0	8,870	23.6	14,196	27.1
2024[c]	[d]	36.6	[d]	24.6	[d]	28.0

Note: Data include pickups, vans, and truck SUV less than 8,500 lb Beginning with 2011, truck SUVs and passenger vans up to 10,000 lb were also included.

Source:
U.S. Environmental Protection Agency, *The 2024 EPA Automotive Trends Report*, EPA-420-R-24-022, November 2024. (Additional resources: www.epa.gov/fuel-economy-trends)

[a] The fuel economy data on this table are adjusted to provide the best estimate of real world performance. These data are typically 20-25% lower than Corporate Average Fuel Economy data.
[b] All Cars include both car and car SUV categories.
[c] Data for 2024 are preliminary.
[d] Data are not available, but 36.7% of all light-duty vehicles were cars (car + car SUV) and 63.3% were light-duty trucks (pickups, vans, and truck SUV) in 2024.

Back in 1975 only 19.3% of new light-duty vehicles produced were light-duty trucks. Because of the boom in production of minivans, sport utility vehicles, and pick-up trucks, that number rose to 41.7% in 1998. Since 2018 more than half of light-duty vehicles produced were light-duty trucks. The car SUV category was 12.5% of production in 2023 and the truck SUVs were 45.3%.

Table 4.13
Light-Duty Vehicle Production Shares[a], Model Years 1975–2023

Model Year	Car	Car SUV	Pickup	Van	Truck SUV	Total Light-Duty Vehicles Produced (thousands)	Production Share	
							All Cars[b]	Light-duty Trucks
1975	80.6%	0.1%	13.1%	4.5%	1.7%	10,224	80.7%	19.3%
1980	83.5%	0.0%	12.7%	2.1%	1.6%	11,306	83.5%	16.5%
1985	74.6%	0.6%	14.4%	5.9%	4.5%	14,460	75.2%	24.8%
1990	69.8%	0.5%	14.5%	10.0%	5.1%	12,615	70.4%	29.6%
1995	62.0%	1.5%	15.0%	11.0%	10.5%	15,145	63.5%	36.5%
1996	60.0%	2.2%	14.9%	10.7%	12.2%	13,144	62.2%	37.8%
1997	57.6%	2.5%	16.7%	8.8%	14.5%	14,458	60.1%	39.9%
1998	55.1%	3.1%	16.7%	10.3%	14.7%	14,456	58.3%	41.7%
1999	55.1%	3.2%	16.7%	9.6%	15.4%	15,215	58.3%	41.7%
2000	55.1%	3.7%	15.8%	10.2%	15.2%	16,571	58.8%	41.2%
2001	53.9%	4.8%	16.1%	7.9%	17.3%	15,605	58.6%	41.4%
2002	51.5%	3.7%	14.8%	7.7%	22.3%	16,115	55.3%	44.7%
2003	50.2%	3.6%	15.7%	7.8%	22.6%	15,773	53.9%	46.1%
2004	48.0%	4.1%	15.9%	6.1%	25.9%	15,709	52.0%	48.0%
2005	50.5%	5.1%	14.5%	9.3%	20.6%	15,892	55.6%	44.4%
2006	52.9%	5.0%	14.5%	7.7%	19.9%	15,104	57.9%	42.1%
2007	52.9%	6.0%	13.8%	5.5%	21.7%	15,276	58.9%	41.1%
2008	52.7%	6.6%	12.9%	5.7%	22.1%	13,898	59.3%	40.7%
2009	60.5%	6.5%	10.6%	4.0%	18.4%	9,316	67.0%	33.0%
2010	54.5%	8.2%	11.5%	5.0%	20.7%	11,116	62.8%	37.3%
2011	47.8%	10.0%	12.3%	4.3%	25.5%	12,018	57.8%	42.2%
2012	55.0%	9.4%	10.1%	4.9%	20.6%	13,449	64.4%	35.6%
2013	54.1%	10.0%	10.4%	3.8%	21.8%	15,198	64.1%	35.9%
2014	49.2%	10.1%	12.4%	4.3%	23.9%	15,512	59.3%	40.7%
2015	47.2%	10.2%	10.7%	3.9%	28.1%	16,739	57.4%	42.6%
2016	43.8%	11.5%	11.7%	3.9%	29.1%	16,278	55.3%	44.7%
2017	41.0%	11.6%	12.1%	3.6%	31.7%	17,016	52.6%	47.4%
2018	36.7%	11.3%	13.9%	3.1%	35.0%	16,259	48.0%	52.0%
2019	32.7%	11.7%	15.6%	3.4%	36.5%	16,139	44.4%	55.6%
2020	30.9%	13.0%	14.4%	2.9%	38.7%	13,721	43.9%	56.1%
2021	25.7%	11.4%	16.1%	2.2%	44.7%	13,812	37.1%	62.9%
2022	26.5%	10.4%	16.4%	2.9%	43.8%	12,860	36.9%	63.1%
2023	25.0%	12.5%	14.7%	2.5%	45.3%	14,196	37.5%	62.5%

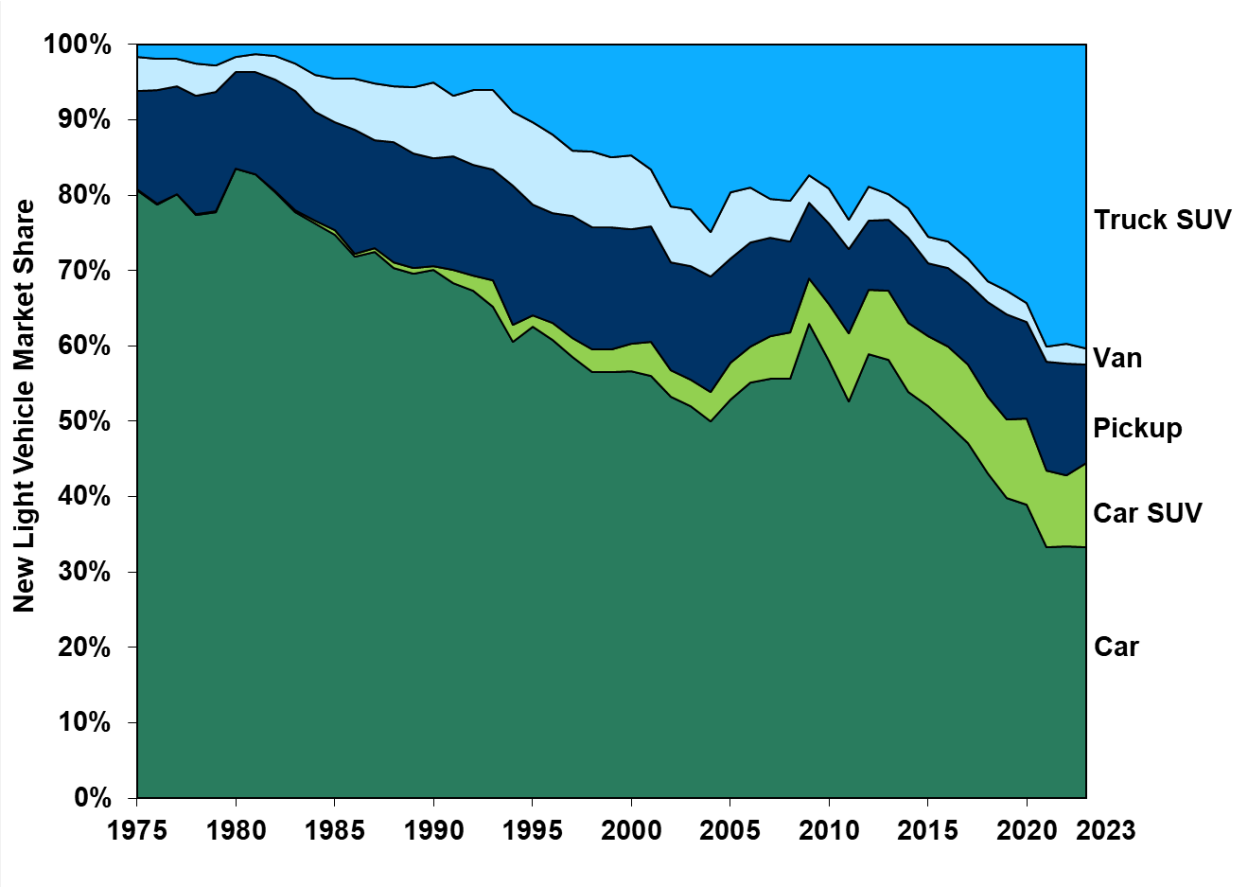
Note: Light-duty truck data include pickups, vans, and truck SUVs less than 8,500 lb Beginning with 2011, SUV and passenger vans up to 10,000 lb were also included.

Source:
U.S. Environmental Protection Agency, *The 2024 EPA Automotive Trends Report*, EPA-420-R-24-022, November 2024. (Additional resources: www.epa.gov/fuel-economy-trends)

[a] Percentages may not sum to totals due to rounding.
[b] All cars include both car and car SUV categories.

The effects of the Japanese earthquake/tsunami in 2011 are apparent in the large decline in car production for that year. Light-duty trucks were gaining market share from the early 1980s until 2004, mainly due to increases in the market share of sport utility vehicles (SUVs) and pickup trucks. Car SUVs are two-wheel drive SUVs that are counted as cars in the Corporate Average Fuel Economy Standards for model years 2011-on. A listing of the makes/models of car SUVs is in Table 4.10.

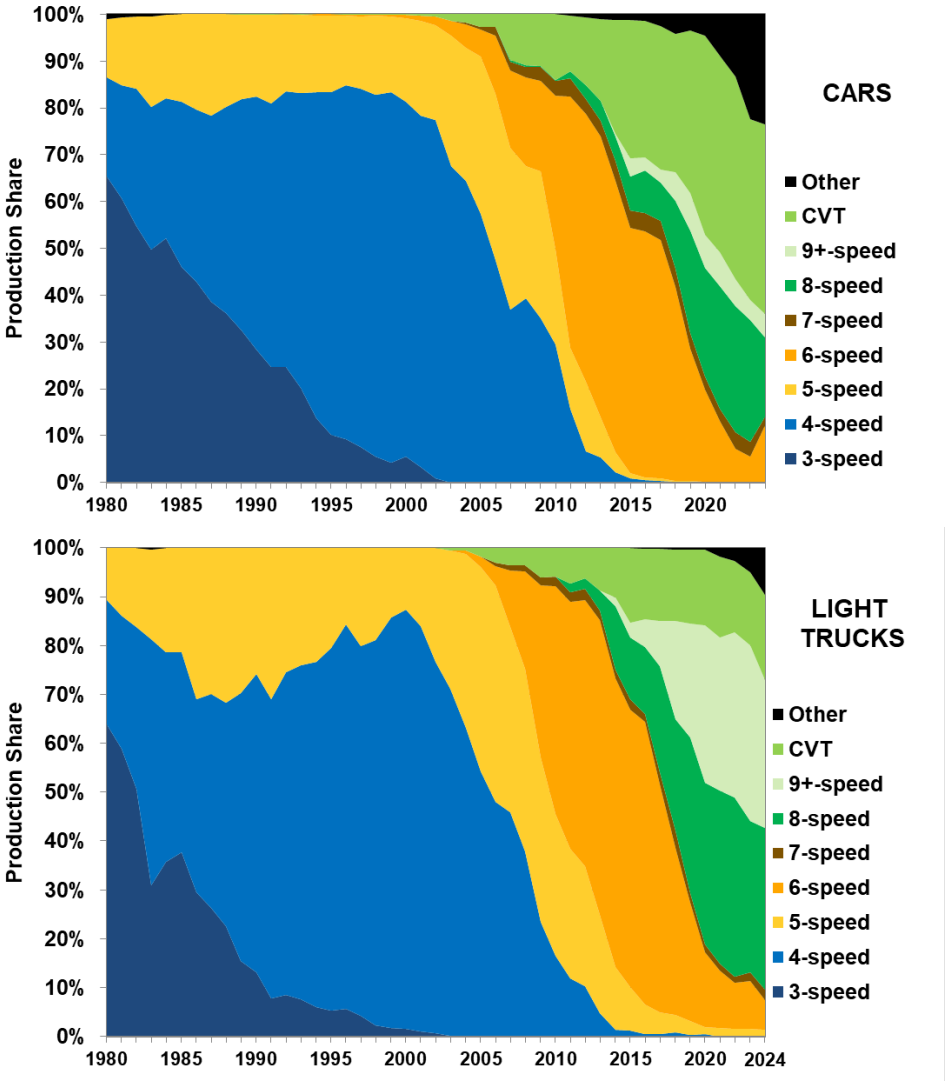
Figure 4.4. Light-Duty Vehicle Production Shares, Model Years 1975–2023



Source:
U.S. Environmental Protection Agency, *The 2024 EPA Automotive Trends Report*, EPA-420-R-24-022, November 2024. (Additional resources: www.epa.gov/fuel-economy-trends)

The number of transmission speeds in new light-duty vehicles has been growing over the last few decades. By 2024, all cars and 99% of light-duty trucks were at least six speeds. Since 2020, more than 30% of all light-duty trucks produced had nine or more speeds. Continuously variable transmissions (CVTs) were 40% of car production and 18% of light-duty truck production. A greater number of gears improves fuel economy and performance by more closely matching the wheel speed to the optimum engine speed.

Figure 4.5. Car and Light-Duty Truck Production by Transmission Speed, Model Years 1980-2024

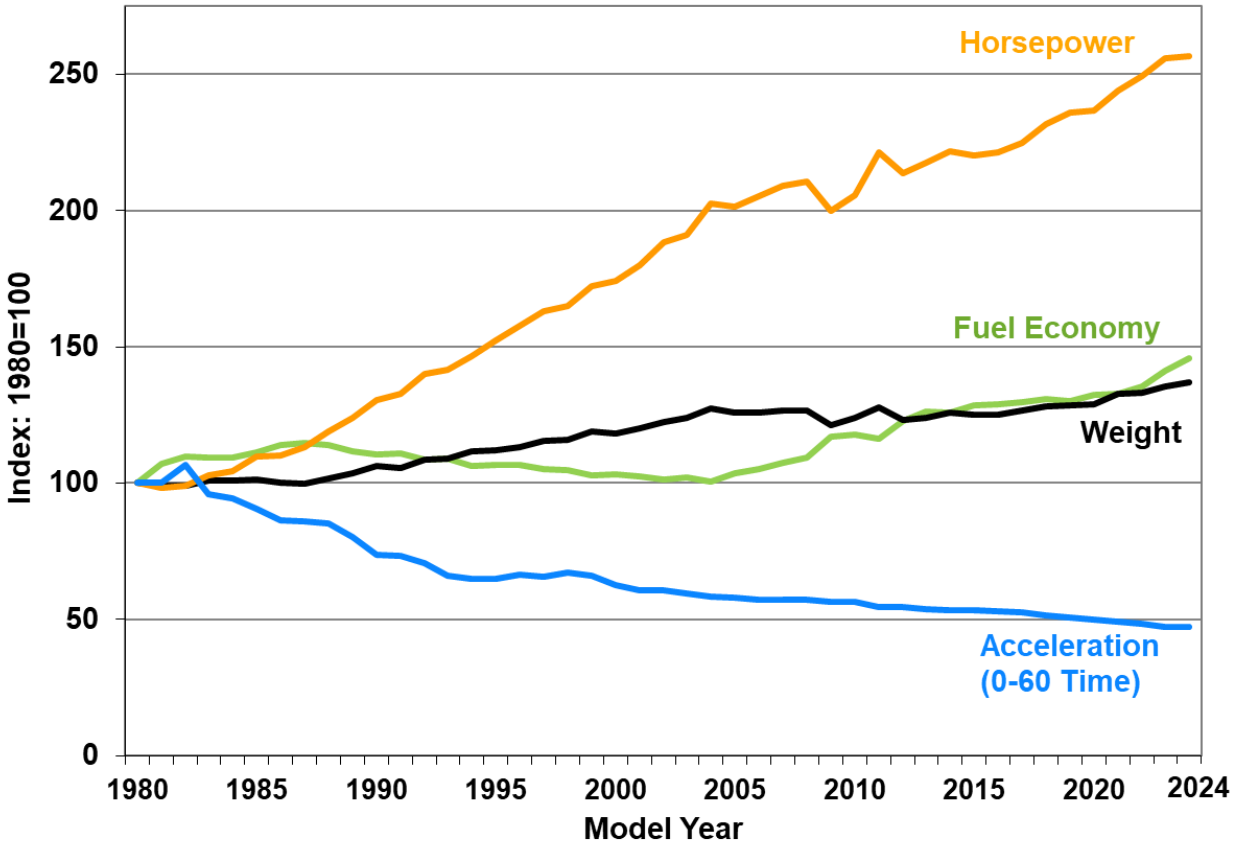


Note: Data are production-weighted averages for each model year. Data for model year 2024 are preliminary. CVT data include both hybrid and non-hybrid. The "Other" category includes electric vehicles and plug-in hybrid-electric vehicles. Data include light-duty trucks less than 8,500 lb Beginning with 2011, SUVs and passenger vans up to 10,000 lb were also included.

Source:
U.S. Environmental Protection Agency, *The 2024 EPA Automotive Trends Report*, EPA-420-R-24-022, November 2024. (Additional resources: www.epa.gov/fuel-economy-trends)

Increased performance typically comes as a trade-off with fuel economy. But light-duty vehicle manufacturers have been able to employ advanced technologies to improve both performance and fuel economy. Despite a 157% increase in horsepower and 53% improvement in acceleration from model year 1980 to 2024, the fuel economy of vehicles improved 37%. In the 1990s and early 2000s, fuel economy decreased while vehicle weight increased. Fuel economy has improved nearly every year since 2004.

Figure 4.6. Horsepower, Fuel Economy, Weight, and 0-60 Time for New Light-Duty Vehicles, Model Years 1980-2024



Note: Data are production-weighted averages for each model year. Data for model year 2024 are preliminary. Data include light-duty trucks less than 8,500 lb Beginning with 2011, SUVs and passenger vans up to 10,000 lb were also included.

Source:
U.S. Environmental Protection Agency, *The 2024 EPA Automotive Trends Report*, EPA-420-R-24-022, November 2024. (Additional resources: www.epa.gov/fuel-economy-trends)

Manufacturers have introduced new technologies that have played a significant role in improving the fuel economy of passenger cars. Turbocharging has enabled manufacturers to downsize engines without sacrificing performance while gasoline direct injection has improved combustion efficiency in the engine. Cylinder deactivation is another strategy for reducing engine displacement that shuts down cylinders under light load conditions. Stop-start reduces unnecessary idling by automatically shutting down the engine when the vehicle is stopped and restarting the engine only when needed. Continuously variable transmissions improve efficiency by maintaining optimum engine speed as the vehicle speed varies. Gasoline direct injection grew rapidly after 2008, peaking at 53% of new cars in MY 2019; it was installed in 44% of new cars in MY 2024. Turbochargers were installed on 36% of new cars produced in MY 2024.

Table 4.14
Car Technology Penetration, 1996-2024

Model year	Turbo	Continuously variable transmission (non-hybrid)	Continuously variable transmission (hybrid)	Gasoline direct injection	Cylinder deactivation	Stop-start (non-hybrid)	Stop-start (hybrid)
1996	0.3%	0.0%	[a]	[a]	[a]	[a]	[a]
1997	0.7%	0.1%	[a]	[a]	[a]	[a]	[a]
1998	1.4%	0.1%	[a]	[a]	[a]	[a]	[a]
1999	2.5%	0.0%	[a]	[a]	[a]	[a]	[a]
2000	2.2%	0.0%	[a]	[a]	[a]	[a]	0.1%
2001	3.3%	0.0%	0.2%	[a]	[a]	[a]	0.2%
2002	3.9%	0.1%	0.3%	[a]	[a]	[a]	0.3%
2003	2.0%	1.0%	0.5%	[a]	[a]	[a]	0.6%
2004	3.6%	0.9%	0.8%	[a]	[a]	[a]	0.9%
2005	2.4%	1.1%	1.7%	[a]	1.0%	[a]	1.9%
2006	3.2%	1.2%	1.5%	[a]	2.0%	[a]	1.5%
2007	3.6%	6.7%	3.0%	0.3%	0.9%	[a]	3.2%
2008	4.5%	7.7%	3.2%	3.1%	2.0%	[a]	3.3%
2009	4.0%	8.3%	2.8%	4.2%	1.8%	[a]	2.9%
2010	4.1%	8.4%	5.5%	9.2%	2.1%	[a]	5.6%
2011	8.2%	8.8%	3.1%	18.4%	1.3%	[a]	3.4%
2012	9.7%	11.0%	4.0%	27.4%	1.7%	1.3%	4.6%
2013	15.1%	13.7%	4.3%	37.3%	1.9%	3.5%	5.3%
2014	18.1%	21.3%	3.7%	42.7%	2.2%	10.7%	4.1%
2015	18.1%	26.3%	3.6%	44.0%	2.2%	12.7%	4.0%
2016	23.6%	27.2%	2.4%	49.5%	2.1%	12.1%	2.7%
2017	28.9%	29.1%	2.7%	52.4%	3.0%	15.7%	3.4%
2018	36.4%	28.2%	2.4%	52.5%	3.3%	21.8%	2.9%
2019	35.2%	32.1%	3.2%	53.1%	3.6%	25.2%	4.4%
2020	35.8%	39.5%	4.1%	52.1%	4.8%	29.0%	3.6%
2021	33.5%	38.6%	4.2%	46.7%	5.2%	27.4%	3.9%
2022	33.5%	38.7%	5.8%	42.5%	4.0%	36.1%	5.2%
2023	29.7%	34.1%	4.8%	37.4%	4.2%	32.4%	6.0%
2024[b]	35.8%	34.6%	6.4%	44.2%	2.4%	42.2%	6.7%

Note: Based on production. Car category includes car SUV. See Table 4.10 for car SUV listing.

Source:
U.S. Environmental Protection Agency, *The 2024 EPA Automotive Trends Report*, EPA-420-R-24-022, November 2024. (Additional resources: www.epa.gov/fuel-economy-trends)

[a] The Environmental Protection Agency did not record market penetration for this technology in this year.
[b] Data for 2024 are preliminary.

Manufacturers have introduced a number of engine and transmission technologies to improve fuel efficiency and performance of light-duty trucks. Gasoline direct injection has seen rapid market penetration from about 1% of all new light-duty trucks produced in model year (MY) 2008 to 60% by MY 2024. Turbocharging reached nearly 50% or more of light-duty truck production in MY 2024. The penetration of continuously variable transmissions (CVT) is lower for light-duty trucks than for cars because CVTs are not generally well suited to the high horsepower and high torque requirements of pickup trucks and large SUVs that provide greater load hauling and towing capability.

Table 4.15
Light-Duty Truck Technology Penetration, 2002-2024

Model year	Turbo	Continuously variable transmission (non-hybrid)	Continuously variable transmission (hybrid)	Gasoline direct injection	Cylinder deactivation	Stop-start (non-hybrid)	Stop-start (hybrid)
2002	[a]	0.0%	[a]	[a]	[a]	[a]	
2003	0.2%	0.6%	[a]	[a]	[a]	[a]	
2004	0.8%	0.6%	[a]	[a]	[a]	[a]	0.0%
2005	0.7%	1.7%	0.1%	[a]	0.5%	[a]	0.1%
2006	0.6%	1.6%	1.5%	[a]	5.9%	[a]	1.5%
2007	1.0%	2.9%	0.7%	[a]	16.4%	[a]	0.8%
2008	1.0%	2.3%	1.3%	1.1%	13.5%	[a]	1.3%
2009	1.7%	5.1%	0.9%	4.2%	18.3%	[a]	0.9%
2010	1.8%	5.1%	0.8%	6.8%	13.8%	[a]	0.9%
2011	4.9%	6.9%	0.4%	11.3%	20.6%	[a]	0.4%
2012	6.1%	5.9%	0.3%	13.5%	19.6%	0.3%	0.4%
2013	11.7%	8.4%	0.4%	18.4%	18.0%	1.1%	0.4%
2014	9.9%	9.8%	0.3%	29.7%	22.9%	2.8%	0.4%
2015	12.6%	15.0%	0.3%	39.0%	21.7%	5.9%	0.3%
2016	15.3%	13.6%	0.8%	46.1%	20.7%	11.2%	0.8%
2017	17.3%	13.8%	1.0%	46.7%	21.8%	20.0%	1.1%
2018	24.1%	13.7%	1.1%	48.1%	20.9%	37.1%	1.8%
2019	25.8%	13.8%	1.4%	52.8%	24.0%	46.3%	3.2%
2020	33.0%	12.8%	2.8%	61.1%	22.5%	58.3%	2.6%
2021	30.8%	11.0%	6.1%	57.4%	23.3%	53.9%	6.2%
2022	37.1%	9.2%	5.7%	58.0%	22.9%	56.4%	6.5%
2023	41.8%	9.7%	5.9%	58.3%	21.6%	59.4%	7.9%
2024[b]	49.4%	10.3%	8.1%	60.6%	19.7%	62.4%	10.7%

Note: Based on production. Data include pickups, vans, and truck SUV less than 8,500 lb Beginning with 2011, truck SUVs and passenger vans up to 10,000 lb were also included.

Source:
U.S. Environmental Protection Agency, *The 2024 EPA Automotive Trends Report*, EPA-420-R-24-022, November 2024. (Additional resources: www.epa.gov/fuel-economy-trends)

[a] The Environmental Protection Agency did not record market penetration for this technology in this year.
[b] Data for 2024 are preliminary.

The production-weighted average engine displacement of cars in 1975 was 4.73 liters but had declined to 2.04 liters by 2024. Car SUVs also experienced a decline in engine displacement. For a list of car SUVs, see Table 4.10.

Table 4.16
Production-Weighted Engine Size of New Domestic and Import Cars, Model Years 1975-2024
(liters[a])

Model Year	Car	Car SUV
1975	4.73	4.29
1980	3.08	4.59
1985	2.90	2.80
1990	2.67	3.42
1991	2.66	3.52
1992	2.78	3.44
1993	2.73	3.91
1994	2.75	3.42
1995	2.74	3.51
1996	2.71	3.52
1997	2.68	3.11
1998	2.68	3.58
1999	2.72	3.45
2000	2.71	3.47
2001	2.70	3.17
2002	2.71	3.00
2003	2.71	2.97
2004	2.76	3.13
2005	2.72	3.05
2006	2.82	3.01
2007	2.71	3.04
2008	2.70	2.93
2009	2.54	2.87
2010	2.56	2.81
2011	2.61	2.72
2012	2.42	2.74
2013	2.37	2.63
2014	2.40	2.52
2015	2.37	2.51
2016	2.32	2.33
2017	2.27	2.26
2018	2.26	2.09
2019	2.21	2.06
2020	2.17	2.02
2021	2.23	2.10
2022	2.22	2.07
2023	2.27	1.93
2024[b]	2.04	1.72
Annual average percentage change		
1975-2024	-1.7%	-1.8%
2014-2024	-1.7%	-3.7%

Source:
U.S. Environmental Protection Agency, *The 2024 EPA Automotive Trends Report*, EPA-420-R-24-022, November 2024. (Additional resources: www.epa.gov/fuel-economy-trends)

a 1 liter = 61.02 cubic inches.

b Data for 2024 are preliminary.

Engine sizes for light-duty trucks have been declining. The production-weighted engine size of truck sport utility vehicles (SUVs) was 2.6 liters in 2024 while pickups were 3.66 liters.

Table 4.17
Production-Weighted Engine Size of New Domestic and Import Light-Duty Trucks, Model Years 1975-2024
(liters[a])

Model Year	Pickup	Van	Truck SUV
1975	5.02	5.20	5.44
1980	3.86	4.72	4.83
1985	3.63	3.87	3.63
1990	4.04	3.69	3.85
1995	4.20	3.79	4.01
1996	4.12	3.61	4.24
1997	4.33	3.61	4.19
1998	4.13	3.56	4.14
1999	4.38	3.65	4.14
2000	4.18	3.55	4.15
2001	4.41	3.75	3.92
2002	4.45	3.57	4.01
2003	4.33	3.59	4.05
2004	4.61	3.58	4.13
2005	4.65	3.53	4.00
2006	4.55	3.54	3.87
2007	4.69	3.59	3.94
2008	4.69	3.60	3.76
2009	4.70	3.53	3.46
2010	4.80	3.51	3.48
2011	4.63	3.47	3.56
2012	4.69	3.44	3.52
2013	4.62	3.43	3.36
2014	4.80	3.49	3.21
2015	4.54	3.32	3.24
2016	4.36	3.37	3.13
2017	4.48	3.37	3.11
2018	4.37	3.36	2.95
2019	4.38	3.34	2.93
2020	4.31	3.18	2.83
2021	4.23	2.90	2.91
2022	3.94	2.99	2.81
2023	3.80	3.07	2.80
2024[b]	3.66	3.28	2.62
	Annual average percentage change		
1975-2024	-0.6%	-0.9%	-1.5%
2014-2024	-2.7%	-0.6%	-2.0%

Note: Data include pickups, vans, and truck SUV less than 8,500 lb Beginning with 2011, truck SUVs and passenger vans up to 10,000 lb were also included.

Source:
U.S. Environmental Protection Agency, *The 2024 EPA Automotive Trends Report*, EPA-420-R-24-022, November 2024. (Additional resources: www.epa.gov/fuel-economy-trends)

[a] 1 liter = 61.02 cubic inches.
[b] Data for 2024 are preliminary.

The production-weighted loaded vehicle weight of cars declined by 252 lb from 1975 to 2024, while car SUVs declined by only 14 lb

Table 4.18
Production-Weighted Loaded Vehicle Weight[a] of New Domestic and Import Cars, Model Years 1975–2024
(pounds)

Model Year	Car	Car SUV
1975	4,058	4,000
1980	3,101	4,000
1985	3,093	3,469
1990	3,176	3,518
1991	3,154	3,733
1992	3,240	3,713
1993	3,207	3,848
1994	3,250	3,735
1995	3,263	3,763
1996	3,282	3,710
1997	3,274	3,549
1998	3,306	3,824
1999	3,365	3,831
2000	3,369	3,870
2001	3,380	3,765
2002	3,391	3,747
2003	3,417	3,716
2004	3,462	3,854
2005	3,463	3,848
2006	3,534	3,876
2007	3,507	3,935
2008	3,527	3,902
2009	3,464	3,846
2010	3,474	3,949
2011	3,559	3,890
2012	3,452	3,915
2013	3,465	3,966
2014	3,497	3,865
2015	3,489	3,868
2016	3,468	3,782
2017	3,471	3,860
2018	3,535	3,739
2019	3,512	3,714
2020	3,582	3,755
2021	3,631	3,786
2022	3,679	3,890
2023	3,799	4,075
2024[b]	3,806	3,986
Annual average percentage change		
1975-2024	-0.1%	0.0%
2014-2024	0.9%	0.3%

Source:
U.S. Environmental Protection Agency, *The 2024 EPA Automotive Trends Report*, EPA-420-R-24-022, November 2024. (Additional resources: www.epa.gov/fuel-economy-trends)

[a] Loaded vehicle weight is equal to the vehicle's curb weight plus 300 pounds.
[b] Data for 2024 are preliminary.

The production-weighted loaded vehicle weight of pickups, vans, and truck SUVs increased from 1975 to 2024. Pickups gained 1,385 lb while vans gained 541 lb and truck SUVs gained 364 lb

Table 4.19
Production-Weighted Loaded Vehicle Weight [a] of New Domestic and Import Light-Duty Trucks, Model Years 1975–2024
(pounds)

Model Year	Pickup	Van	Truck SUV
1975	4,012	4,196	4,214
1980	3,740	4,353	4,237
1985	3,642	3,975	4,092
1990	3,928	4,095	4,098
1995	4,182	4,110	4,323
1996	4,190	4,195	4,386
1997	4,415	4,240	4,463
1998	4,282	4,183	4,450
1999	4,486	4,306	4,518
2000	4,340	4,276	4,602
2001	4,551	4,518	4,546
2002	4,690	4,394	4,636
2003	4,642	4,393	4,754
2004	4,939	4,487	4,756
2005	4,988	4,430	4,756
2006	4,968	4,475	4,715
2007	5,144	4,479	4,797
2008	5,161	4,527	4,727
2009	5,176	4,572	4,548
2010	5,309	4,533	4,555
2011	5,268	4,502	4,665
2012	5,335	4,442	4,640
2013	5,429	4,543	4,584
2014	5,485	4,489	4,483
2015	5,165	4,416	4,533
2016	5,150	4,459	4,482
2017	5,217	4,503	4,510
2018	5,233	4,524	4,426
2019	5,085	4,497	4,444
2020	5,126	4,487	4,448
2021	5,201	4,591	4,493
2022	5,171	4,559	4,489
2023	5,197	4,660	4,562
2024[b]	5,397	4,737	4,578
Annual average percentage change			
1975-2024	0.6%	0.2%	0.2%
2014-2024	-0.2%	0.5%	0.2%

Note: Data include pickups, vans, and truck SUV less than 8,500 lb Beginning with 2011, truck SUVs and passenger vans up to 10,000 lb were also included.

Source:
U.S. Environmental Protection Agency, *The 2024 EPA Automotive Trends Report*, EPA-420-R-24-022, November 2024. (Additional resources: www.epa.gov/fuel-economy-trends)

[a] Loaded vehicle weight is equal to the vehicle's curb weight plus 300 pounds.
[b] Data for 2024 are preliminary.

The American Chemistry Council created a new methodology for determining the material content of a new light-duty vehicle that is not comparable to the data in past issues of the Transportation Energy Data Book.

Table 4.20
Materials Content for a Light-Duty Vehicle, 2014–2023[a]
(pounds)

Material	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
High-Strength Steel	1,005	1,038	1,067	1,111	1,147	1,185	1,202	1,308	1,373	1,442
Other Steels & Steel Alloys	947	883	839	805	763	727	677	673	616	609
Aluminum	341	354	374	387	398	402	435	453	457	473
Plastics & Polymer Composites	337	335	340	353	359	367	368	384	381	399
Iron	299	294	291	295	296	296	293	251	257	257
Other Metals/Alloys	186	188	189	195	207	209	214	226	217	228
Synthetic Rubber/Elastomers	182	181	177	184	191	197	198	206	205	220
Fluids & Lubricants	186	185	181	176	179	173	178	182	189	195
Glass	83	87	87	88	94	95	95	101	100	104
Textiles	72	75	75	80	86	87	91	93	96	100
Natural rubber	80	75	75	77	78	79	75	73	72	71
Coatings	42	41	42	42	39	39	40	40	40	42
Average Vehicle Curb Weight	3,760	3,735	3,735	3,793	3,837	3,856	3,866	3,989	4,003	4,139

Sources:
Share of material in an average light-duty vehicle: American Chemistry Council, Chemistry and Automobiles Driving the Future, Tables 4 & 5, May 2024.
Average Vehicle Curb Weight: U.S. Environmental Protection Agency, The 2024 Automotive EPA Trends Report, EPA-420-R-24-022, November 2024.
(Additional information: www.epa.gov)

[a] Data are for cars, pickups, vans, and SUVs produced in North America.

In the automotive industry, a Tier 1 supplier is a company that sells directly to the original equipment manufacturer (OEM). Globally, Bosch Group was the top automotive supplier in 2023. Of the top 20 global Tier 1 suppliers, Magna International has the highest share of sales in North America (49%) with Adient and Panasonic not far behind (47% each).

Table 4.21
List of Top Twenty Tier 1 Global Suppliers, 2023

			Market share				
Rank	Company	Headquarters location	North America	Europe	Asia	Rest of World	Total
1	Bosch Group	Germany	17%	41%	40%	2%	100%
2	ZF Friedrichshafen AG	Germany	28%	44%	24%	4%	100%
3	Magna International, Inc.	Canada	49%	38%	12%	1%	100%
4	CATL	China	10%	20%	70%	0%	100%
5	Denso Corp.	Japan	25%	10%	63%	2%	100%
6	Hyundai Mobis	Korea	15%	13%	68%	4%	100%
7	Aisin Corp.	Japan	22%	8%	67%	3%	100%
8	Continental	Germany	27%	48%	21%	4%	100%
9	Forvia	France	24%	48%	25%	3%	100%
10	Lear Corp.	United States	40%	37%	19%	4%	100%
11	Valeo	France	20%	48%	32%	0%	100%
12	Apitiv PLC	Ireland	38%	34%	28%	0%	100%
13	Sumitomo Electric Industries	Japan	28%	a	a	a	a
14	Motherson Group	India	21%	44%	31%	4%	100%
15	Yanfeng International	China	19%	10%	71%	0%	100%
16	Adient	United States	47%	34%	19%	0%	100%
17	BASF	Germany	28%	33%	36%	3%	100%
18	Panasonic Automotive Systems Co	Japan	47%	8%	45%	0%	100%
19	Hitachi Astemo	Japan	30%	a	a	a	a
20	Yazaki Corp.	Japan	32%	18%	50%	0%	100%

Source:
Crain Communications, Automotive News Supplement, "Top 100 Global Suppliers," 2024. (Additional resources: www.autonews.com)

[a] Data are not available.

There are 18 U.S.-based companies in the top 100 automotive global suppliers. Nine of these companies had at least half of their sales in North America in 2023.

Table 4.22
U.S.-Based Tier 1 Suppliers in the Global Top 100, 2023

Rank	Company	Percent North American sales	Products
10	Lear Corp.	40%	Seating & electrical systems (E-Systems)
16	Adient	47%	Seating & structures for passenger & commercial vehicles
21	BorgWarner, Inc.	29%	Inverters, power electronics, charging stations, electric drive modules, electric motors, turbochargers, high voltage heaters
28	Dana Inc.	45%	Axles, driveshafts, thermal, sealing, e-axles, e-transmissions, motors, inverters, e-thermal & fuel cell bipolar plates for traditional & EV programs
36	Flex-N-Gate Corp.	84%	Interior & exterior plastics, metal bumpers & towing devices, structural components & assemblies, forward & signal lighting, prototyping & sequencing
46	American Axle & Mfg Holdings, Inc	73%	Driveline (including EV) & metal forming component
58	Nexteer Automotive	54%	Electric power steering, hydraulic power steering systems, steer-by-wire systems, steering columns, driveline systems & software solutions
59	Visteon Corp.	28%	Digital instrument clusters, displays, Android-based infotainment systems, domain controllers, ADAS, connected services, power electronics & battery management systems
61	Novelis Inc.	57%	Flat-rolled aluminum sheet for vehicle structures, body panels, heat shields & other automotive applications
67	Flex	43%	Power electronics, compute platforms, motion & interfaces
69	Piston Group	100%	Batteries, cooling modules, brake corners, grills, shocks, struts, lps, piston interiors, seat trim & parts, sun visors, armrests, consoles & shades
84	Cooper Standard	55%	Sealing & fluid handling systems
92	Autokiniton	96%	Frame assembly, body in white stampings & complex assemblies, hot stampings & tube mill
93	Clarios	48%	Battery technologies that support virtually every type of passenger, commercial & recreational vehicle (conventional to fully electric)
94	Gentex Corp.	38%	Interior & exterior auto-dimming mirrors & full display mirrors, HomeLink, SmartBeam, aerospace windows & fire protection products
95	Nifco	27%	Injection molding plastic, fasteners, ADAS, powertrain, interior, exterior & EV
97	Bridgewater Interiors	100%	Automotive seating systems
99	Inteva Products	65%	Closure & interior systems; motors & electronics

Note: Rank based on total global OEM automotive parts sales in 2023.

Source:
Crain Communications, Automotive News Supplement, "GLOBAL - Top 100 parts suppliers worldwide, ranked by sales of original equipment parts in 2023," 2024. (Additional resources: www.autonews.com)

The number of franchised dealerships which sell new light-duty vehicles (cars and light-duty trucks) has declined 45% since 1970. The average number of light-duty vehicle sales per dealer in 2024 was 910.

Table 4.23
New Light-Duty Vehicle Dealerships and Sales, 1970–2024

Calendar year	Number of franchised new Light-duty vehicle dealerships[a]	New light-duty vehicle sales[b] (thousands)	Light-duty vehicle sales per dealer
1970	30,800	9,778	320
1975	29,600	10,539	361
1980	27,900	10,909	391
1985	24,725	14,667	593
1990	24,825	13,849	558
1991	24,200	12,307	509
1992	23,500	12,842	546
1993	22,950	13,869	604
1994	22,850	15,024	657
1995	22,800	14,673	644
1996	22,750	14,998	659
1997	22,700	15,014	661
1998	22,600	15,384	681
1999	22,400	16,711	746
2000	22,250	17,164	771
2001	22,150	16,950	765
2002	21,800	16,675	765
2003	21,725	16,494	759
2004	21,650	16,737	773
2005	21,640	16,774	775
2006	21,495	16,336	760
2007	21,200	15,867	748
2008	20,770	13,015	627
2009	20,010	10,236	512
2010	18,460	11,394	617
2011	17,700	12,542	709
2012	17,540	14,220	811
2013	17,665	15,279	865
2014	16,396	16,192	988
2015	16,545	17,107	1,033
2016	16,708	17,179	1,028
2017	16,802	16,827	1,001
2018	16,753	16,919	1,010
2019	16,741	16,630	993
2020	16,623	14,123	850
2021	16,676	14,567	874
2022	16,773	13,421	800
2023	16,835	15,117	898
2024	16,957	15,436	910
	Average annual percentage change		
1970-2024	-1.1%	0.8%	2.0%
2014-2024	0.3%	-0.5%	-0.8%

Source:
Number of dealers - National Automobile Dealers Association website, www.nada.org, 2025. (Additional resources: www.nada.org). Light-duty vehicle sales - See tables 4.5 and 4.6.

[a] As of the beginning of the year.
[b] Includes cars and trucks up to 10,000 lb gross vehicle weight.

The target levels for the fuel economy and carbon dioxide emission standards for vehicles manufactured in model years 2012-on are assigned based on a vehicle's "footprint." Each footprint has a different target. The vehicle footprint is calculated as:

footprint = track width × wheelbase,

where

track width = lateral distance between the centerlines of the base tires at ground, and
wheelbase = longitudinal distance between the front and rear wheel centerlines.

Table 4.24
Vehicle Footprint by Vehicle Type, Model Years 2008-2024
(square feet)

Model year	Car	Car SUV	All cars	Pickup	Van	Truck SUV	All light-duty trucks	All light-duty vehicles
2008	45.2	46.2	45.3	63.0	54.1	48.7	54.0	48.9
2009	44.9	46.1	45.0	62.6	54.5	48.6	53.8	47.9
2010	45.2	46.9	45.4	63.5	54.2	48.3	53.8	48.5
2011	45.8	46.9	46.0	63.9	55.4	49.7	54.4	49.5
2012	45.4	46.8	45.7	64.3	54.8	49.7	54.5	48.8
2013	45.7	47.1	45.9	65.3	54.8	49.7	54.7	49.1
2014	46.0	46.5	46.1	66.2	55.1	49.2	55.0	49.7
2015	46.0	46.4	46.1	65.3	54.6	49.4	53.9	49.4
2016	46.2	46.1	46.1	64.5	55.2	49.1	53.7	49.5
2017	46.1	46.5	46.2	64.8	55.7	49.4	53.8	49.8
2018	46.7	46.0	46.5	65.5	55.5	49.2	53.9	50.4
2019	46.5	46.4	46.5	65.1	55.1	49.5	54.2	50.8
2020	46.6	46.6	46.6	65.6	55.5	50.0	54.3	50.9
2021	46.9	46.8	46.9	65.7	55.7	50.1	54.3	51.5
2022	47.1	47.6	47.2	64.7	56.0	50.1	54.2	51.6
2023	47.4	48.3	47.7	65.1	56.6	50.6	54.2	51.8
2024[a]	47.1	47.9	47.5	65.6	57.0	50.2	54.0	51.6

Source:
U.S. Environmental Protection Agency, *The 2024 EPA Automotive Trends Report*, EPA-420-R-24-022, November 2024. (Additional resources: www.epa.gov/fuel-economy-trends)

[a] Data for 2024 are preliminary.

The Corporate Average Fuel Economy standards were first established by the U.S. Energy Policy and Conservation Act of 1975 (PL94-163). These standards must be met at the manufacturer level. Legislation passed in December 2007 changed the CAFE standard methodology beginning in the 2011 model year (MY). Some two-wheel drive sport utility vehicles are classified as cars under the final standards for MY 2011 on.

Table 4.25
Car Corporate Average Fuel Economy (CAFE) Standards versus Sales-Weighted Fuel Economy Estimates, 1978–2021[a]
(miles per gallon)

Model year[b]	Cars				CAFE estimates
	CAFE standards		CAFE estimates[c]		Cars and light-duty trucks combined
	Domestic	Import	Domestic	Import	
1978	18.0	18.0	18.7	27.3	19.9
1980	20.0	20.0	22.6	29.6	23.1
1985	27.5	27.5	26.3	31.5	25.4
1990	27.5	27.5	26.9	29.9	25.4
1995	27.5	27.5	27.7	30.3	24.9
1996	27.5	27.5	28.1	29.6	24.9
1997	27.5	27.5	27.8	30.1	24.6
1998	27.5	27.5	28.6	29.2	24.7
1999	27.5	27.5	28.0	29.0	24.5
2000	27.5	27.5	28.7	28.3	24.8
2001	27.5	27.5	28.7	29.0	24.5
2002	27.5	27.5	29.1	28.8	24.7
2003	27.5	27.5	29.1	29.9	25.1
2004	27.5	27.5	29.9	28.7	24.6
2005	27.5	27.5	30.5	29.9	25.4
2006	27.5	27.5	30.3	29.7	25.8
2007	27.5	27.5	30.6	32.2	26.6
2008	27.5[d]	27.5	31.2	31.8	27.1
2009	27.5[d]	27.5	32.1	33.8	29.0
2010	27.5[d]	27.5	33.1	35.2	29.3
2011	30.0	30.4	32.7	33.7	29.0
2012	32.7	33.4	34.8	36.0	30.8
2013	33.2	33.9	36.1	36.8	31.6
2014	34.0	34.6	36.3	36.9	31.7
2015	35.2	35.8	37.2	37.3	32.2
2016	36.5	37.4	37.3	38.1	32.3
2017	38.5	39.6	39.2	39.7	33.4
2018	39.8	40.6	41.9	39.8	34.0
2019	41.3	42.1	41.2	40.4	33.7
2020	42.7	43.9	43.4	41.2	34.7
2021	42.9	44.4	46.2	42.7	35.0

Source:
U.S. Department of Transportation, NHTSA, "Summary of Fuel Economy Performance," Washington, DC, December 2014 and CAFE Public Information Center Reports, July 2025. (Additional resources: www.nhtsa.gov)

[a] Only vehicles with at least 75 percent domestic content can be counted in the average domestic fuel economy for a manufacturer.
[b] Model year as determined by the manufacturer on a vehicle-by-vehicle basis.
[c] All CAFE calculations are sales weighted.
[d] Unreformed standards, which were an option from 2008-2010.

The Corporate Average Fuel Economy standards for light-duty trucks are lower than the car standards. Light-duty trucks include pickups, minivans, sport utility vehicles and vans. Legislation passed in December 2007 changed the CAFE standard methodology beginning in the 2011 model year (MY). Some two-wheel drive sport utility vehicles are classified as cars under the final standards for MY 2011 on.

Table 4.26
Light-Duty Truck Corporate Average Fuel Economy (CAFE) Standards versus Sales-Weighted Fuel Economy Estimates, 1978–2021[a]
(miles per gallon)

Model year[c]	Light-Duty trucks[b]				CAFE estimates
	CAFE standards	CAFE estimates[d]			Cars and light-duty trucks combined
		Domestic	Import	Combined	
1978	[e]	[f]	[f]	[f]	19.9
1980	[e]	16.8	24.3	18.5	23.1
1985	19.5	19.6	26.5	20.7	25.4
1990	20.0	20.3	23.0	20.8	25.4
2000	20.7	[f]	[f]	21.3	24.8
2001	20.7	[f]	[f]	20.9	24.5
2002	20.7	[f]	[f]	21.4	24.7
2003	20.7	[f]	[f]	21.8	25.1
2004	20.7	[f]	[f]	21.5	24.6
2005	21.0	[f]	[f]	22.1	25.4
2006	21.6	[f]	[f]	22.5	25.8
2007	22.2	[f]	[f]	23.1	26.6
2008	22.4[g]	[f]	[f]	23.6	27.1
2009	23.0[g]	[f]	[f]	24.8	29.0
2010	23.4[g]	[f]	[f]	25.2	29.3
2011	24.3	[f]	[f]	24.7	29.0
2012	25.3	[f]	[f]	25.0	30.8
2013	25.9	[f]	[f]	25.7	31.6
2014	26.3	[f]	[f]	26.5	31.7
2015	27.6	[f]	[f]	27.3	32.2
2016	28.8	[f]	[f]	27.4	32.3
2017	29.4	[f]	[f]	28.6	33.4
2018	30.0	[f]	[f]	29.5	34.0
2019	30.4	[f]	[f]	29.6	33.7
2020	31.0	[f]	[f]	30.4	34.7
2021	31.5	[f]	[f]	31.1	35.0

Source:
U.S. Department of Transportation, NHTSA, "Summary of Fuel Economy Performance," Washington, DC, December 2014 and CAFE Public Information Center Reports, July 2025. (Additional resources: www.nhtsa.gov)

[a] Only vehicles with at least 75% domestic content can be counted in the average domestic fuel economy for a manufacturer.

[b] Represents two- and four-wheel drive trucks combined. Gross vehicle weight of 0-6,000 pounds for model year 1978-1979 and 0-8,500 pounds for subsequent years.

[c] Model year as determined by the manufacturer on a vehicle-by-vehicle basis.

[d] All CAFE calculations are sales weighted.

[e] Standards were set for two-wheel drive and four-wheel drive light-duty trucks, but no combined standard was set in this year.

[f] Data are not available.

[g] Unreformed standards, which were an option from 2008-2010. See Table 4.25 for reformed standards.

Manufacturers of cars and light-duty trucks whose vehicles did not meet the CAFE standards were fined until changes were made in 2025. Data from the National Highway Traffic Safety Administration show the CAFE fine in the year in which the money was collected, which may not be the same year in which it was assessed.

Table 4.27
Corporate Average Fuel Economy (CAFE) Fines Collected, as of July 2025[a]

Model year	Current dollars	2020 constant dollars[b]
1982	$120,000	$321,838
1983	$57,970	$150,635
1984	$5,958,020	$14,841,204
1985	$15,564,540	$37,437,492
1986	$29,871,815	$70,539,729
1987	$31,260,530	$71,219,798
1988	$44,519,450	$97,397,493
1989	$47,380,515	$98,891,923
1990	$48,329,015	$95,700,694
1991	$41,826,645	$79,480,146
1992	$38,288,815	$70,631,265
1993	$28,688,380	$51,383,172
1994	$31,498,570	$55,007,938
1995	$34,262,413	$58,185,626
1996	$19,301,930	$31,839,081
1997	$36,211,782	$58,392,570
1998	$21,571,421	$34,251,049
1999	$27,516,451	$42,746,459
2000	$51,067,038	$76,752,097
2001	$34,009,421	$49,700,803
2002	$19,804,978	$28,492,196
2003	$13,548,667	$19,057,305
2004	$33,637,439	$46,086,497
2005	$27,486,696	$36,425,290
2006	$43,183,481	$55,438,293
2007	$37,028,365	$46,220,005
2008	$12,922,256	$15,533,559
2009	$7,661,280	$9,242,338
2010	$23,803,412	$28,252,306
2011	$40,013,270	$46,038,590
2012	$14,962,382	$16,866,420
2013	$18,738,390	$20,818,011
2014	$2,289,788	$2,503,304
2015	$0	$0
2016	$167,198,554	$180,298,178
2017	$117,683,478	$124,256,603
2018	$269,122,087	$277,378,792
2019	$112,302,344	$113,687,800
2020	$78,383,151	$78,383,151

Source:
U.S. Department of Transportation, National Highway Traffic Safety Administration, Summary of Civil Penalties, July 2025. (Additional resources: www.nhtsa.gov)

[a] These data represent fines collected, not fines being assessed. Fines which are assessed in certain year may not have been collected in that year.

[b] Adjusted using the Consumer Price Inflation Index.

Consumers must pay the Gas Guzzler Tax when purchasing a car that has an Environmental Protection Agency (EPA) fuel economy rating (combined city and highway) less than that stipulated in the table below. The Gas Guzzler Tax doubled in 1991 after remaining constant from 1986 to 1990. The tax has not changed since 1991. This tax does not apply to light-duty trucks such as pickups, minivans, sport utility vehicles, and vans.

Table 4.28
The Gas Guzzler Tax on New Cars
(dollars per vehicle)

Vehicle fuel economy (mpg)	1980	1981	1982	1983	1984	1985	1986–90	1991 - on
Over 22.5	0	0	0	0	0	0	0	0
22.0–22.5	0	0	0	0	0	0	500	1,000
21.5–22.0	0	0	0	0	0	0	500	1,000
21.0–21.5	0	0	0	0	0	0	650	1,300
20.5–21.0	0	0	0	0	0	500	650	1,300
20.0–20.5	0	0	0	0	0	500	850	1,700
19.5–20.0	0	0	0	0	0	600	850	1,700
19.0–19.5	0	0	0	0	450	600	1,050	2,100
18.5–19.0	0	0	0	350	450	800	1,050	2,100
18.0–18.5	0	0	200	350	600	800	1,300	2,600
17.5–18.0	0	0	200	500	600	1,000	1,300	2,600
17.0–17.5	0	0	350	500	750	1,000	1,500	3,000
16.5–17.0	0	200	350	650	750	1,200	1,500	3,000
16.0–16.5	0	200	450	650	950	1,200	1,850	3,700
15.5–16.0	0	350	450	800	950	1,500	1,850	3,700
15.0–15.5	0	350	600	800	1,150	1,500	2,250	4,500
14.5–15.0	200	450	600	1,000	1,150	1,800	2,250	4,500
14.0–14.5	200	450	750	1,000	1,450	1,800	2,700	5,400
13.5–14.0	300	550	750	1,250	1,450	2,200	2,700	5,400
13.0–13.5	300	550	950	1,250	1,750	2,200	3,200	6,400
12.5–13.0	550	650	950	1,550	1,750	2,650	3,200	6,400
Under 12.5	550	650	1,200	1,550	2,150	2,650	3,850	7,700

Source:
Internal Revenue Service, Form 6197, (Rev. 10-2023), "Gas Guzzler Tax," October 2023.
(Additional resources: www.irs.gov)

Consumers who purchased these 2024 model year vehicles paid the Gas Guzzler tax. The tax is based on unadjusted combined city/highway fuel economy. Adjusted combined fuel economy is on the window sticker.

Table 4.29
List of Model Year 2024 Cars with Gas Guzzler Taxes[a]

Manufacturer	Model(s)	Size class	Unadjusted combined city/highway fuel economy	Adjusted combined city/highway fuel economy
Aston Martin Lagonda Ltd	Valour	Two Seaters	18	14
Audi	RS 6 Avant	Midsize Station Wagons	21	17
Audi	RS 7	Midsize Cars	21	17
Bentley	Continental GT	Subcompact Cars	22	17
Bentley	Continental GT	Subcompact Cars	19	15
Bentley	Continental GTC	Minicompact Cars	21	16
Bentley	Continental GTC	Minicompact Cars	18	14
Bentley	Flying Spur	Midsize Cars	21	17
Bentley	Flying Spur	Midsize Cars	18	15
BMW	M8 Competition Convertible	Subcompact Cars	22	17
BMW	M8 Competition Coupe	Subcompact Cars	22	17
BMW	M8 Competition Gran Coupe	Midsize Cars	22	17
Bugatti	Chiron Super Sport	Two Seaters	11	9
Cadillac	CT5 V	Midsize Cars	19	16
Cadillac	CT5 V	Midsize Cars	19	15
Chevrolet	Camaro	Subcompact Cars	19	16
Chevrolet	Camaro	Subcompact Cars	20	16
Chevrolet	Corvette Z06	Two Seaters	18	15
Chevrolet	Corvette Z06 Carbon Aero	Two Seaters	17	14
Ferrari	812 Competizione	Two Seaters	17	14
Ferrari	812 Competizione A	Two Seaters	17	14
Ferrari	Ferrari Daytona SP3	Two Seaters	17	13
Ford	Mustang Dark Horse	Subcompact Cars	22	17
Ford	Mustang Dark Horse	Subcompact Cars	22	17
Ford	Mustang Dark Horse	Subcompact Cars	21	17
Lamborghini	Huracan Coupe 2WD	Two Seaters	18	15
Lamborghini	Huracan Spyder	Two Seaters	18	15
Lamborghini	Huracan Sterrato	Two Seaters	18	15
Lamborghini	Urus Performante	Small Station Wagons	20	16
Maserati	Ghibli Trofeo	Midsize Cars	20	16
Maserati	Quattroporte Trofeo	Large Cars	20	16
Mercedes-Benz	AMG GT 55 4Matic+ (coupe)	Two Seaters	20	16
Mercedes-Benz	AMG GT 63 4Matic+ (coupe)	Two Seaters	20	16
Mercedes-Benz	AMG SL 55 4Matic+	Minicompact Cars	21	16
Mercedes-Benz	AMG SL 63 4Matic+	Minicompact Cars	21	16
Mercedes-Benz	Maybach S 680 4Matic	Large Cars	19	15
Porsche	718 GT4 RS	Two Seaters	21	16
Porsche	718 Spyder RS	Two Seaters	21	16
Porsche	911 GT3	Two Seaters	20	16
Porsche	911 GT3	Two Seaters	20	15
Porsche	911 GT3 RS	Two Seaters	20	16
Porsche	911 GT3 Touring	Two Seaters	20	16
Porsche	911 GT3 Touring	Two Seaters	20	15
Porsche	911 S/T	Two Seaters	19	15
Porsche	911 Turbo	Minicompact Cars	21	17
Porsche	911 Turbo Cabriolet	Minicompact Cars	21	16
Porsche	911 Turbo S	Minicompact Cars	21	16
Porsche	911 Turbo S Cabriolet	Minicompact Cars	21	16
Rolls-Royce	Cullinan	Midsize Station Wagons	18	14

Table 4.29 (Continued)
List of Model Year 2024 Cars with Gas Guzzler Taxes[a]

Manufacturer	Model(s)	Size class	Unadjusted combined city/highway fuel economy	Adjusted combined city/highway fuel economy
Rolls-Royce	Cullinan Black Badge	Midsize Station Wagons	18	14
Rolls-Royce	Ghost	Large Cars	18	14
Rolls-Royce	Ghost Black Badge	Large Cars	18	14
Rolls-Royce	Ghost Extended	Large Cars	18	14
Rolls-Royce	Phantom	Large Cars	18	14
Rolls-Royce	Phantom Extended	Large Cars	18	14

Source:
U.S. Department of Energy and U.S. Environmental Protection Agency, Fuel Economy Guide database, www.fueleconomy.gov, 2025.

[a] Tax is based on unadjusted combined fuel economy; adjusted combined fuel economy is used on window stickers.

The IRS collected $116 million from those buying model year 2023 cars with combined city/highway fuel economy less than 22.5 miles per gallon. This tax does not apply to light-duty trucks such as pickups, minivans, sport utility vehicles, and vans.

Table 4.30
Tax Receipts from the Sale of Gas Guzzlers, 1980–2023
(thousands)

Model year	Current dollars	2023 constant dollars[a]
1980	740	2,736
1985	39,790	112,677
1986	147,660	410,514
1987	145,900	391,338
1988	116,780	300,787
1989	109,640	269,416
1990	103,200	240,591
1991	118,400	264,880
1992	144,200	313,172
1993	111,600	235,327
1994	64,100	131,791
1995	73,500	146,953
1996	52,600	102,150
1997	48,200	91,506
1998	47,700	89,167
1999	68,300	124,917
2000	70,800	125,278
2001	78,200	134,544
2002	79,700	134,990
2003	126,700	209,814
2004	140,800	227,115
2005	163,800	255,557
2006	201,700	304,853
2007	178,700	262,611
2008	172,400	243,985
2009	99,300	141,034
2010	85,200	119,055
2011	68,900	93,332
2012	73,500	97,544
2013	61,300	80,179
2014	48,200	62,038
2015	58,700	75,463
2016	72,500	92,043
2017	36,700	45,621
2018	42,000	50,964
2019	42,700	50,892
2020	49,000	57,688
2021	52,900	59,485
2022	55,100	57,368
2023	116,600	116,600

Source:
Internal Revenue Service, "SOI tax stats – Excise tax statistics," accessed March 2025. (Additional resources: www.irs.gov)

[a] Adjusted using the Consumer Price Inflation Index.

This table shows the driving cycles for the new methodology that the Environmental Protection Agency (EPA) used to determine fuel economy ratings for new vehicles beginning in model year 2008. In addition to the Urban Driving Cycle and the Highway Driving cycle, the EPA will also use three additional tests to adjust fuel economy ratings to account for higher speeds, air conditioner use, and colder temperatures. Though the EPA uses a complex combination of these five cycles to determine the fuel economy that will be posted on a new vehicle window sticker, the manufacturer's Corporate Average Fuel Economy is still calculated using only the city and highway driving cycles. To know more about new vehicle fuel economy ratings, visit www.fueleconomy.gov.

Table 4.31
Driving Cycle Attributes

	Test schedule				
	City	Highway	High speed	Air conditioner (AC)	Cold temp
Trip type	Low speeds in stop-and-go urban traffic	Free-flow traffic at highway speeds	Higher speeds; harder acceleration & braking	AC use under hot ambient conditions	*City* test w/colder outside temperature
Top speed	56 mph	60 mph	80 mph	54.8 mph	56 mph
Average speed	21 mph	48 mph	48 mph	21 mph	21 mph
Max. acceleration	3.3 mph/sec	3.2 mph/sec	8.46 mph/sec	5.1 mph/sec	3.3 mph/sec
Simulated distance	11 mi.	10.3 mi.	8 mi.	3.6 mi.	11 mi.
Time	31.2 min.	12.8 min.	9.9 min.	9.9 min.	31.2 min.
Stops	23	None	4	5	23
Idling time	18% of time	None	7% of time	19% of time	18% of time
Engine startup[a]	Cold	Warm	Warm	Warm	Cold
Lab temperature	68-86° F	68-86° F	68-86° F	95° F	20° F
Vehicle air conditioning	Off	Off	Off	On	Off

Source:
U.S. Department of Energy and U.S. Environmental Protection Agency, Fuel Economy website, www.fueleconomy.gov, 2025.

[a] A vehicle's engine doesn't reach maximum fuel efficiency until it is warm.

Testing cycles to determine vehicle fuel economy and emissions vary by country. The United States currently uses five different drive cycles to determine vehicle fuel economy for new vehicle window stickers. The Chinese test cycle was developed by the China Automotive Technology and Research Center (CATARC). The ARTEMIS cycles are not used in vehicle certification but are used to represent real world driving in Europe.

Table 4.32
Comparison of U.S., Chinese, Japanese, and European Cycles Attributes

Cycle	Time (seconds)	Distance (miles)	Average Speed (mph)	Maximum Speed (mph)	Maximum Acceleration (mph/s)
United States					
City	1,872	11.0	21.2	56.0	3.3
Highway	765	10.3	48.3	60.0	3.2
High-Speed	594	8.0	48.4	80.0	8.5
Air Conditioner Use	594	3.6	21.2	54.8	5.1
Cold Temperatures	1,872	11.0	21.2	56.0	3.3
World Light-Duty Vehicle Test Cycle (WLTC)					
Low	589	1.9	11.7	35.1	3.6
Medium	433	3.0	24.5	47.6	3.6
High	455	4.4	35.1	60.5	3.7
Extra High	323	5.1	57.0	81.6	2.3
Total WLTC	1,800	14.5	28.9	81.6	3.7
China Light-Duty Vehicle Test Cycle (CLTC-P)					
Low-Speed	674	1.5	8.1	29.9	3.3
Medium-Speed	693	3.7	19.1	44.2	3.2
High-Speed	433	3.8	31.6	70.8	2.4
Total CLTC-P	1,800	9.0	18.0	70.8	3.3
Japan					
JC08	1,204	5.1	15.2	50.7	3.8
New European Driving Cycle (NEDC)					
Urban Driving Cycle (UDC)	780	2.5	11.8	31.1	2.3
Extra Urban Driving Cycle (EUDC)	400	4.3	38.9	74.6	1.9
Total NEDC	1,180	6.8	20.9	74.6	2.3
ARTEMIS					
Urban	993	3.0	11.0	35.9	6.4
Rural Road	1,082	10.7	35.7	69.3	5.3
Motorway	1,068	17.9	60.1	81.9	4.3
Total ARTEMIS	3,143	31.6	36.2	81.9	6.4

Source:
United States - U.S. Department of Energy, Fuel Economy Guide website, www.fueleconomy.gov/feg/fe_test_schedules.shtml, 2025.
China – Liu, et.al., *Comparative Analysis of China Light-duty Vehicle Test cycle for Passenger Car and Other Typical Driving Cycles,* ICEPP 2020, 2021.
All other - Compiled from public sources by Aymeric Rousseau, Argonne National Laboratory, September 2016.

HEAVY-DUTY VEHICLES & CHARACTERISTICS

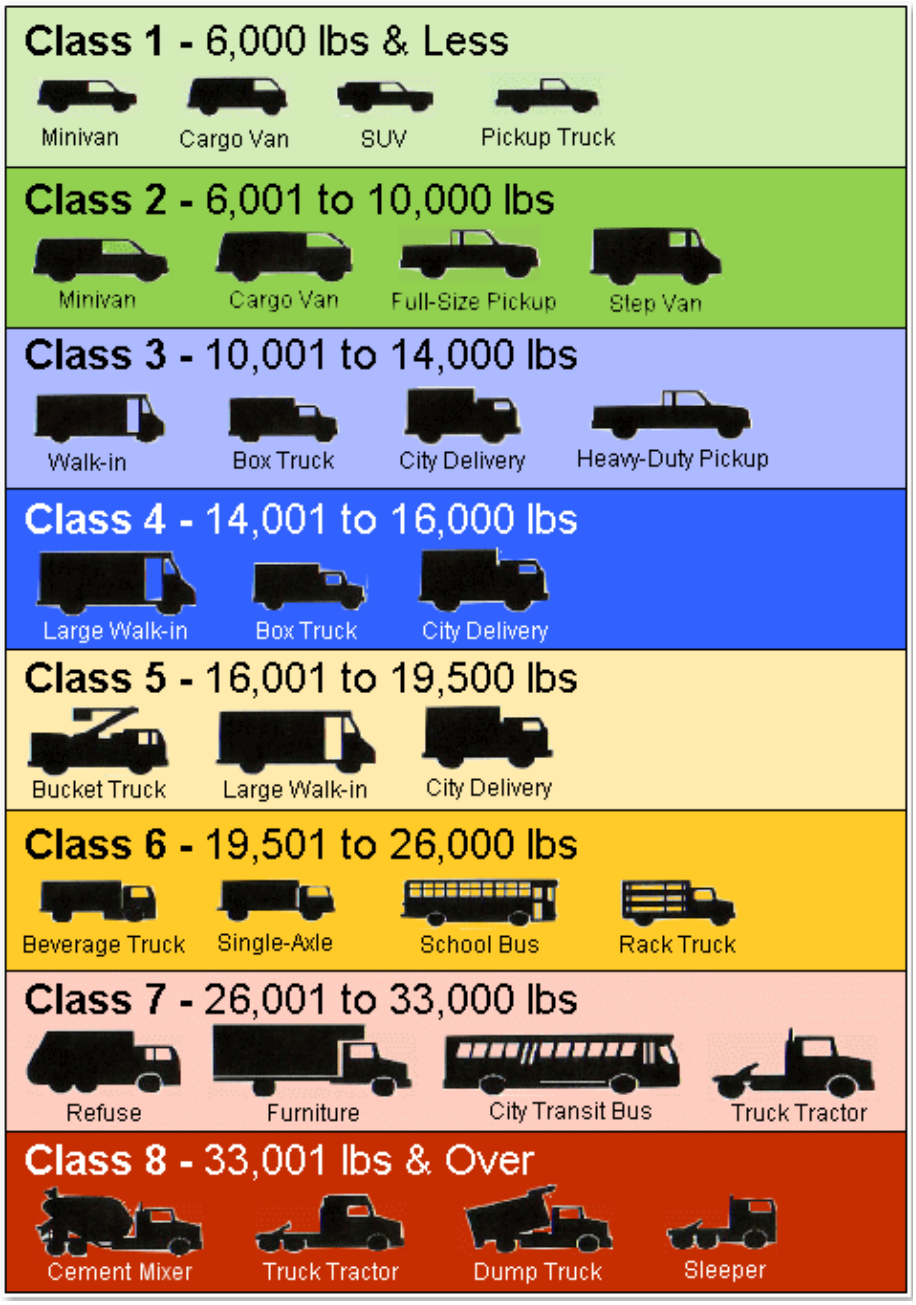
Chapter 5



Credit: Vitpho/iStock/Getty Images

There are eight truck classes, categorized by the gross vehicle weight rating that the vehicle is assigned when it is manufactured. The pictures below show examples of some of the different body types that would be included in each class. Many of the body types can be in more than one category, depending on the vehicle's attributes. Examples of this include pickups, box trucks, buses, and truck tractors.

Figure 5.1. Examples of Body Types in Each Truck Class



Source:
Oak Ridge National Laboratory, National Transportation Research Center, Oak Ridge, TN. Gross vehicle weight category definitions from 49CFR565.6 (2000).

Class 3-8 single-unit trucks include trucks over 10,000 lb gross vehicle weight with the cab/engine and cargo space together as one unit. Most of these trucks would be used for business or for individuals with heavy hauling or towing needs. Very heavy single-unit trucks, such as concrete mixers and dump trucks, are also in this category. The data series was changed by the FHWA back to 2007.

Table 5.1
Summary Statistics for Class 3-8 Single-Unit Trucks, 1970–2023

Year	Registrations (thousands)	Vehicle travel (million miles)	Average annual miles per vehicle	Fuel use (million gallons)	Average fuel economy per vehicle (miles per gallon)
1970	3,681	27,081	7,357	3,968	6.8
1975	4,232	34,606	8,177	5,420	6.4
1980	4,374	39,813	9,102	6,923	5.8
1985	4,593	45,441	9,894	7,399	6.1
1990	4,487	51,901	11,567	8,357	6.2
1991	4,481	52,898	11,805	8,172	6.5
1992	4,370	53,874	12,328	8,237	6.5
1993	4,408	56,772	12,879	8,488	6.7
1994	4,906	61,284	12,492	9,032	6.8
1995	5,024	62,705	12,481	9,216	6.8
1996	5,266	64,072	12,167	9,409	6.8
1997	5,293	66,893	12,638	9,576	7.0
1998	5,414	67,894	12,540	9,741	7.0
1999	5,763	70,304	12,199	9,372	7.5
2000	5,926	70,500	11,897	9,563	7.4
2001	5,704	72,448	12,701	9,667	7.5
2002	5,651	75,866	13,425	10,321	7.4
2003	5,849	77,757	13,294	8,881	8.8
2004	6,161	78,441	12,732	8,959	8.8
2005	6,395	78,496	12,275	9,501	8.3
2006	6,649	80,344	12,084	9,852	8.2[a]
2007	8,117	119,979	14,781	16,314	7.3
2008	8,288	126,855	15,306	17,144	7.4
2009	8,356	120,207	14,386	16,253	7.4
2010	8,217	110,738	13,477	15,097	7.3
2011	7,819	103,803	13,276	14,214	7.3
2012	8,190	105,605	12,894	14,376	7.3
2013	8,126	106,582	13,116	14,502	7.3
2014	8,329	109,301	13,123	14,894	7.3
2015	8,456	109,597	12,960	14,850	7.4
2016	8,747	113,338	12,958	15,338	7.4
2017	9,337	116,102	12,435	15,600	7.4
2018	10,328	120,699	11,687	16,080	7.5
2019	10,160	124,746	12,278	16,657	7.5
2020	9,908	117,832	11,892	15,180	7.8
2021	10,687	131,637	12,317	17,169	7.7
2022	11,050	136,224	12,328	17,181	7.9
2023	11,567	134,101	11,593	17,163	7.8
			Average annual percentage change		
1970-2023	2.2%	3.1%	0.9%	2.8%	0.3%
2013-2023	3.6%	2.3%	-1.2%	1.7%	0.7%

Source:
U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics 2023*, Washington, DC, 2025, Table VM-1 and annual. (Additional resources: www.fhwa.dot.gov)

[a] Due to FHWA methodology changes, data from 2007-on are not comparable with previous data.

Class 7-8 combination trucks include all trucks designed to be used in combination with one or more trailers with a gross vehicle weight rating over 26,000 lb The average vehicle travel of these trucks (on a per truck basis) far surpasses the travel of other trucks due to long-haul freight movement. The data series was changed by the FHWA back to 2007.

Table 5.2
Summary Statistics for Class 7-8 Combination Trucks, 1970–2023

Year	Registrations (thousands)	Vehicle travel[a] (million miles)	Average annual miles per vehicle	Fuel use (million gallons)	Average fuel economy per vehicle (miles per gallon)
1970	905	35,134	38,822	7,348	4.8
1975	1,131	46,724	41,312	9,177	5.1
1980	1,417	68,678	48,467	13,037	5.3
1985	1,403	78,063	55,640	14,005	5.6
1990	1,709	94,341	55,202	16,133	5.8
1991	1,691	96,645	57,153	16,809	5.7
1992	1,675	99,510	59,409	17,216	5.8
1993	1,680	103,116	61,379	17,748	5.8
1994	1,681	108,932	64,802	18,653	5.8
1995	1,696	115,451	68,073	19,777	5.8
1996	1,747	118,899	68,059	20,192	5.9
1997	1,790	124,584	69,600	20,302	6.1
1998	1,831	128,159	69,994	21,100	6.1
1999	2,029	132,384	65,246	24,537	5.4
2000	2,097	135,020	64,387	25,666	5.3
2001	2,154	136,584	63,409	25,512	5.4
2002	2,277	138,737	60,930	26,480	5.2
2003	1,908	140,160	73,459	26,895	5.2
2004	2,010	142,370	70,831	24,191	5.9
2005	2,087	144,028	69,012	27,689	5.2
2006	2,170	142,169	65,516	28,107	5.1[b]
2007	2,635	184,199	69,905	30,904	6.0
2008	2,585	183,826	71,113	30,561	6.0
2009	2,617	168,100	64,234	28,050	6.0
2010	2,553	175,789	68,856	29,927	5.9
2011	2,452	163,791	66,799	28,181	5.8
2012	2,469	163,602	66,262	27,975	5.8
2013	2,471	168,436	68,155	28,795	5.8
2014	2,577	169,830	65,897	29,118	5.8
2015	2,747	170,246	61,978	28,886	5.9
2016	2,752	174,557	63,428	29,555	5.9
2017	2,892	181,490	62,751	30,364	6.0
2018	2,906	184,165	63,374	30,325	6.1
2019	2,925	175,305	59,929	28,987	6.0
2020	2,991	179,817	60,120	29,186	6.2
2021	3,135	195,389	62,321	30,439	6.4
2022	3,240	195,049	60,205	28,218	6.9
2023	3,324	195,758	58,890	29,297	6.7
			Average annual percentage change		
1970-2023	2.5%	3.3%	0.8%	2.6%	0.6%
2013-2023	3.0%	1.5%	-1.5%	0.2%	1.4%

Source:
U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics 2023*, Washington, DC, 2025, Table VM-1 and annual. (Additional resources: www.fhwa.dot.gov)

[a] The Federal Highway Administration changed the combination truck travel methodology in 1993.
[b] Due to FHWA methodology changes, data from 2007-on are not comparable with previous data.

Truck sales grew to over 13 million in 2024. Trucks under 10,000 lb continue to dominate truck sales.

Table 5.3
New Retail Truck Sales by Gross Vehicle Weight, 1970–2024[a]
(thousands)

Calendar year	Class 1 6,000 lb or less	Class 2 6,001–10,000 lb	Class 3 10,001–14,000 lb	Class 4 14,001–16,000 lb	Class 5 16,001–19,500 lb	Class 6 19,501–26,000 lb	Class 7 26,001–33,000 lb	Class 8 33,001 lb and over	Total
Domestic sales (import data are not available)									
1970[b]	1,049	408	6	12	58	133	36	89	1,791
1975	1,101	952	23	1	9	159	23	83	2,351
1980	985	975	4	[c]	2	90	58	117	2,231
1981	896	850	1	[c]	2	72	51	100	1,972
1982	1,102	961	1	[c]	1	44	62	76	2,248
1983	1,314	1,207	[c]	[c]	1	47	59	82	2,710
1984	2,031	1,224	6	[c]	5	55	78	138	3,538
1985	2,408	1,280	11	[c]	5	48	97	134	3,983
Domestic and import sales									
1986	3,380	1,214	12	[c]	6	45	101	113	4,870
1990	3,451	1,097	21	27	5	38	85	121	4,846
1995	4,422	1,631	40	53	4	23	107	201	6,481
1996	4,829	1,690	52	59	7	19	104	170	6,930
1997	5,085	1,712	53	57	9	18	114	179	7,226
1998	5,263	2,036	102	43	25	32	115	209	7,826
1999	5,707	2,366	122	49	30	48	130	262	8,716
2000	5,965	2,421	117	47	29	51	123	212	8,965
2001	6,073	2,525	102	52	24	42	92	140	9,050
2002	6,068	2,565	80	38	24	45	69	146	9,035
2003	6,267	2,671	91	40	29	51	67	142	9,357
2004	6,458	2,796	107	47	36	70	75	203	9,793
2005	6,586	2,528	167	49	46	60	89	253	9,777
2006	6,136	2,438	150	50	49	70	91	284	9,268
2007	5,682	2,623	166	51	45	54	70	151	8,842
2008	4,358	1,888	135	36	40	39	49	133	6,680
2009	3,528	1,306	112	20	24	22	39	95	5,145
2010	4,245	1,513	161	12	31	29	38	107	6,137
2011	4,714	1,735	195	10	42	41	41	171	6,951
2012	5,164	1,811	223	9	55	40	47	195	7,544
2013	5,615	2,077	254	12	60	47	48	185	8,298
2014	6,209	2,275	264	13	67	52	54	220	9,154
2015	7,161	2,417	283	14	72	55	59	249	10,310
2016	7,724	2,572	296	14	72	62	60	193	10,993
2017	8,102	2,637	317	19	79	63	62	192	11,470
2018	8,881	2,728	301	21	81	72	64	251	12,398
2019	9,091	2,819	327	22	85	78	66	276	12,765
2020	8,195	2,526	349	22	93	52	51	192	11,480
2021	8,803	2,414	380	28	102	61	48	222	12,059
2022	8,276	2,287	327	24	80	72	46	254	11,372
2023	9,526	2,474	371	26	83	78	53	267	12,893
2024	9,961	2,491	431	25	86	71	60	240	13,365
Average annual percentage change									
1970-2024	4.3%	3.4%	8.2%	1.3%	0.7%	-1.1%	1.0%	1.9%	3.8%
1986-2024	2.9%	1.9%	9.9%	7.0%[d]	7.3%	1.2%	-1.4%	2.0%	2.7%
2014-2024	4.8%	0.9%	5.0%	6.3%	2.5%	3.3%	1.0%	0.9%	3.9%

Source:
Ward's Communications, www.wardsauto.com, 2025. (Additional resources: www.wardsauto.com)

[a] Sales include domestic-sponsored imports.
[b] Data for 1970 is based on new truck registrations.
[c] Data are not available.
[d] 1987-2024.

Based on factory sales, the share of diesel medium/heavy-duty trucks sold has declined from 1995 to 2019 for truck gross vehicle weight rating (GVWR) classes 4 and 5. Class 6 diesel share sales increased in that period and class 8 continued to be nearly 100% diesel. In 2020, possibly due to pandemic disruption, there were very few Class 7 trucks produced (about 20% of the normal annual volume) and all of them were diesel. The result for all class 4 through 8 trucks combined was a decline from 87% diesel share in 1995 to 82% in 2020.

Table 5.4
Diesel Share of Medium and Heavy-Duty Truck Sales by Gross Vehicle Weight, 1995–2024[a]

Calendar year	Class 4 14,001–16,000 lb	Class 5 16,001–19,500 lb	Class 6 19,501–26,000 lb	Class 7 26,001–33,000 lb	Class 8 33,001 lb and over	Total (Class 4 - Class 8)
1995	68%	87%	70%	74%	100%	87%
1996	66%	92%	69%	68%	100%	85%
1997	61%	90%	82%	70%	100%	85%
1998	72%	91%	88%	72%	100%	88%
1999	62%	86%	90%	74%	100%	88%
2000	62%	93%	54%	68%	100%	83%
2001	91%	90%	70%	59%	100%	84%
2002	68%	93%	66%	54%	100%	82%
2003	74%	92%	77%	47%	100%	83%
2004	71%	92%	76%	54%	100%	85%
2005	74%	92%	73%	56%	100%	87%
2006	76%	92%	75%	59%	100%	88%
2007	78%	92%	52%	50%	100%	81%
2008	81%	92%	58%	50%	100%	84%
2009	87%	91%	56%	36%	100%	80%
2010	94%	93%	92%	39%	100%	87%
2011	82%	80%	95%	49%	100%	91%
2012	14%	79%	95%	49%	100%	89%
2013	39%	80%	96%	46%	100%	88%
2014	32%	80%	91%	45%	100%	88%
2015	24%	80%	98%	48%	100%	89%
2016	21%	54%	89%	45%	100%	78%
2017	16%	52%	87%	45%	100%	75%
2018	18%	53%	87%	50%	100%	80%
2019	27%	58%	90%	45%	100%	82%
2020	25%	60%	90%	100%	99%	82%
2021	22%	53%	88%	100%	100%	79%
2022	24%	55%	82%	100%	100%	81%
2023	24%	57%	81%	98%	100%	82%
2024	34%	60%	92%	99%	99%	85%

Source:
Ward's Communications, www.wardsauto.com, 2025. (Additional resources: www.wardsauto.com)

[a] Estimates based on available factory sales. May not represent the entire industry.

Vehicle Inventory and Use Survey

The Vehicle Inventory and Use Survey (VIUS), which was formerly the Truck Inventory and Use Survey (TIUS), provides data on the physical and operational characteristics of the Nation's truck population. It is based on a stratified simple random sample of private and commercial trucks registered (or licensed) in each state. Since 1987, the survey has included minivans, vans, station wagons on truck chassis, and sport utility vehicles in addition to the bigger trucks. The 1977 and 1982 surveys did not include those vehicle types. In 1997, the survey title was changed to the Vehicle Inventory and Use Survey due to future possibilities of including additional vehicle types, such as cars or buses. The surveys conducted after that, however, continued to include only trucks.

After a long period for which vehicle characteristics and travel data were not available for trucks, the survey was again conducted, collecting data for the calendar year 2021. Due to the length of time between surveys, the 2021 survey was not meant to be directly comparable to the older surveys. Therefore, caution should be used if comparing the 2021 estimates to the older surveys. Documentation of the differences between the 2002 and 2021 surveys is found at rosap.ntl.bts.gov/view/dot/74765. The data for all TIUS and VIUS datasets back to 1977 are found at www.bts.gov/vius.

Table 5.5
Truck Statistics by Gross Vehicle Weight Class, 2021

Manufacturer's gross vehicle weight class	Number of trucks	Percentage of trucks	Average annual miles per truck	Harmonic mean fuel economy	Percentage of fuel use
1) 6,000 lb and less	72,662,035	52.6%	10,283	21.3	35.6%
2) 6,001 – 10,000 lb	57,826,433	41.8%	10,714	16.4	38.3%
3) 10,001 – 14,000 lb	3,127,932	2.3%	11,094	12.5	2.8%
4) 14,001 – 16,000 lb	425,166	0.3%	11,622	8.8	0.6%
5) 16,001 – 19,500 lb	565,476	0.4%	14,659	8.8	1.0%
6) 19,501 – 26,000 lb	510,708	0.4%	15,233	8.1	1.0%
7) 26,001 – 33,000 lb	491,011	0.4%	16,414	7.1	1.2%
8) 33,001 lb and up	2,593,241	1.9%	46,505	6.3	19.6%
Total	138,202,002	100.0%	11,224	15.75	100.0%
Light-duty truck subtotal (1–2)	130,488,468	94.4%	10,474	18.77	73.2%
Medium-duty truck subtotal (3–6)	4,629,281	3.3%	12,035	10.6	5.2%
Heavy-duty truck subtotal (7–8)	3,084,252	2.2%	41,714	6.31	21.6%

Source:
U.S. Department of Transportation, Bureau of Transportation Statistics; and U.S. Department of Commerce, Census Bureau. (2023-10-02), 2021 Vehicle Inventory and Use Survey Public Use File. (Additional resources: www.bts.gov/vius)

Table 5.6
Truck Harmonic Mean Fuel Economy by Size Class, 1992, 1997, 2002, and 2021[a]
(miles per gallon)

Manufacturer's gross vehicle weight class	1992 TIUS	1997 VIUS	2002 VIUS	2021 VIUS
1) 6,000 lb and less	17.2	17.1	17.6	21.3
2) 6,001–10,000 lb	13.0	13.6	14.3	16.4
3) 10,001–14,000 lb	8.8	9.4	10.5	12.5
4) 14,001–16,000 lb	8.8	9.3	8.5	8.8
5) 16,001–19,500 lb	7.4	8.7	7.9	8.8
6) 19,501–26,000 lb	6.9	7.3	7.0	8.1
7) 26,001–33,000 lb	6.5	6.4	6.4	7.1
8) 33,001 lb and over	5.5	5.7	5.7	6.3
Light-duty truck subtotal (1–2)	15.7	15.8	16.2	18.8
Medium-duty truck subtotal (3–6)	7.3	8.6	8.0	10.6
Heavy-duty truck subtotal (7–8)	5.6	6.1	5.8	6.3

Note: Based on average fuel economy as reported by respondent.

Sources:
Estimates are based on data provided on the following public use files: U.S. Department of Commerce, Bureau of the Census, Census of Transportation, Washington, DC, *1992 Truck Inventory and Use Survey*, 1995; *1997 Vehicle Inventory and Use Survey*, 2000; *2002 Vehicle Inventory and Use Survey*, 2005; and *2021 Vehicle Inventory and Use Survey Public Use File*, 2023. (Additional resources: www.bts.gov/vius)

[a] Caution should be used when comparing the 2021 VIUS data with historical VIUS/TIUS data. Documentation of the differences between the 2002 and 2021 surveys is found at rosap.ntl.bts.gov/view/dot/74765.

Most light-duty trucks travel within 50 miles of their home base and refuel at public stations. About 59% of heavy-duty trucks typically operate more than 50 miles from home base (20% did not report), and about 25% of them refuel primarily at their own facility.

Table 5.7
Truck Statistics by Size, 2021

	Manufacturer's gross vehicle weight class			
	Light-duty (< 10,000 lb)	Medium-duty (10,001–26,000 lb)	Heavy-duty (> 26,000 lb)	Total
	Typical trip miles or range of operation[a]			
Under 50 miles	66.0%	49.4%	21.2%	61.4%
51–100 miles	12.6%	14.8%	15.8%	13.0%
101–200 miles	4.4%	6.1%	12.0%	5.1%
201–500 miles	2.7%	3.1%	13.0%	3.6%
501 miles or more	2.7%	2.6%	18.0%	4.0%
Not reported	11.5%	24.1%	20.0%	12.8%
Total[b]	**100.0%**	**100.0%**	**100.0%**	**100.0%**
	Primary refueling facility			
Gas station	95.8%	71.2%	10.4%	87.4%
Truck stop	0.2%	4.8%	51.6%	4.8%
Own facility	0.9%	9.7%	24.6%	3.3%
Other nonpublic facility	0.1%	1.4%	2.6%	0.4%
Other	0.1%	0.2%	0.3%	0.1%
Not reported	2.9%	12.6%	10.5%	3.9%
Total[b]	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source:
U.S. Department of Transportation, Bureau of Transportation Statistics; and U.S. Department of Commerce, Census Bureau. (2023-10-02), 2021 Vehicle Inventory and Use Survey Public Use File. (Additional resources: www.bts.gov/vius)

[a] The respondent was asked to choose the category which best described the trips made by the vehicle.
[b] Percentages may not sum to totals due to rounding.

Light-duty and medium-duty trucks were more often for personal use, while heavy-duty trucks were for hire. Construction was the second highest major use for each of the three truck sizes.

Table 5.8
Percentage of Trucks by Size Ranked by Major Use, 2021

Rank	Light-duty (< 10,000 lb average weight)	Medium-duty (10,001 – 26,000 lb average weight)	Heavy-duty (> 26,000 lb average weight)
1	**Personal**	**Personal**	**For hire**
	85.1%	41.5%	23.3%
2	**Construction**	**Construction**	**Construction**
	4.3%	22.4%	17.8%
3	**Other services**	**Other services**	**Personal**
	3.9%	6.6%	13.4%
4	**Agriculture**	**Agriculture**	**Agriculture**
	1.2%	5.7%	10.0%
5	**Retail**	**Wholesale**	**Wholesale**
	0.9%	4.9%	9.5%
6	**Wholesale**	**For hire**	**Waste management**
	0.8%	3.9%	4.6%
7	**For hire**	**Retail**	**Not in use**
	0.7%	3.3%	4.5%
8	**Leasing**	**Utilities**	**Manufacturing**
	0.5%	2.4%	3.4%
9	**Waste management**	**Waste management**	**Utilities**
	0.4%	1.9%	3.1%
10	**Food services**	**Manufacturing**	**Food services**
	0.4%	1.7%	2.7%
11	**Arts**	**Not in use**	**Other services**
	0.4%	1.6%	2.7%
12	**Manufacturing**	**Food services**	**Mining**
	0.4%	1.4%	1.9%
13	**Not in use**	**Mining**	**Retail**
	0.4%	1.4%	1.8%
14	**Utilities**	**Arts**	**Leasing**
	0.2%	0.5%	0.9%
15	**Information services**	**Leasing**	**Arts**
	0.2%	0.4%	0.1%
16	**Mining**	**Information services**	**Information services**
	0.1%	0.3%	0.1%

Source:
U.S. Department of Transportation, Bureau of Transportation Statistics; and U.S. Department of Commerce, Census Bureau. (2023-10-02), 2021 Vehicle Inventory and Use Survey Public Use File. (Additional resources: www.bts.gov/vius)

Commercial trucks that travel more than 200 miles fueled the most at truck stops and their own facilities in 2021 while trucks with a range of operation 50 miles or less fueled mostly at gas stations.

Table 5.9
Percentage of Trucks by Range of Operation and Primary Refueling Facility, 2021

Range of operation	Primary refueling facility: Gas station	Truck stop	Own facility	Other's facility	Total[a]
			All vehicles		
Under 50 miles	95.9%	1.1%	2.6%	0.4%	100.0%
51–100 miles	88.7%	5.3%	5.5%	0.6%	100.0%
101–200 miles	79.0%	13.6%	5.9%	1.6%	100.0%
201–500 miles	69.0%	22.7%	7.0%	1.3%	100.0%
501 miles or more	61.5%	34.8%	3.3%	0.4%	100.0%
			Commercial vehicles		
Under 50 miles	85.0%	4.7%	9.2%	1.0%	100.0%
51–100 miles	74.6%	12.4%	11.8%	1.2%	100.0%
101–200 miles	60.2%	27.0%	11.1%	1.6%	100.0%
201–500 miles	45.1%	40.6%	12.0%	2.3%	100.0%
501 miles or more	36.0%	58.1%	5.4%	0.6%	100.0%

Source:
U.S. Department of Transportation, Bureau of Transportation Statistics; and U.S. Department of Commerce, Census Bureau. (2023-10-02), 2021 Vehicle Inventory and Use Survey Public Use File. (Additional resources: www.bts.gov/vius)

[a] Percentages may not sum to totals due to rounding.

Most trucks were fueled at gas stations, but more than a quarter of for-hire trucks were fueled at truck stops in 2021. About 22% of utility trucks fuel at the companies' own facility along with 19% of trucks used in agriculture.

Table 5.10
Share of Trucks by Major Use and Primary Fueling Facility, 2021

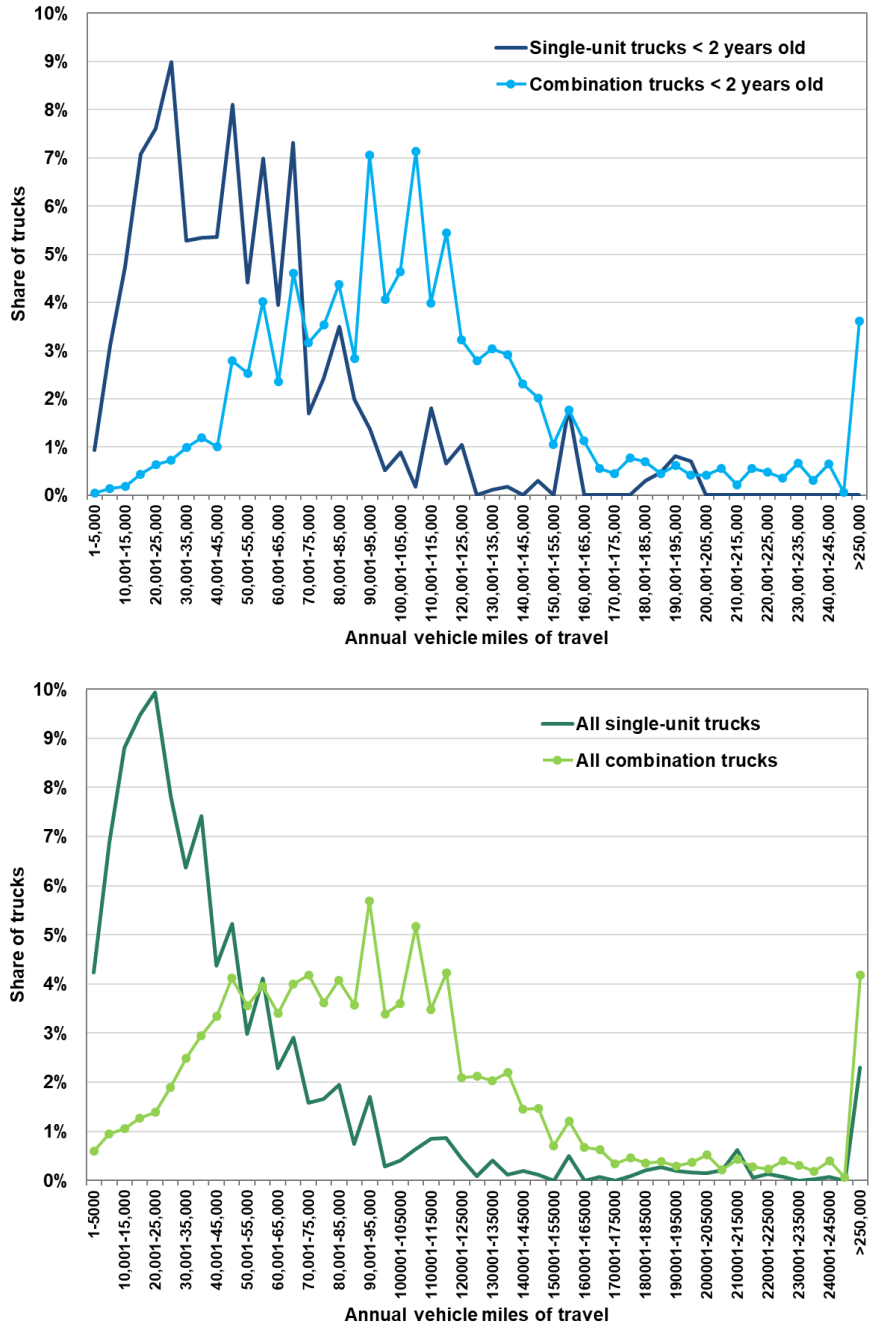
Major use	Gas station	Truck stop	Own facility	Others facility	Other	All[a]
Information services	99.4%	0.2%	0.2%	0.0%	0.2%	100.0%
Personal	98.2%	0.2%	1.0%	0.2%	0.4%	100.0%
Arts	94.0%	1.6%	0.9%	0.0%	3.5%	100.0%
Retail	93.1%	2.0%	3.3%	0.7%	0.9%	100.0%
Other services	92.3%	1.4%	3.0%	0.3%	3.0%	100.0%
Construction	90.1%	1.9%	6.3%	0.9%	0.8%	100.0%
Food services	87.6%	5.8%	5.6%	0.7%	0.3%	100.0%
Manufacturing	82.7%	8.2%	8.1%	0.8%	0.2%	100.0%
Wholesale	81.0%	9.3%	7.8%	1.2%	0.6%	100.0%
Waste management	80.7%	3.2%	12.3%	1.4%	2.4%	100.0%
Agriculture	73.9%	5.3%	19.2%	1.1%	0.5%	100.0%
Mining	72.3%	8.4%	17.3%	1.4%	0.5%	100.0%
Utilities	71.9%	3.5%	21.6%	2.3%	0.7%	100.0%
For hire	56.6%	27.1%	14.0%	2.0%	0.3%	100.0%
Leasing	51.7%	2.7%	1.6%	0.8%	43.3%	100.0%
Not in use	48.5%	1.8%	19.0%	0.2%	30.5%	100.0%
Overall	**95.5%**	**1.0%**	**2.2%**	**0.3%**	**1.0%**	**100.0%**

Source:
U.S. Department of Transportation, Bureau of Transportation Statistics; and U.S. Department of Commerce, Census Bureau. (2023-10-02), 2021 Vehicle Inventory and Use Survey Public Use File. (Additional resources: www.bts.gov/vius)

[a] Percentages may not sum to totals due to rounding.

The figure below shows the distribution of annual travel for the two types of Class 7 and 8 vehicles–combination units (separate tractor and trailer) and single units (tractor and trailer on a single chassis). This information is for all trucks two years old or less.

Figure 5.2. Distribution of Trucks over 26,000 lb by Vehicle-Miles Traveled, 2021

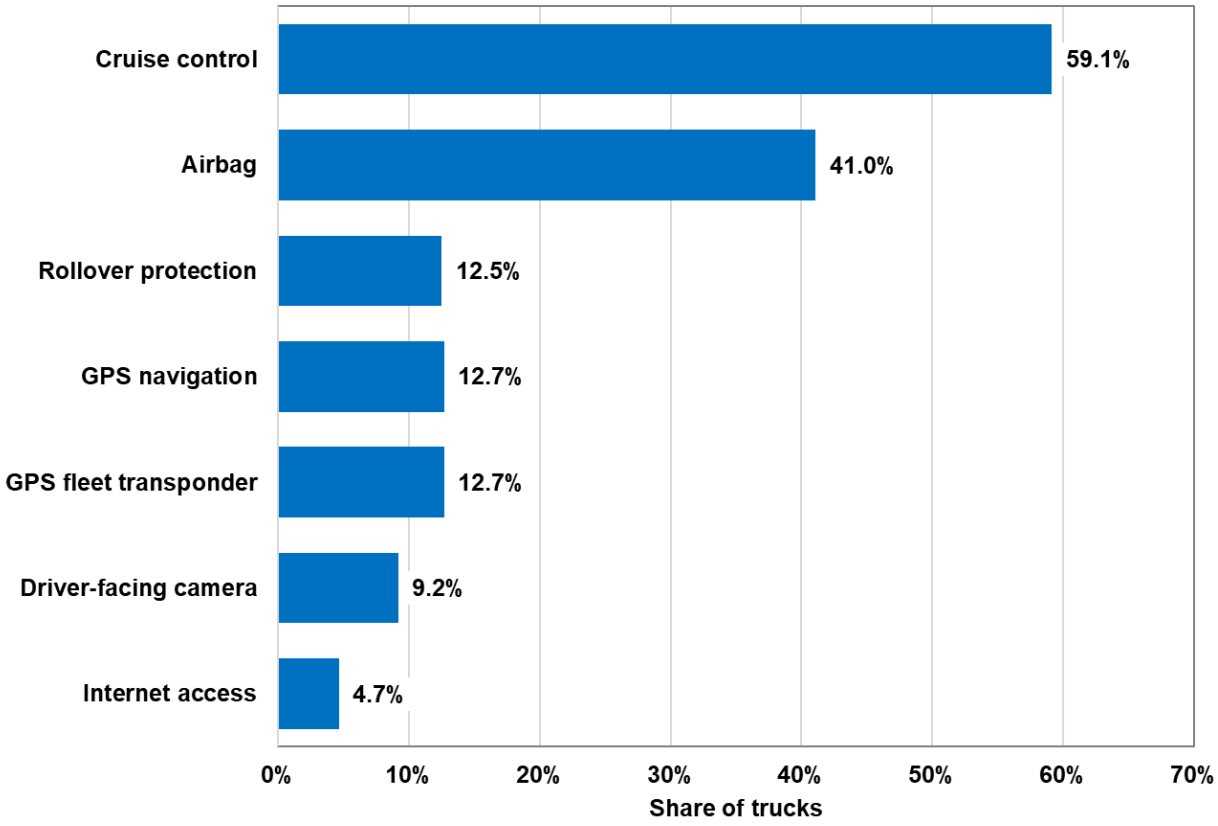


Source:

U.S. Department of Transportation, Bureau of Transportation Statistics; and U.S. Department of Commerce, Census Bureau. (2023-10-02), 2021 Vehicle Inventory and Use Survey Public Use File. (Additional resources: www.bts.gov/vius)

The latest Vehicle Inventory and Use Survey (VIUS) asked truck owners if the truck had certain features as permanent equipment on the truck. The survey asked about safety equipment and technology, such as cruise control. Of the 4.4 million heavy-duty trucks (class 7 & 8) in VIUS, nearly 60% had cruise control installed with only 41% having airbags and 12.5% rollover protection. Fewer heavy-duty trucks had technology such as GPS (navigation or fleet transponders), driver-facing cameras or internet access as permanent equipment.

Figure 5.3. Share of Heavy-Duty Trucks with Selected Features, 2021



Note: Heavy-duty trucks (classes 7 and 8) are greater than 26,000 pounds gross vehicle weight based on the manufacturer's rating.

Source:
U.S. Department of Transportation, Bureau of Transportation Statistics; and U.S. Department of Commerce, Census Bureau. (2023-10-02), 2021 Vehicle Inventory and Use Survey Public Use File. (Additional resources: www.bts.gov/vius)

The gross weight of a vehicle (GVW) is the weight of the empty vehicle plus the weight of the maximum payload that the vehicle was designed to carry. In cars and small light-duty trucks, the difference between the empty weight and the GVW is small (1,000 to 1,500 lb). The largest trucks and tractor-trailers, however, have a payload capacity share of 200%, which means they can carry 200% of their empty weight. The medium-sized trucks (truck classes 3-6) have payload capacity shares between 50% and 100%.

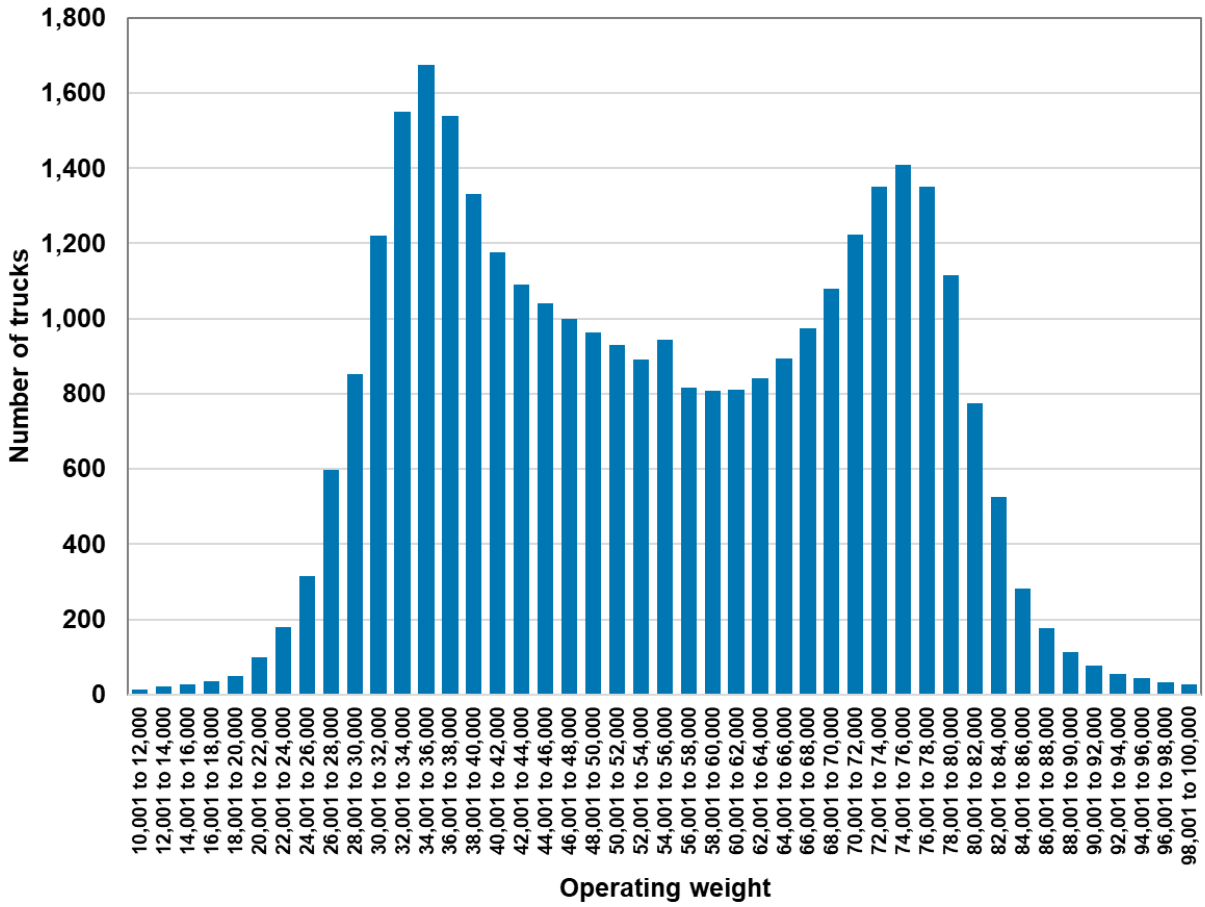
Table 5.11
Gross Vehicle Weight versus Empty Vehicle Weight

Vehicle description	Truck class	Gross vehicle weight range (pounds)	Empty vehicle weight range (pounds)	Maximum payload capacity (pounds)	Payload capacity share (percent of empty weight)
Cars		3,200-6,000	2,400-5,000	1,000	20%
Minivans, small SUVs, small pick-ups	1	4,000-6,000	3,200-4,500	1,500	33%
Large SUVs, standard pick-ups	2a	6,001-8,500	4,500-6,000	2,500	40%
Large SUVs, standard pick-ups	2b	8,501-10,000	5,000-6,300	3,700	60%
Utility van, multi-purpose, mini-bus, step van	3	10,001-14,000	7,650-8,750	5,250	60%
City delivery, parcel delivery, large walk-in, bucket, landscaping	4	14,001-16,000	7,650-8,750	7,250	80%
City delivery, parcel delivery, large walk-in, bucket	5	16,001-19,500	9,500-10,000	8,700	80%
City delivery, school bus, large walk-in, bucket	6	19,501-26,000	11,500-14,500	11,500	80%
City bus, furniture, refrigerated, refuse, fuel tanker, dump, tow, concrete, fire engine, tractor-trailer	7	26,001-33,000	11,500-14,500	18,500	125%
Refuse, concrete, furniture, city bus, tow, fire engine (straight trucks)	8a	33,001-80,000	20,000-26,000	54,000	200%
Tractor-trailer: van, refrigerated, bulk tanker, flat bed (combination trucks)	8b	33,001-80,000	20,000-26,000	54,000	200%

Source:
National Academy of Sciences, *Technologies and Approaches to Reducing the Fuel Consumption of Medium and Heavy-Duty Vehicles*, 2010, pp. 18 and 116.

According to weigh-in-motion data collected by fifteen states, 5-axle tractor-trailers on the road had a bimodal weight distribution with peaks at 34,001–36,000 lb and 74,001–76,000 lb Half of these trucks weighed less than 54,000 lb These data show that only 3% of 5-axle tractor-trailers on the road in these states were 78,000–80,000 lb nearing the maximum roadway gross vehicle weight of 80,000 lb Thus, more trucks may be filling the trailer space to capacity (cubing-out) before they reach the maximum weight limit (weighing-out). About 7% of trucks exceed the 80,000 lb limit (allowed with permits).

Figure 5.4 Distribution of 5-axle Tractor-Trailers by Vehicle Operating Weight, 2019



Note: Data are from these 15 States: California, Connecticut, Florida, Georgia, Hawaii, Iowa, Minnesota, Missouri, Montana, North Carolina, Oregon, Pennsylvania, South Dakota, Texas, and Washington.

Source:
Travel Monitoring Analysis System (TMAS), FHWA Office of Highway Policy Information, 2021.

Commodity Flow Survey

The Commodity Flow Survey (CFS) is designed to provide data on the flow of goods and materials by mode of transport. The survey was first conducted in various years from 1963 to 1977, and was again conducted in 1993, 1997, 2002, 2007, 2012, 2017 and 2022 with improvements in methodology, sample size, and scope. Full data for the 2022 survey are being released in late 2025. It is a shipper-based survey which covers business establishments from these industries:

- Mining
- Manufacturing
- Wholesale trade
- Select Retail and Services

Industries not covered by CFS include transportation, construction, most retail and services industries, farms, fisheries, foreign establishments, and most government-owned establishments. Before 1993 data were collected only on the principal mode of travel, but after that time all modes of a shipment were captured in the data.

The CFS is a joint effort of the Bureau of Transportation Statistics and the U.S. Census Bureau. Additional information on the survey can be found at:

- www.bts.gov/cfs
- www.census.gov/programs-surveys/cfs.html

Industries covered by the 2017 Commodity Flow Survey (CFS) shipped goods worth over $14 trillion. Compared to the 1993 CFS, the value of shipments is up 1.2% per year. By value, multiple mode shipments increased 3.5% per year from 1993 to 2017.

Table 5.12
Value of Goods Shipped in the United States: Comparison of the 1993, 1997, 2002, 2007, 2012, and 2017 Commodity Flow Surveys[a]

	1993 (billion 2017 dollars)	1997 (billion 2017 dollars)	2002 (billion 2017 dollars)	2007 (billion 2017 dollars)	2012 (billion 2017 dollars)	2017 (billion dollars)	Average annual percent change (1993-2017)
All modes	**10,790.0**	**10,605.0**	**11,441.5**	**13,813.9**	**14,788.8**	**14,517.8**	**1.2%**
Single modes	**9,120.0**	**8,735.1**	**9,605.0**	**11,277.1**	**12,705.1**	**11,738.0**	**1.1%**
Truck[b]	8,127.2	7,607.9	8,495.4	9,854.6	10,817.4	10,398.9	1.0%
For-hire truck	4,844.9	4,431.1	5,119.1	5,858.6	6,944.5	6,968.2	1.5%
Private truck	3,240.7	3,110.2	3,331.8	3,995.9	3,872.9	3,430.7	0.2%
Rail	456.6	488.1	423.6	516.0	505.1	254.2	-2.4%
Water	113.8	115.8	121.7	135.8	322.0	243.9	3.2%
Inland water	75.2	82.3	78.3	107.6	233.7	117.3	1.9%
Great Lakes	[c]	2.3	1.2	[c]	0.4	0.6	[c]
Deep sea	36.5	31.2	42.3	27.2	64.0	120.7	5.1%
Multiple waterways	[c]	[d]	[d]	[d]	23.8	5.3	[c]
Air (includes truck and air)	256.7	349.9	361.0	298.3	481.1	496.6	2.8%
Pipeline[e]	165.9	173.4	203.3	472.4	579.6	344.4	3.1%
Multiple modes	**1,222.9**	**1,444.6**	**1,470.4**	**2,206.9**	**2,082.7**	**2,777.7**	**3.5%**
Parcel, U.S.P.S. or courier	1,039.5	1,307.2	1,345.8	1,846.5	1,802.4	2,117.1	3.0%
Truck and rail	153.3	115.6	95.2	221.3	240.0	348.0	3.5%
Truck and water	17.3	12.6	19.5	69.1	31.0	251.4	11.8%
Rail and water	6.8	2.7	4.5	16.4	8.5	43.6	8.0%
Other multiple modes	6.0	6.5	5.2	53.6	0.7	17.5	4.6%
Other and unknown modes	**447.1**	**425.4**	**366.0**	**330.0**	**1.1**	**2.1**	**-20.0%**

Source:

U.S. Department of Transportation, Bureau of Transportation Statistics and U.S. Department of Commerce, Bureau of the Census, *1993, 1997, 2002, 2007, 2012, and 2017 Commodity Flow Surveys*, Table 1, 2020, and previous editions. (Additional resources: https://www.bts.gov/topics/commodity-flow-survey-data-and-reports)

[a] Detail may not add to total because of rounding.

[b] "Truck" as a single mode includes shipments which went by private truck only, for-hire truck only, or a combination of private truck and for-hire truck.

[c] Denotes data do not meet publication standards because of high sampling variability or poor response quality.

[d] Data are not available.

[e] CFS data for pipeline exclude most shipments of crude oil.

Industries covered by the 2017 Commodity Flow Survey (CFS) shipped over 12 billion tons of goods nationwide. About 71% of the freight tonnage was shipped by truck.

Table 5.13
Tons of Freight in the United States: Comparison of the 1993, 1997, 2002, 2007, 2012, and 2017 Commodity Flow Surveys[a]

	1993 (millions)	1997 (millions)	2002 (millions)	2007 (millions)	2012 (millions)	2017 (millions)	Average annual percent change (1993-2017)
All modes	**9,688.50**	**11,089.7**	**11,667.9**	**12,543.4**	**11,299.4**	**12,468.9**	**1.1%**
Single modes	**8,922.30**	**10,436.5**	**11,086.7**	**11,698.1**	**10,905.5**	**11,604.8**	**1.1%**
Truck[b]	6,385.90	7,700.7	7,842.8	8,778.7	8,060.2	8,843.3	1.4%
For-hire truck	2,808.30	3,402.6	3,657.3	4,075.1	4,298.7	5,232.0	2.6%
Private truck	3,543.50	4,137.3	4,149.7	4,703.6	3,761.3	3,611.3	0.1%
Rail	1,544.10	1,549.8	1,873.9	1,861.3	1,628.5	1,251.2	-0.9%
Water	505.4	563.4	681.2	403.6	576.0	804.4	2.0%
Inland water	362.5	414.8	458.6	343.3	424.5	471.9	1.1%
Great Lakes	33	38.4	38.0	17.8	31.4	41.9	1.0%
Deep sea	109.9	110.2	184.6	42.5	73.0	268.6	3.8%
Multiple waterways	[c]	[c]	[c]	[c]	47.1	22.0	[c]
Air (includes truck and air)	3.1	4.5	3.8	3.6	4.8	8.0	4.0%
Pipeline[d]	483.6	618.2	685.0	650.9	636.0	697.8	1.5%
Multiple modes	**225.7**	**216.7**	**216.7**	**573.7**	**357.0**	**770.5**	**5.2%**
Parcel, U.S.P.S. or courier	18.9	23.7	25.5	33.9	28.5	38.0	3.0%
Truck and rail	40.6	54.2	43.0	225.6	213.8	471.4	10.8%
Truck and water	68	33.2	23.3	145.5	56.7	109.9	2.0%
Rail and water	79.2	79.3	105.1	54.9	55.6	143.0	2.5%
Other multiple modes	18.9	26.2	19.8	113.8	2.5	8.2	-3.4%
Other and unknown modes	**540.5**	**436.5**	**364.6**	**271.6**	**36.8**	**93.6**	**-7.0%**

Source:
U.S. Department of Transportation, Bureau of Transportation Statistics and U.S. Department of Commerce, Bureau of the Census, *1993, 1997, 2002, 2007, 2012, and 2017 Commodity Flow Surveys*, Table 1, 2020, and previous editions. (Additional resources: https://www.bts.gov/topics/commodity-flow-survey-data-and-reports)

[a] Detail may not add up to total because of rounding.
[b] "Truck" as a single mode includes shipments which went by private truck only, for-hire truck only, or a combination of private truck and for-hire truck.
[c] Data are not available.
[d] CFS data for pipeline exclude most shipments of crude oil.

Industries covered by the 2017 Commodity Flow Survey (CFS) accounted for 3.1 trillion ton-miles on the nation's highways, railways, waterways, pipelines, and aviation system. Ton-miles increased by an average of 1.1% per year from 1993 to 2017.

Table 5.14
Ton-Miles of Freight in the United States: Comparison of the 1993, 1997, 2002, 2007, 2012, and 2017 Commodity Flow Surveys[a]

	1993 (billions)	1997 (billions)	2002 (billions)	2007 (billions)	2012 (billions)	2017 (billions)	Average annual percent change (1993-2017)
All modes	**2,420.90**	**2,661.4**	**3,137.9**	**3,344.7**	**2,969.5**	**3,116.9**	**1.1%**
Single modes	**2,136.90**	**2,383.5**	**2,867.9**	**2,894.3**	**2,697.4**	**2,479.6**	**0.6%**
Truck[b]	869.5	1,023.5	1,255.9	1,342.1	1,247.7	1,327.1	1.8%
For-hire truck	629	741.1	959.6	1,055.6	1,050.9	1,162.2	2.6%
Private truck	235.9	268.6	291.1	286.5	196.8	164.9	-1.5%
Rail	942.6	1,022.5	1,261.6	1,344.0	1,211.5	824.8	-0.6%
Water	272	261.7	282.7	157.3	192.9	259.6	-0.2%
Inland water	164.4	189.3	211.5	117.5	118.7	177.5	0.3%
Great Lakes	12.4	13.4	13.8	[6.9]	11.0	15.6	1.0%
Deep sea	95.2	59.0	57.4	33.0	22.1	50.9	-2.6%
Multiple waterways	[c]	[c]	[c]	[c]	41.0	15.6	[c]
Air (includes truck and air)	4	6.2	5.8	4.5	5.8	9.8	3.8%
Pipeline[d]	[c]	[e]	[e]	[e]	[e]	[c]	[c]
Multiple modes	**191.5**	**204.5**	**225.7**	**416.6**	**271.8**	**637.2**	**5.1%**
Parcel, U.S.P.S. or courier	13.2	18.0	19.0	28.0	22.7	29.8	3.5%
Truck and rail	37.7	55.6	45.5	196.8	169.5	443.2	10.8%
Truck and water	40.6	34.8	32.4	98.4	48.6	51.9	1.0%
Rail and water	70.2	77.6	115.0	47.1	29.2	102.7	1.6%
Other multiple modes	[c]	18.6	13.8	46.4	1.9	9.6	[c]
Other and unknown modes	**92.6**	**73.4**	**44.2**	**33.8**	**0.3**	**0.1**	**-24.0%**

Source:
U.S. Department of Transportation, Bureau of Transportation Statistics and U.S. Department of Commerce, Bureau of the Census, *1993, 1997, 2002, 2007, 2012, and 2017 Commodity Flow Surveys*, Table 1, 2020, and previous editions. (Additional resources: https://www.bts.gov/topics/commodity-flow-survey-data-and-reports)

[a] Detail may not add up to total because of rounding.
[b] "Truck" as a single mode includes shipments which went by private truck only, for-hire truck only, or a combination of private truck and for-hire truck.
[c] Data are not available.
[d] CFS data for pipeline exclude most shipments of crude oil.
[e] Denotes data do not meet publication standards because of high sampling variability or poor response quality.

Industries covered by the 2017 Commodity Flow Survey (CFS) had an average shipment length of 679 miles, a 60% increase from the 1993 survey. For single mode shipments, air had the highest shipment length in 2017; for multiple modes, truck and rail had the highest length.

Table 5.15
Average Miles per Shipment in the United States: Comparison of the 1993, 1997, 2002, 2007, 2012, and 2017 Commodity Flow Surveys[a]

	1993 (miles)	1997 (miles)	2002 (miles)	2007 (miles)	2012 (miles)	2017 (miles)	Average annual percent change (1993-2017)
All modes	**424**	**472**	**546**	**619**	**630**	**679**	**2.0%**
Single modes	**197**	**184**	**240**	**234**	**262**	**243**	**0.9%**
Truck[b]	144	144	173	206	227	206	1.5%
For-hire truck	472	485	523	599	508	369	-1.0%
Private truck	52	53	64	57	58	45	-0.6%
Rail	766	769	807	728	805	579	-1.2%
Water	[c]	482	568	520	908	259	[c]
Inland water	[c]	177	450	144	275	188	[c]
Great Lakes	534	204	339	657	347	304	-2.3%
Deep sea	1,861	1,024	664	923	1,157	359	-6.6%
Multiple waterways	[c]	[c]	[c]	[c]	1,034	525	[c]
Air (includes truck and air)	1,415	1,380	1,919	1,304	1,295	1,403	0.0%
Pipeline[d]	[c]	[e]	[e]	[e]	[e]	[e]	[c]
Multiple modes	**736**	**813**	**895**	**975**	**922**	**953**	**1.1%**
Parcel, U.S.P.S. or courier	734	813	894	975	922	953	1.1%
Truck and rail	1,403	1,347	1,413	1,007	988	1,177	-0.7%
Truck and water	1,417	1,265	1,950	1,429	1,562	784	-2.4%
Rail and water	627	1,092	957	1,928	1,073	1,075	2.3%
Other multiple modes	1,082	[e]	[e]	1,182	[e]	1,425	1.2%
Other and unknown modes	**229**	**122**	**130**	**116**	**2**	**1**	**-20.3%**

Source:
U.S. Department of Transportation, Bureau of Transportation Statistics and U.S. Department of Commerce, Bureau of the Census, *1993, 1997, 2002, 2007, 2012, and 2017 Commodity Flow Surveys*, Table 1, 2020, and previous editions. (Additional resources: https://www.bts.gov/topics/commodity-flow-survey-data-and-reports)

[a] Detail may not add up to total because of rounding.
[b] "Truck" as a single mode includes shipments which went by private truck only, for-hire truck only, or a combination of private truck and for-hire truck.
[c] Data are not available.
[d] CFS data for pipeline exclude most shipments of crude oil.
[e] Denotes data do not meet publication standards because of high sampling variability or poor response quality.

Freight Analysis Framework

The Freight Analysis Framework is a combination of sources drawn together to create a comprehensive picture of freight movement in the U.S. in terms of tonnage, value, and ton-miles. Data are available by origin, destination, commodity type, distance band, and mode. FAF origin and destination data include state level or major metropolitan area. The sources of data for FAF are the Commodity Flow Survey, international trade data from the Census Bureau, and other data sources from agriculture, extraction, utility, construction, service, and other sectors.

Historically, FAF data are available for 1997, 2002, 2007, 2012, and 2017 with estimated data for 2018-2024, forecasted data from 2030-2050 and historical state-level estimates from 1997-2012. A new version, FAF5.7.1 was recently released.

For additional information on FAF, see the website: faf.ornl.gov/fafweb .

For shipments of 100 miles or less, trucks moved 5.6 billion tons of freight in 2023. Trucks moved the most tons in every distance band under 750 miles; pipelines led in the 750-999 mile band and rail from 1,000 to 2,000 miles. More than 20 billion tons of freight were shipped in 2023.

Table 5.16
Tons of Freight Moved in the United States by Mode and Distance Band, 2023
(thousand tons)

	Distance Band[a] (miles)								
Mode	Below 100	100 - 249	250 - 499	500 - 749	750 - 999	1,000 - 1,499	1,500 - 2,000	Over 2,000	Total
Truck	5,580,416	5,426,836	1,098,978	285,471	183,673	212,167	91,260	95,795	12,974,596
Rail	240,718	380,352	259,519	144,578	139,383	287,187	109,384	36,832	1,597,953
Water	243,916	175,963	149,926	58,846	41,757	83,958	15,915	26,718	796,998
Air (include truck-air)	3	434	1,369	1,106	659	817	965	1,225	6,578
Pipeline	970,721	1,643,644	849,618	214,569	223,951	113,458	5,515	1	4,021,476
Multiple modes & mail	55,722	84,135	130,205	77,063	87,467	110,473	39,910	59,532	644,506
No domestic mode	114,115	0	0	0	0	0	0	0	114,115
Other and unknown	68,847	14,900	39	5	17	94	3	27	83,932
Total	7,274,457	7,726,262	2,489,654	781,636	676,907	808,154	262,952	220,130	20,240,154

Note: Includes total flows moved between domestic origins and destinations and includes both domestic and foreign shipments. Mode of transportation is the mode used from zone of entry to the domestic destination, domestic origin to domestic destination, and domestic origin to zone of exit.

Source:
U.S. Department of Transportation, FAF Data Tabulation Tool, Freight Analysis Framework Version 5.6.1, 2025.
(Additional resources: faf.ornl.gov)

[a] Freight shipments categorized by origin to destination Great Circle Distance, which is commonly called "as-the-crow-flies."

Table 5.17
Top Ten Commodities Moved in the United States by Weight, Ton-Miles, and Value, 2023

Weight	
Commodity	Billion tons
Natural gas/other fossil products	3.1
Gravel	2.1
Gasoline	1.4
Cereal grains	1.3
Nonmetal min. prods.	1.2
Crude petroleum	1.2
Fuel oils	1.0
Other ag prods.	0.7
Natural sands	0.7
Waste/scrap	0.7
Ton-Miles	
Commodity	Billion ton-miles
Crude petroleum	667.3
Natural gas/other fossil products	629.3
Cereal grains	427.6
Coal	385.7
Other ag prods.	252.1
Other foodstuffs	247.4
Gravel	200.3
Gasoline	198.7
Nonmetal min. prods.	179.5
Basic chemicals	168.7
Value	
Commodity	Trillion dollars
Electronics	2.2
Mixed freight	2.0
Motorized vehicles	1.9
Pharmaceuticals	1.7
Machinery	1.5
Gasoline	1.2
Misc. mfg. prods.	1.1
Plastics/rubber	1.0
Natural gas/other fossil products	1.0
Fuel oils	0.9

Note: Commodities are based on Standard Classification of Transported Goods (SCTG) codes. See the Census Bureau web site for commodity details: bhs.econ.census.gov/bhsphpext/brdsearch/scs_code.html.

Source:
U.S. Department of Transportation, FAF Data Tabulation Tool, Freight Analysis Framework Version 5.6.1, 2025. (Additional resources: faf.ornl.gov)

The Freight Analysis Framework compiles data from a variety of sources to create a comprehensive picture of freight movement in the United States.

Table 5.18
U.S. Freight Ton-Miles by State, 2023
(million ton-miles)

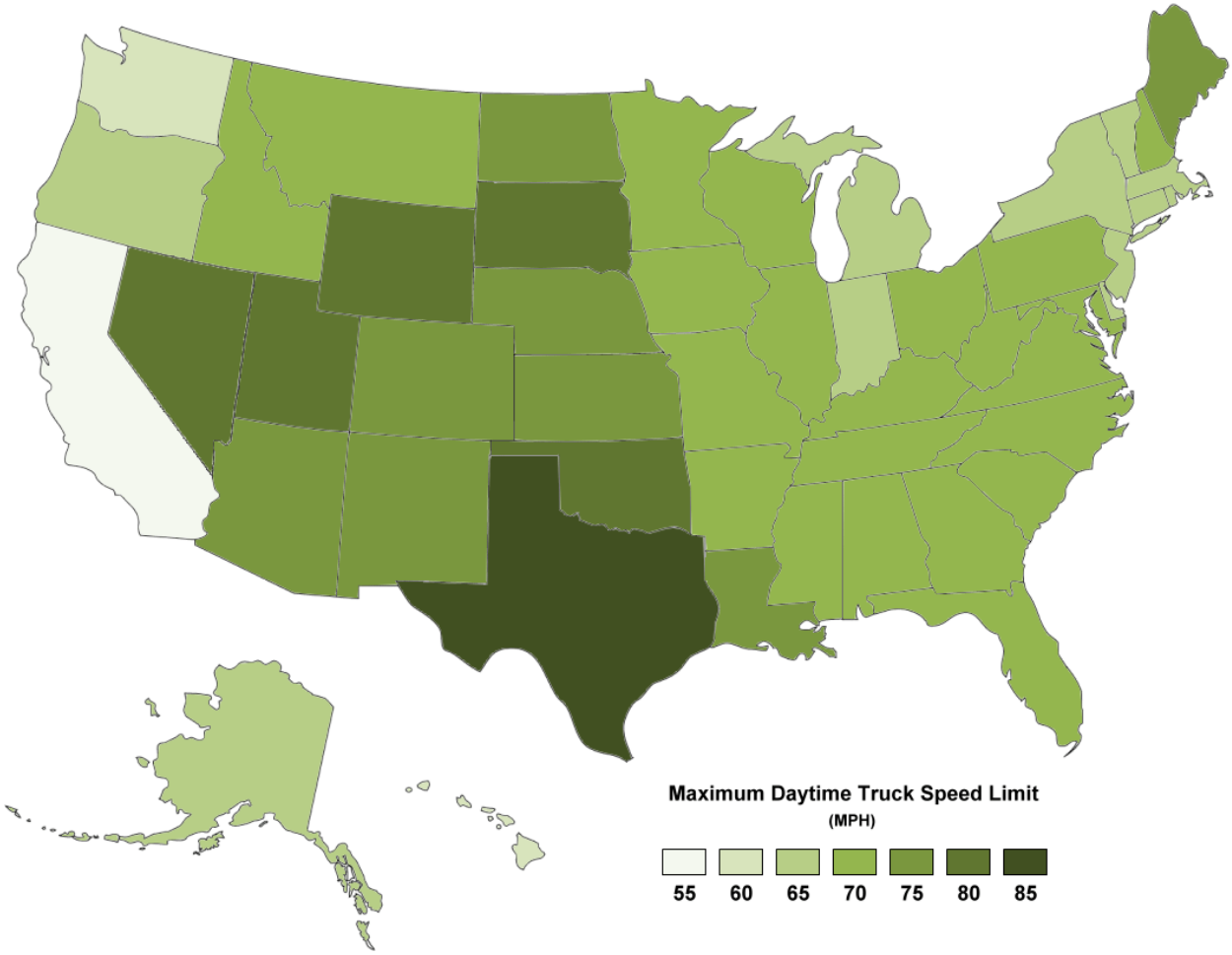
State	Within the given state	Outbound from the given state	Inbound to the given state
Alabama	25,921.7	74,029.1	72,194.6
Alaska	6,195.2	63,236.9	5,347.9
Arizona	8,597.3	34,525.9	61,911.7
Arkansas	20,348.4	39,480.8	40,420.3
California	104,341.7	240,770.8	335,922.4
Colorado	16,967.5	69,398.3	45,526.2
Connecticut	2,831.3	11,327.0	26,815.6
Delaware	578.9	6,507.7	11,725.3
District of Columbia	5.1	442.0	1,193.6
Florida	64,383.3	61,329.9	135,020.3
Georgia	34,989.7	74,237.7	109,452.4
Hawaii	804.0	1,382.5	10,603.1
Idaho	16,715.3	36,387.0	17,381.3
Illinois	53,136.9	204,593.5	259,335.4
Indiana	27,930.4	98,420.1	115,213.6
Iowa	45,865.9	102,504.4	55,319.0
Kansas	27,996.4	49,796.6	44,951.3
Kentucky	17,537.1	77,013.2	77,070.1
Louisiana	63,772.1	170,187.3	313,162.5
Maine	5,569.6	9,227.4	6,729.8
Maryland	5,841.5	21,666.5	33,941.9
Massachusetts	4,617.7	21,209.2	29,215.2
Michigan	41,303.6	89,146.2	139,637.2
Minnesota	44,556.4	141,280.6	101,033.9
Mississippi	14,637.1	57,151.4	57,619.1
Missouri	24,126.3	72,103.5	77,783.3
Montana	13,172.8	66,006.2	16,052.8
Nebraska	30,096.5	55,036.0	41,183.1
Nevada	5,627.5	17,808.0	25,474.9
New Hampshire	1,817.8	4,924.9	5,540.2
New Jersey	7,172.3	60,283.5	77,435.9
New Mexico	11,681.7	73,768.2	24,245.0
New York	31,992.4	66,126.8	104,625.7
North Carolina	25,994.8	46,222.2	89,393.5
North Dakota	23,334.5	335,591.0	42,327.5
Ohio	39,234.2	109,897.0	160,512.6
Oklahoma	13,603.5	64,293.4	75,357.3
Oregon	17,171.4	45,686.5	54,125.9
Pennsylvania	32,938.5	100,073.7	106,545.9
Rhode Island	345.0	3,016.0	2,974.2
South Carolina	13,574.0	36,489.8	44,447.2
South Dakota	14,085.0	38,224.0	13,219.0
Tennessee	18,349.4	68,547.3	76,649.5
Texas	356,793.0	420,959.7	492,233.3
Utah	6,042.8	40,727.5	42,765.9
Vermont	978.2	6,593.7	3,276.7
Virginia	24,980.2	42,396.2	65,807.1
Washington	37,257.3	75,372.1	143,800.4
West Virginia	10,708.9	49,504.9	21,450.6
Wisconsin	33,441.1	80,327.0	78,483.3
Wyoming	7,681.2	271,861.1	14,637.6

Note: Includes total flows between domestic origins and destinations, and both domestic and foreign shipments.

Source:
U.S. Department of Transportation, FAF Data Tabulation Tool, Freight Analysis Framework Version 5.6.1, 2025. (Additional resources: faf.ornl.gov)

Ranging from a speed limit of 55 miles per hour (mph) to 85 mph, the maximum speed limit for trucks varies from state to state and sometimes from year to year. Currently, California has the most conservative maximum speed limit for trucks – 55 mph. At the other end of the spectrum, Texas has some roads where the truck speed limit is 85 mph. Because of the varying limits, there is not one common highway speed at which trucks travel. Manufacturers design the vehicle to perform well over the entire range of speeds.

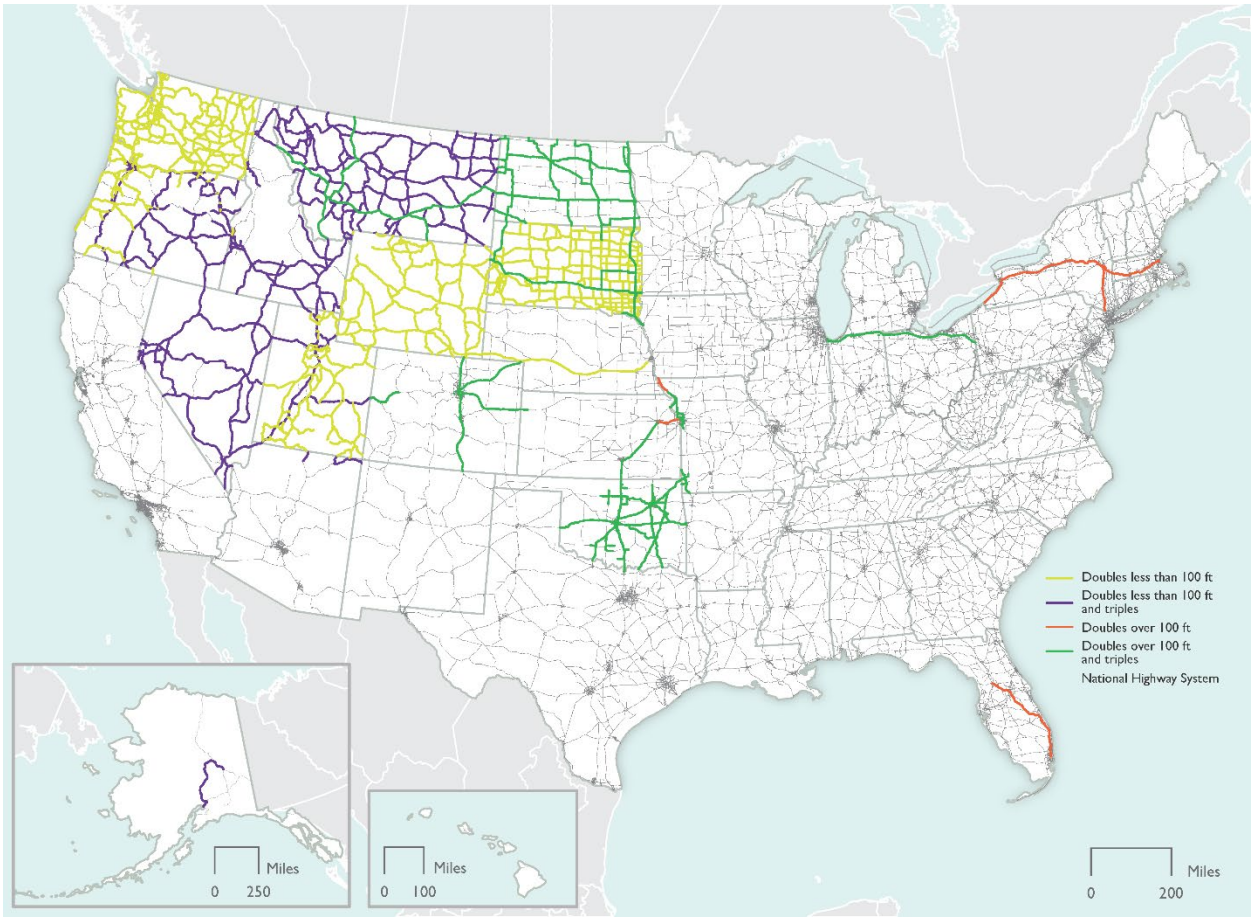
Figure 5.5. Maximum Daytime Truck Speed Limits by State, 2025



Source:
Insurance Institute for Highway Safety, Highway Loss Data Institute, "Speed Limits," March 2025.
(Additional resources: www.iihs.org/iihs/topics/speed/speed-limit-laws)

Although all states allow the conventional combinations consisting of a 28-foot semi-trailer and a 28-foot trailer, only 27 states and 6 state turnpike authorities allow longer combination vehicles (LCVs) on at least some parts of their road networks. LCVs are tractors pulling a semi-trailer and trailer, with at least one of them – the semi-trailer, the trailer, or both – longer than 28 feet. The routes that these LCVs can travel have not changed since 1991.

Figure 5.6. Routes Where Longer Combination Vehicles Are Permitted, 2025



Note: Empty triples are allowed on I-80 in Nebraska.

Source:
U.S. Department of Transportation, Bureau of Transportation Statistics, *Freight Facts and Figures* digital version, 2025. (Original source: 23 CFR Part 658, Appendix C.)
(Additional resources: www.bts.gov/product/freight-facts-and-figures)

Chapter 6

ALTERNATIVE FUEL & ADVANCED TECHNOLOGY VEHICLES & CHARACTERISTICS



Credit: Onurdongel/iStock/Getty Images

Chapter 6

Alternative Fuels

The Energy Policy Act of 1992 defines alternative fuels and allows the U.S. Department of Energy (DOE) to add to the list of alternative fuels if the fuel is substantially nonpetroleum, yields substantial energy security benefits, and offers substantial environmental benefits. DOE currently recognizes the following as alternative fuels:

- methanol, ethanol, and other alcohols,
- blends of 85% or more of alcohol with gasoline,
- natural gas and liquid fuels domestically produced from natural gas,
- liquefied petroleum gas (propane),
- coal-derived liquid fuels,
- hydrogen,
- electricity,
- biodiesel (B100),
- fuels (other than alcohol) derived from biological materials,
- P-series.

Alternative Fuels Data Center

DOE established the Alternative Fuels Data Center (AFDC) in 1991 to support its work aimed at fulfilling the Alternative Motor Fuels Act directives. Since then, the AFDC has expanded its focus to include all advanced transportation fuels, vehicles, and technologies. The AFDC is operated and managed by the National Laboratory of the Rockies (NLR) in Golden, Colorado.

The purposes of the AFDC are:

- to gather and analyze information on the fuel consumption, operation, and durability of alternative fuel vehicles, and

- to provide unbiased, accurate information on alternative fuels and alternative fuel vehicles to government agencies, private industry, research institutions, and other interested organizations.

Much of the AFDC data can be obtained through their website: **afdc.energy.gov**. Several tables and graphs in this chapter contain statistics which were generated by the AFDC. Below are some links to specific areas of the AFDC website.

Alternative Fuels & Advanced Vehicles – afdc.energy.gov/fuels

Alternative Fueling Station Locator – afdc.energy.gov/stations

Federal & State Laws & Incentives – afdc.energy.gov/laws

Maps and Data – afdc.energy.gov/data

Tools – **afdc.energy.gov/tools**

Table 6.1
Light-Duty Alternative Fuel Vehicles in Operation by State, 2025
(thousands)

State	Electric	Plug-in hybrid	Fuel cell electric	Natural gas	Liquefied petroleum gas	Total
Alabama	23	8	0	0	0	31
Alaska	4	1	0	0	0	5
Arizona	136	33	0	0	1	170
Arkansas	12	5	0	0	0	17
California	1,798	487	17	10	2	2,314
Colorado	160	57	0	0	0	217
Connecticut	48	26	0	0	0	74
Delaware	16	6	0	0	0	22
Dist. of Columbia	12	5	0	0	0	17
Florida	432	86	0	0	0	518
Georgia	154	32	0	0	0	186
Hawaii	34	9	0	0	0	43
Idaho	14	7	0	0	0	21
Illinois	157	50	0	0	0	207
Indiana	45	19	0	0	0	64
Iowa	15	9	0	0	0	24
Kansas	18	8	0	0	0	26
Kentucky	20	8	0	0	0	28
Louisiana	20	6	0	0	0	26
Maine	12	10	0	0	0	22
Maryland	117	41	0	0	0	158
Massachusetts	111	59	0	0	0	170
Michigan	110	42	0	0	0	152
Minnesota	58	24	0	0	0	82
Mississippi	7	3	0	0	0	10
Missouri	42	19	0	1	0	62
Montana	7	4	0	0	0	11
Nebraska	11	5	0	0	0	16
Nevada	82	16	0	0	0	98
New Hampshire	15	9	0	0	0	24
New Jersey	206	61	0	0	0	267
New Mexico	16	7	0	0	0	23
New York	205	125	0	0	0	330
North Carolina	115	34	0	0	0	149
North Dakota	2	1	0	0	0	3
Ohio	90	36	0	1	0	127
Oklahoma	26	30	0	2	0	58
Oregon	95	38	0	0	0	133
Pennsylvania	110	55	0	0	0	165
Rhode Island	10	6	0	0	0	16
South Carolina	34	13	0	0	0	47
South Dakota	3	2	0	0	0	5
Tennessee	53	16	0	0	0	69
Texas	361	77	0	1	1	440
Utah	66	19	0	2	0	87
Vermont	12	8	0	0	0	20
Virginia	130	38	0	0	0	168
Washington	229	56	0	0	0	285
West Virginia	5	3	0	0	0	8
Wisconsin	41	18	0	0	0	59
Wyoming	2	1	0	0	0	3
Total	5,506	1,752	17	23	6	7,304

Notes: Vehicles in operation on September 30, 2025. Data may not sum to totals due to rounding.

Source:
Experian Automotive, analyzed by Argonne National Laboratory, December 2025.

Hybrid vehicle sales began in 1999 and plug-in electric vehicle sales began in 2010. Hybrids captured 10% of the light-duty vehicle market in 2024. All-electric vehicles accounted for 8% of the light-duty vehicle market in 2024, more than double that of 2021.

Table 6.2
Light-Duty Hybrid and Plug-In Vehicle Sales, 1999-2024

Calendar year	Hybrid vehicle sales (thousands)	Plug-in hybrid vehicle sales (thousands)	All-electric vehicle sales (thousands)	All light-duty vehicle sales[a] (thousands)	Hybrid share of all light vehicles	Plug-in hybrid share of all light-duty vehicles	All-electric share of all light-duty vehicles
1999	0.0	0.0	0.0	16,711	0.0%	0.0%	0.0%
2000	9.4	0.0	0.0	17,164	0.1%	0.0%	0.0%
2001	20.3	0.0	0.0	16,950	0.1%	0.0%	0.0%
2002	36.0	0.0	0.0	16,675	0.2%	0.0%	0.0%
2003	47.6	0.0	0.0	16,494	0.3%	0.0%	0.0%
2004	84.2	0.0	0.0	16,737	0.5%	0.0%	0.0%
2005	205.9	0.0	0.0	16,774	1.2%	0.0%	0.0%
2006	251.9	0.0	0.0	16,336	1.5%	0.0%	0.0%
2007	351.1	0.0	0.0	15,867	2.2%	0.0%	0.0%
2008	315.8	0.0	0.0	13,015	2.4%	0.0%	0.0%
2009	290.3	0.0	0.0	10,236	2.8%	0.0%	0.0%
2010	274.6	0.3	0.0	11,394	2.4%	0.0%	0.0%
2011	268.7	7.7	10.1	12,542	2.1%	0.1%	0.1%
2012	434.6	38.6	14.6	14,220	3.1%	0.3%	0.1%
2013	495.5	49.0	48.1	15,279	3.2%	0.3%	0.3%
2014	452.2	55.4	63.5	16,192	2.8%	0.3%	0.4%
2015	384.4	43.0	71.1	17,107	2.2%	0.3%	0.4%
2016	346.9	72.9	86.7	17,179	2.0%	0.4%	0.5%
2017	362.9	91.2	104.5	16,827	2.2%	0.5%	0.6%
2018	338.1	123.9	207.1	16,919	2.0%	0.7%	1.2%
2019	399.4	85.8	233.8	16,630	2.4%	0.5%	1.4%
2020	455.1	69.0	238.5	14,123	3.2%	0.5%	1.7%
2021	799.0	176.1	459.5	14,567	5.5%	1.2%	3.2%
2022	766.4	183.4	748.0	13,422	5.7%	1.4%	5.6%
2023	1,175.5	293.6	1,164.6	15,117	7.8%	1.9%	7.7%
2024	1,609.0	321.8	1,247.7	15,436	10.4%	2.1%	8.1%
			Average annual percentage change				
2000-2024	23.9%	[b]	[b]	-0.4%			
2014-2024	13.5%	19.2%	34.7%	-0.5%			

Notes: Plug-in vehicle sales include only those vehicles certified for highway use. Small electric carts and neighborhood electric vehicles are excluded. See glossary for hybrid and plug-in hybrid vehicle definition.

Sources:
Hybrid and Electric Vehicle Sales – Compiled by the Transportation Research Center at Argonne National Laboratory, 2025. (Additional resources: www.anl.gov/esia/light-duty-electric-drive-vehicles-monthly-sales-updates)
All Light-Duty Vehicle Sales – Table 3.12.

[a] Includes plug-in hybrid vehicles and all-electric vehicles.
[b] Data are not available.

Table 6.3
Light-Duty E85 Flex-Fuel Vehicles Available by Manufacturer, Model Year 2024

Model	EPA Size Class	Range E85 (Miles)
Chevrolet Silverado 2WD	Standard Pick-up Trucks 2WD	312/368
Chevrolet Silverado 4WD	Standard Pick-up Trucks 4WD	288/340
Chevrolet Silverado Mud Terrain Tires 4WD	Standard Pick-up Trucks 4WD	288
Ford Explorer FFV AWD	Standard SUV 4WD	303
GMC Sierra 2WD	Standard Pick-up Trucks 2WD	312/368
GMC Sierra 4WD	Standard Pick-up Trucks 4WD	288/340
GMC Sierra Mud Terrain Tires 4WD	Standard Pick-up Trucks 4WD	288

Note: Vehicles with two ranges listed have two fuel tank size options.

Source:
U.S. Department of Energy and U.S. Environmental Protection Agency, Fuel Economy Website, Power Search www.fueleconomy.gov/feg/powerSearch.jsp. Data accessed: March 27, 2025.

Table 6.4
Light-Duty B20, CNG, and LPG Vehicles Available by Manufacturer, Model Year 2024

Model	Fuel[a]	EPA Size Class	Range (Miles)
Cadillac Escalade 2WD	B20	Standard SUV 2WD	552
Cadillac Escalade 4WD	B20	Standard SUV 4WD	528
Chevrolet Silverado 2WD	B20	Standard Pick-up Trucks 2WD	624
Chevrolet Silverado 4WD	B20	Standard Pick-up Trucks 4WD	576
Chevrolet Silverado 4WD with Sport Mode	B20	Standard Pick-up Trucks 4WD	552
Chevrolet Silverado 4WD MT Tires	B20	Standard Pick-up Trucks 4WD	528
Chevrolet Silverado 4WD MT Tires Sport Mode	B20	Standard Pick-up Trucks 4WD	528
Chevrolet Silverado 4WD ZR2	B20	Standard Pick-up Trucks 4WD	504
Chevrolet Suburban 2WD	B20	Standard SUV 2WD	644
Chevrolet Suburban4WD	B20	Standard SUV 4WD	616
Chevrolet Tahoe 2WD	B20	Standard SUV 2WD	576
Chevrolet Tahoe 4WD	B20	Standard SUV 4WD	528
GMC Sierra 2WD	B20	Standard Pick-up Trucks 2WD	600
GMC Sierra 4WD	B20	Standard Pick-up Trucks 4WD	576
GMC Sierra 4WD AT4X	B20	Standard Pick-up Trucks 4WD	456
GMC Sierra 4WD MT Tires	B20	Standard Pick-up Trucks 4WD	528
GMC Yukon 2WD	B20	Standard SUV 2WD	552
GMC Yukon 4WD	B20	Standard SUV 4WD	528
GMC Yukon XL 2WD	B20	Standard SUV 2WD	644
GMC Yukon XL 4WD	B20	Standard SUV 4WD	616
No light vehicles fueled with CNG are available in this model year.			
No light vehicles fueled with LPG are available in this model year.			

Note: Vehicles with two ranges listed have two fuel tank size options.

Source:
U.S. Department of Energy and U.S. Environmental Protection Agency, Fuel Economy Website, Power Search www.fueleconomy.gov/feg/powerSearch.jsp. Data accessed March 27, 2025.

[a] All diesel vehicles are capable of using B20.

Table 6.5
Light-Duty Hybrid Vehicles Available by Manufacturer, Model Year 2024

Model	EPA Size Class	Range (Miles)
Audi A3	Subcompact Cars	422
Audi A3 quattro	Subcompact Cars	435
Audi A4 allroad quattro	Small Station Wagons	398
Audi A4 quattro	Compact Cars	459
Audi A4 S line quattro	Compact Cars	413
Audi A5 Cabriolet quattro	Subcompact Cars	413
Audi A5 Coupe quattro	Subcompact Cars	413
Audi A5 Sportback quattro	Midsize Cars	459
Audi A5 Sportback S line quattro	Midsize Cars	413
Audi A6 allroad quattro	Midsize Station Wagons	482
Audi A6 quattro 4cyl 2.0L	Midsize Cars	502
Audi A6 quattro 6cyl 3.0L	Midsize Cars	482
Audi A7 quattro	Midsize Cars	482
Audi A8 quattro	Large Cars	477
Audi Q5 quattro	Small SUV 4WD	481
Audi Q5 S line quattro	Small SUV 4WD	444
Audi Q5 Sportback S line quattro	Small SUV 4WD	444
Audi Q7 quattro	Standard SUV 4WD	472
Audi Q8 quattro	Standard SUV 4WD	428
Audi RS 6 Avant	Midsize Station Wagons	328
Audi RS 7	Midsize Cars	328
Audi RS Q8	Standard SUV 4WD	338
Audi S3	Subcompact Cars	377
Audi S6	Midsize Cars	425
Audi S7	Midsize Cars	425
Audi S8	Large Cars	391
BMW 530i Sedan	Midsize Cars	477
BMW 530i xDrive Sedan	Midsize Cars	477
BMW 540i xDrive Sedan	Midsize Cars	445
BMW 740i Sedan	Large Cars	[a]
BMW 740i xDrive Sedan	Large Cars	[a]
BMW 760i xDrive Sedan	Large Cars	[a]
BMW Alpina XB7	Standard SUV 4WD	372
BMW M340i Sedan	Compact Cars	406
BMW M340i xDrive Sedan	Compact Cars	406
BMW M440i Convertible	Subcompact Cars	406
BMW M440i Coupe	Subcompact Cars	421
BMW M440i Gran Coupe	Compact Cars	421
BMW M440i xDrive Convertible	Subcompact Cars	390
BMW M440i xDrive Coupe	Subcompact Cars	390
BMW M440i xDrive Gran Coupe	Compact Cars	390
BMW X3 M40i	Small SUV 4WD	396
BMW X4 M40i	Small SUV 4WD	396
BMW X5 M Competition	Standard SUV 4WD	328
BMW X5 M60i xDrive	Standard SUV 4WD	416
BMW X5 sDrive40i	Standard SUV 2WD	548
BMW X5 xDrive40i	Standard SUV 4WD	548
BMW X6 M Competition	Standard SUV 4WD	328
BMW X6 M60i xDrive	Standard SUV 4WD	416
BMW X6 xDrive40i	Standard SUV 4WD	526
BMW X7 M60i xDrive	Standard SUV 4WD	394
BMW X7 xDrive40i	Standard SUV 4WD	482
Chevrolet Corvette E-Ray	Two Seaters	352
Ford Escape AWD HEV	Small SUV 4WD	558
Ford Escape FWD HEV	Small SUV 2WD	558
Ford F150 Pickup 4WD HEV	Standard Pick-up Trucks 4WD	704
Ford Maverick HEV FWD	Small Pick-up Trucks 2WD	511

Table 6.5 (Continued)
Light-Duty Hybrid Vehicles Available by Manufacturer, Model Year 2024

Model	EPA Size Class	Range (Miles)
Genesis G90 MHEV	Large Cars	386
Honda Accord	Large Cars	614
Honda Accord Sport/Touring	Midsize Cars	563
Honda CR-V AWD	Small SUV 4WD	518
Honda CR-V FWD	Small SUV 2WD	560
Hyundai Elantra Hybrid	Midsize Cars	620
Hyundai Elantra Hybrid Blue	Midsize Cars	670
Hyundai Santa Fe Hybrid AWD	Small SUV 4WD	602
Hyundai Santa Fe Hybrid FWD	Small SUV 2WD	637
Hyundai Sonata Hybrid	Large Cars	620
Hyundai Tucson Hybrid	Small SUV 4WD	507
Hyundai Tucson Hybrid Blue	Small SUV 4WD	521
Jaguar F-Pace P400 MHEV	Small SUV 4WD	460
Kia Niro	Small SUV 2WD	544
Kia Niro FE	Small SUV 2WD	588
Kia Sorento Hybrid AWD	Small SUV 4WD	602
Kia Sorento Hybrid FWD	Small SUV 2WD	655
Kia Sportage Hybrid AWD	Small SUV 4WD	521
Kia Sportage Hybrid FWD	Small SUV 4WD	589
Lamborghini Revuelto	Two Seaters	[a]
Land Rover Defender 110 MHEV	Standard SUV 4WD	428
Land Rover Defender 130 Outbound	Standard SUV 4WD	405
Land Rover Defender 130 P300 MHEV	Standard SUV 4WD	428
Land Rover Defender 130 P400 MHEV	Standard SUV 4WD	428
Land Rover Defender 90 MHEV	Standard SUV 4WD	468
Land Rover Discovery MHEV	Standard SUV 4WD	[a]
Land Rover Range Rover LWB MHEV	Standard SUV 4WD	428
Land Rover Range Rover MHEV	Standard SUV 4WD	452
Land Rover Range Rover P360 LWB MHEV	Standard SUV 4WD	[a]
Land Rover Range Rover P360 MHEV	Standard SUV 4WD	[a]
Land Rover Range Rover P400 LWB MHEV	Standard SUV 4WD	476
Land Rover Range Rover P400 MHEV	Standard SUV 4WD	476
Land Rover Range Rover Sport MHEV	Standard SUV 4WD	[a]
Land Rover Range Rover Sport P360 MHEV	Standard SUV 4WD	[a]
Land Rover Range Rover Sport P400 MHEV	Standard SUV 4WD	[a]
Land Rover Range Rover Sport SVR MHEV	Standard SUV 4WD	[a]
Land Rover Range Rover SV LWB MHEV	Standard SUV 4WD	428
Land Rover Range Rover SV MHEV	Standard SUV 4WD	428
Land Rover Range Rover Velar P340 MHEV	Small SUV 4WD	475
Land Rover Range Rover Velar P400 MHEV	Small SUV 4WD	454
Lexus ES 300h	Midsize Cars	581
Lexus LC 500h	Subcompact Cars	644
Lexus LS 500h AWD	Midsize Cars	555
Lexus LS 500h AWD	Midsize Cars	555
Lexus NX 350h AWD	Small SUV 4WD	566
Lexus RX 350h AWD	Small SUV 4WD	619
Lexus RX 500h AWD	Small SUV 4WD	464
Lexus TX 500h AWD	Standard SUV 4WD	481
Lexus UX 250h	Compact Cars	445
Lexus UX 250h AWD	Compact Cars	413
Lincoln Nautilus HEV AWD	Small SUV 4WD	600
Maserati Grecale GT	Small SUV 4WD	[a]
Maserati Grecale Modena	Small SUV 4WD	[a]
Mazda CX-90 4WD Regular	Standard SUV 4WD	462
Mazda CX-90 4WD Premium	Standard SUV 4WD	462
Mercedes-Benz AMG C 43 4MATIC	Compact Cars	400
Mercedes-Benz AMG CLA 35 4MATIC	Compact Cars	338
Mercedes-Benz AMG CLE 53 4MATIC+ (Coupe)	Subcompact Cars	400
Mercedes-Benz AMG GLA 35 4MATIC	Small Station Wagons	305
Mercedes-Benz AMG GLB 35 4MATIC	Midsize Station Wagons	366

Table 6.5 (Continued)
Light-Duty Hybrid Vehicles Available by Manufacturer, Model Year 2024

Mercedes-Benz AMG GLC 43 4MATIC	Small SUV 4WD	365
Mercedes-Benz AMG GLC 43 4MATIC (coupe)	Small SUV 4WD	365
Mercedes-Benz AMG GLE 53 4MATIC+	Standard SUV 4WD	450
Mercedes-Benz AMG GLE 53 4MATIC+ (coupe)	Standard SUV 4WD	450
Mercedes-Benz AMG GLE 63 S 4MATIC+	Standard SUV 4WD	360
Mercedes-Benz AMG GLE 63 S 4MATIC+ (coupe)	Standard SUV 4WD	360
Mercedes-Benz AMG GLS 63 4MATIC+	Standard SUV 4WD	381
Mercedes-Benz AMG GT 43 4MATIC+	Compact Cars	443
Mercedes-Benz AMG GT 53 4MATIC+	Compact Cars	443
Mercedes-Benz AMG SL 43	Two Seaters	407
Mercedes-Benz C 300 4MATIC	Compact Cars	470
Mercedes-Benz CLA 250	Compact Cars	405
Mercedes-Benz CLA 250 4MATIC	Compact Cars	378
Mercedes-Benz CLE 300 4MATIC (Convertible)	Subcompact Cars	452
Mercedes-Benz CLE 300 4MATIC (Coupe)	Subcompact Cars	487
Mercedes-Benz CLE 450 4MATIC (Convertible)	Subcompact Cars	452
Mercedes-Benz CLE 450 4MATIC (Coupe)	Subcompact Cars	452
Mercedes-Benz E 350 4MATIC	Midsize Cars	470
Mercedes-Benz E 450 4MATIC AT	Midsize Station Wagons	528
Mercedes-Benz E450 4MATIC All-Terrain (Wagon)	Midsize Station Wagons	435
Mercedes-Benz GLA 250	Special Purpose Vehicle 2WD	356
Mercedes-Benz GLA 250 4MATIC	Small SUV 4WD	343
Mercedes-Benz GLB 250	Special Purpose Vehicle 2WD	445
Mercedes-Benz GLB 250 4MATIC	Small SUV 4WD	429
Mercedes-Benz GLC 300	Small SUV 2WD	505
Mercedes-Benz GLC 300 4MATIC	Small SUV 4WD	470
Mercedes-Benz GLC 300 4MATIC (Coupe)	Small SUV 4WD	452
Mercedes-Benz GLE 350	Small SUV 4WD	540
Mercedes-Benz GLE 350 4MATIC	Small SUV 4WD	518
Mercedes-Benz GLE 450 4MATIC	Standard SUV 4WD	495
Mercedes-Benz GLE 580 4MATIC	Standard SUV 4WD	382
Mercedes-Benz GLS 450 4MATIC	Standard SUV 4WD	500
Mercedes-Benz GLS 580 4MATIC	Standard SUV 4WD	381
Mercedes-Benz GLS 600 4MATIC Maybach	Standard SUV 4WD	381
Mercedes-Benz S 500 4MATIC	Large Cars	533
Mercedes-Benz S 580 4MATIC	Large Cars	466
Mercedes-Benz S 580 4MATIC Maybach	Large Cars	466
RAM 1500 4X2 3.6L 6cyl	Standard Pick-up Trucks 2WD	506/572
RAM 1500 4X2 5.7L 8cyl	Standard Pick-up Trucks 2WD	460/520
RAM 1500 4X4 3.6L 6cyl	Standard Pick-up Trucks 4WD	583/546
RAM 1500 4X4 5.7L 8cyl	Standard Pick-up Trucks 4WD	437/494
RAM 1500 HFE 4X2	Standard Pick-up Trucks 2WD	529/598
Toyota Camry Hybrid LE	Midsize Cars	686
Toyota Camry Hybrid SE/XLE/XSE	Midsize Cars	607
Toyota Corolla Cross Hybrid	Compact Cars	445
Toyota Corolla Hybrid	Compact Cars	565
Toyota Corolla Hybrid AWD	Compact Cars	542
Toyota Corolla Hybrid AWD	Compact Cars	497
Toyota Crown AWD	Midsize Cars	594
Toyota Crown AWD	Midsize Cars	435
Toyota Grand Highlander Hybrid	Standard SUV 2WD	619
Toyota Grand Highlander Hybrid AWD	Standard SUV 4WD	585
Toyota Grand Highlander Hybrid AWD	Standard SUV 4WD	464
Toyota Grand Highlander Hybrid Limited	Standard SUV 2WD	585
Toyota Highlander Hybrid	Small SUV 2WD	616
Toyota Highlander Hybrid AWD	Standard SUV 4WD	598
Toyota Highlander Hybrid AWD LTD/PLAT	Standard SUV 4WD	598
Toyota Land Cruiser	Standard SUV 4WD	412
Toyota Prius	Midsize Cars	644
Toyota Prius AWD	Midsize Cars	567
Toyota Prius AWD XLE/LTD	Midsize Cars	514

Table 6.5 (Continued)
Light-Duty Hybrid Vehicles Available by Manufacturer, Model Year 2024

Toyota Prius XLE/LTD	Midsize Cars	588
Toyota RAV4 Hybrid AWD	Small SUV 4WD	566
Toyota RAV4 Hybrid AWD Woodland Edition	Small SUV 4WD	536
Toyota Sequoia 2WD	Standard SUV 2WD	495
Toyota Sequoia 4WD	Standard SUV 4WD	450
Toyota Sienna	Special Purpose Vehicle, minivan 2WD	648
Toyota Sienna AWD	Special Purpose Vehicle, minivan 4WD	630
Toyota Tacoma Hybrid 4WD	Standard Pick-up Trucks 4WD	437
Toyota Tacoma Hybrid 4WD	Standard Pick-up Trucks 4WD	419
Toyota Tundra 2WD	Standard Pick-up Trucks 2WD	495/708
Toyota Tundra 2WD	Standard Pick-up Trucks 2WD	495/709
Toyota Tundra 4WD	Standard Pick-up Trucks 4WD	450/644
Toyota Tundra 4WD	Standard Pick-up Trucks 4WD	450/645
Toyota Tundra 4WD PRO	Standard Pick-up Trucks 4WD	428/612
Toyota Tundra 4WD PRO	Standard Pick-up Trucks 4WD	428/613
Toyota Venza AWD	Small SUV 4WD	566
Volvo S60 B5	Compact Cars	477
Volvo S60 B5 AWD	Compact Cars	445
Volvo S90 B6 AWD	Midsize Cars	398
Volvo V60CC B5 AWD	Small Station Wagons	429
Volvo V90CC B6 AWD	Midsize Station Wagons	398
Volvo XC40 B5 AWD	Small SUV 4WD	369
Volvo XC60 B5 AWD	Small SUV 4WD	470
Volvo XC90 B5 AWD	Standard SUV 4WD	451
Volvo XC90 B6 AWD	Standard SUV 4WD	432

Note: Vehicles with two ranges listed have two fuel tank size options.

Source:
U.S. Department of Energy and U.S. Environmental Protection Agency, Fuel Economy Website, Power Search www.fueleconomy.gov/feg/powerSearch.jsp . Data accessed March 27, 2025.

[a] Data are not available.

Table 6.6
Light-Duty Plug-in Hybrid Vehicles Available by Manufacturer, Model Year 2024

Model	EPA Size Class	Range (Miles)
Alfa Romeo Tonale eAWD	Small SUV 4WD	Elec 33 / Total 360
Audi Q5 TFSI e quattro	Small SUV 4WD	[a]
Bentley Bentayga Hybrid	Standard SUV 4WD	[a]
Bentley Flying Spur Hybrid	Midsize Cars	Elec 21 / Total 430
BMW 330e Sedan	Compact Cars	Elec 22 / Total 310
BMW 330e xDrive Sedan	Compact Cars	Elec 20 / Total 300
BMW 750e xDrive Sedan	Large Cars	[a]
BMW X5 xDrive50e	Standard SUV 4WD	[a]
BMW XM	Standard SUV 4WD	Elec 31 / Total 300
Chrysler Pacifica Hybrid	Minivan - 2WD	Elec 32 / Total 520
Dodge Hornet PHEV AWD	Small SUV 4WD	Elec 33 / Total 360
Ferrari 296 GTB	Two Seaters	[a]
Ferrari 296 GTB Spider	Two Seaters	[a]
Ferrari SF90 Spider	Two Seaters	Elec 8 / Total 330
Ferrari SF90 Stradale	Two Seaters	Elec 9 / Total 340
Ford Escape PHEV	Small SUV 2WD	[a]
Hyundai Tucson Plug-in Hybrid	Small SUV 4WD	Elec 33 / Total 420
Jeep Grand Cherokee 4xe	Standard SUV 4WD	Elec 26 / Total 470
Jeep Wrangler 4dr 4xe	Small SUV 4WD	Elec 22 / Total 370
Kia Niro Plug-in Hybrid	Small SUV 2WD	[a]
Kia Sorento Plug-in Hybrid	Small SUV 4WD	Elec 32 / Total 460
Kia Sportage Plug-in Hybrid	Small SUV 4WD	Elec 34 / Total 430
Land Rover Range Rover P550e (PHEV)	Standard SUV 4WD	[a]
Land Rover Range Rover Sport P550e (PHEV)	Standard SUV 4WD	[a]
Lexus NX 450h Plus AWD	Small SUV 4WD	Elec 37 / Total 550
Lexus RX 450h+ AWD	Small SUV 4WD	[a]
Lexus TX 550h+ AWD	Standard SUV 4WD	[a]
Lincoln Corsair AWD PHEV	Small SUV 4WD	[a]
Mazda CX-90	Standard SUV 4WD	[a]
McLaren Artura	Two Seaters	[a]
Mercedes-Benz AMG C63e S	Subcompact Cars	[a]
Mercedes-Benz AMG GT 63 Se 4MATIC+	Compact Cars	[a]
Mercedes-Benz AMG S 63e 4MATIC	Large Cars	[a]
Mercedes-Benz AMG SL 63 Se 4MATIC	Minicompact Cars	[a]
Mercedes-Benz GLE 450e 4MATIC	Standard SUV 4WD	[a]
Mercedes-Benz S 580e 4MATIC	Large Cars	[a]
Mitsubishi Outlander PHEV	Standard SUV 4WD	Elec 38 / Total 420
Porsche Cayenne E-Hybrid	Standard SUV 4WD	[a]
Porsche Cayenne E-Hybrid Coupe	Standard SUV 4WD	[a]
Porsche Cayenne S E-Hybrid	Standard SUV 4WD	[a]
Porsche Cayenne S E-Hybrid Coupe	Standard SUV 4WD	[a]
Porsche Cayenne Turbo S E-Hybrid	Standard SUV 4WD	[a]
Porsche Cayenne Turbo S E-Hybrid Coupe	Standard SUV 4WD	[a]
Toyota Prius Prime	Midsize Cars	Elec 40 / Total 550
Toyota Prius Prime SE	Midsize Cars	Elec 45 / Total 600
Toyota RAV4 Prime 4WD	Small SUV 4WD	Elec 42 / Total 600
Volvo S60 T8 AWD Recharge	Compact Cars	Elec 40 / Total 530
Volvo S90 T8 AWD Recharge	Midsize Station Wagons	[a]
Volvo V60 T8 AWD Recharge	Small Station Wagons	[a]
Volvo XC60 T8 AWD Recharge	Small SUV 4WD	Elec 36 / Total 560
Volvo XC90 T8 AWD Recharge	Standard SUV 4WD	Elec 33 / Total 530

Note: For Range, the term "Elec" refers to the charge depleting portion of operation where electricity is exclusively or primarily used.

Source:
U.S. Department of Energy and U.S. Environmental Protection Agency, Fuel Economy Website, Power Search www.fueleconomy.gov/feg/powerSearch.jsp. Data accessed March 27, 2025.

Table 6.7
Light-Duty All-Electric and Fuel Cell Vehicles Available by Manufacturer, Model Year 2024

Model	Drive Type	EPA Size Class	Range (Miles)
Acura ZDX AWD	EV	Standard SUV 2WD	304
Acura ZDX AWD Type S	EV	Standard SUV 2WD	278
Acura ZDX RWD	EV	Standard SUV 2WD	313
Audi e-tron GT	EV	Midsize Cars	249
Audi Q4 40 e-tron	EV	Standard SUV 2WD	265
Audi Q4 50 e-tron quattro	EV	Standard SUV 4WD	236
Audi Q4 55 e-tron quattro	EV	Standard SUV 4WD	258
Audi Q4 Sportback 50 e-tron quattro	EV	Standard SUV 4WD	242
Audi Q4 Sportback 55 e-tron quattro	EV	Standard SUV 4WD	258
Audi Q8 e-tron quattro	EV	Standard SUV 4WD	285
Audi Q8 Sportback e-tron quattro	EV	Standard SUV 4WD	296
Audi Q8 Sportback e-tron ultra quattro	EV	Standard SUV 4WD	300
Audi RS e-tron GT	EV	Midsize Cars	249
Audi SQ8 e-tron (20 inch wheels)	EV	Standard SUV 4WD	253
Audi SQ8 e-tron (21/22 inch wheels)	EV	Standard SUV 4WD	218
Audi SQ8 Sportback e-tron (20 inch wheels)	EV	Standard SUV 4WD	253
Audi SQ8 Sportback e-tron (21/22 inch wheels)	EV	Standard SUV 4WD	218
BMW i4 eDrive35 Gran Coupe (18 inch Wheels)	EV	Subcompact Cars	276
BMW i4 eDrive35 Gran Coupe (19 inch Wheels)	EV	Subcompact Cars	252
BMW i4 eDrive40 Gran Coupe (18 inch Wheels)	EV	Subcompact Cars	301
BMW i4 eDrive40 Gran Coupe (19 inch Wheels)	EV	Subcompact Cars	283
BMW i4 M50 Gran Coupe (19 inch wheels)	EV	Subcompact Cars	269
BMW i4 M50 Gran Coupe (20 inch wheels)	EV	Subcompact Cars	227
BMW i4 xDrive40 Gran Coupe (18 inch Wheels)	EV	Subcompact Cars	307
BMW i4 xDrive40 Gran Coupe (19 inch Wheels)	EV	Subcompact Cars	279
BMW i5 eDrive40 Sedan (19 inch Wheels)	EV	Compact Cars	295
BMW i5 eDrive40 Sedan (20 inch Wheels)	EV	Compact Cars	278
BMW i5 eDrive40 Sedan (21 inch Wheels)	EV	Compact Cars	270
BMW i5 M60 xDrive Sedan (19 inch Wheels)	EV	Compact Cars	256
BMW i5 M60 xDrive Sedan (20 inch Wheels)	EV	Compact Cars	248
BMW i5 M60 xDrive Sedan (21 inch Wheels)	EV	Compact Cars	240
BMW i7 eDrive50 Sedan (19 inch Wheels)	EV	Large Cars	321
BMW i7 eDrive50 Sedan (20 inch Wheels)	EV	Large Cars	301
BMW i7 eDrive50 Sedan (21 inch Wheels)	EV	Large Cars	311
BMW i7 M70 xDrive Sedan (20 inch Wheels)	EV	Large Cars	274
BMW i7 M70 xDrive Sedan (21 inch Wheels)	EV	Large Cars	291
BMW i7 xDrive60 Sedan (19 inch wheels)	EV	Large Cars	317
BMW i7 xDrive60 Sedan (20 inch wheels)	EV	Large Cars	298
BMW i7 xDrive60 Sedan (21 inch wheels)	EV	Large Cars	307
BMW iX M60 (21 inch Wheels)	EV	Standard SUV 4WD	296
BMW iX M60 (22 inch Wheels)	EV	Standard SUV 4WD	296
BMW iX xDrive40 (20 inch Wheels)	EV	Standard SUV 4WD	217
BMW iX xDrive40 (21 inch Wheels)	EV	Standard SUV 4WD	217
BMW iX xDrive40 (22 inch Wheels)	EV	Standard SUV 4WD	217
BMW iX xDrive50 (20 inch wheels)	EV	Standard SUV 4WD	307
BMW iX xDrive50 (21 inch wheels)	EV	Standard SUV 4WD	307
BMW iX xDrive50 (22 inch wheels)	EV	Standard SUV 4WD	307
Bugatti Rimac Nevera	EV	Two Seaters	204
Cadillac LYRIQ	EV	Small SUV 2WD	314
Cadillac LYRIQ AWD	EV	Small SUV 4WD	307
Chevrolet Blazer EV AWD	EV	Small SUV 4WD	279
Chevrolet Blazer EV RWD	EV	Small SUV 2WD	324
Chevrolet Equinox EV AWD	EV	Small SUV 4WD	285
Chevrolet Equinox EV FWD	EV	Small SUV 2WD	319
Chevrolet Silverado EV	EV	Standard Pickup Trucks 4WD	450
Chevrolet Silverado EV	EV	Standard Pickup Trucks 4WD	393
Dodge Charger 2-Dr Daytona R/T AWD 18in	EV	Large Cars	274
Dodge Charger 2-Dr Daytona R/T AWD 20in Goodyr	EV	Large Cars	268
Dodge Charger 2-Dr Daytona R/T AWD 20in Nexen	EV	Large Cars	308
Dodge Charger 2-Dr Daytona Scat/Track Pack AWD	EV	Large Cars	216

Table 6.7 (Continued)
Light-Duty All-Electric and Fuel Cell Vehicles Available by Manufacturer, Model Year 2024

Model	Drive Type	EPA Size Class	Range (Miles)
Dodge Charger 2-Dr Daytona Scat/Trk Pack AWD A/S	EV	Large Cars	241
Fiat 500e	EV	Minicompact Cars	149
Fiat 500e All Season	EV	Minicompact Cars	141
Fisker Ocean Sport 20in	EV	Standard SUV 2WD	231
Fisker Ocean Sport 22in	EV	Standard SUV 2WD	194
Ford F-150 Lightning 4WD	EV	Standard Pickup Trucks 4WD	240
Ford F-150 Lightning 4WD Extended Range	EV	Standard Pickup Trucks 4WD	320
Ford F-150 Lightning Platinum 4WD	EV	Standard Pickup Trucks 4WD	300
Ford F-150 Lightning PRO 4WD Extended Range	EV	Standard Pickup Trucks 4WD	320
Ford Mustang Mach-E AWD	EV	Small SUV 4WD	230
Ford Mustang Mach-E AWD Extended	EV	Small SUV 4WD	300
Ford Mustang Mach-E GT	EV	Small SUV 4WD	280
Ford Mustang Mach-E Rally	EV	Small SUV 4WD	265
Ford Mustang Mach-E RWD	EV	Small SUV 2WD	250
Ford Mustang Mach-E RWD Extended	EV	Small SUV 2WD	320
Genesis Electrified G80	EV	Midsize Cars	282
Genesis Electrified GV70	EV	Small SUV 4WD	236
Genesis GV60 Advanced (19-inch Wheels)	EV	Small SUV 4WD	264
Genesis GV60 Advanced (20-inch Wheels)	EV	Small SUV 4WD	248
Genesis GV60 PERFORMANCE	EV	Small SUV 4WD	235
Genesis GV60 Standard	EV	Small SUV 2WD	294
GMC Hummer EV Pickup	EV	Standard Pickup Trucks 4WD	314
GMC Hummer EV Pickup 2M20	EV	Standard Pickup Trucks 4WD	311
GMC Hummer EV Pickup MT Tires	EV	Standard Pickup Trucks 4WD	298
GMC Hummer EV Pickup MT Tires 2M20	EV	Standard Pickup Trucks 4WD	279
GMC Hummer EV SUV	EV	Standard SUV 4WD	314
GMC Hummer EV SUV 2M20	EV	Standard SUV 4WD	303
GMC Hummer EV SUV MT Tires	EV	Standard SUV 4WD	298
GMC Hummer EV SUV MT Tires 2M20	EV	Standard SUV 4WD	279
Honda Prologue AWD Elite	EV	Standard SUV 4WD	273
Honda Prologue AWD Touring	EV	Standard SUV 4WD	281
Honda Prologue FWD	EV	Standard SUV 2WD	296
Hyundai Ioniq 5 Long range AWD	EV	Small SUV 4WD	260
Hyundai Ioniq 5 Long range RWD	EV	Small SUV 2WD	303
Hyundai Ioniq 5 Standard range RWD	EV	Small SUV 2WD	220
Hyundai Ioniq 6 Long range AWD (18-inch Wheels)	EV	Midsize Cars	316
Hyundai Ioniq 6 Long range AWD (20-inch Wheels)	EV	Midsize Cars	270
Hyundai Ioniq 6 Long range RWD (18-inch Wheels)	EV	Midsize Cars	361
Hyundai Ioniq 6 Long range RWD (20-inch Wheels)	EV	Midsize Cars	305
Hyundai Ioniq 6 Standard Range RWD	EV	Midsize Cars	240
Hyundai Kona Electric Long Range	EV	Small SUV 2WD	261
Hyundai Kona Electric Standard Range	EV	Small SUV 2WD	200
Jaguar I-Pace EV400 (20-inch tires)	EV	Small SUV 4WD	246
Jaguar I-Pace EV400 (22-inch tires)	EV	Small SUV 4WD	217
Jeep Wagoneer S AWD (Falken tire)	EV	Standard SUV 4WD	303
Jeep Wagoneer S AWD (Pirelli tire)	EV	Standard SUV 4WD	270
Kia EV6 AWD GT	EV	Small SUV 4WD	218
Kia EV6 Long Range AWD (19-inch Wheels)	EV	Small SUV 4WD	282
Kia EV6 Long Range AWD (20-inch Wheels)	EV	Small SUV 4WD	252
Kia EV6 Long Range RWD	EV	Small SUV 2WD	310
Kia EV6 Standard Range RWD	EV	Small SUV 2WD	232
Kia EV9 Long Range AWD	EV	Standard SUV 4WD	280
Kia EV9 Long Range AWD GT-Line	EV	Standard SUV 4WD	270
Kia EV9 Long Range RWD	EV	Standard SUV 2WD	304
Kia EV9 Standard Range RWD	EV	Standard SUV 2WD	230
Kia Niro Electric	EV	Small SUV 2WD	253
Lexus RZ 300e (18-inch wheels)	EV	Small SUV 2WD	266
Lexus RZ 300e (20-inch wheels)	EV	Small SUV 2WD	224
Lexus RZ 450e AWD (18-inch wheels)	EV	Small SUV 4WD	220
Lexus RZ 450e AWD (20-inch wheels)	EV	Small SUV 4WD	196

Table 6.7 (Continued)
Light-Duty All-Electric and Fuel Cell Vehicles Available by Manufacturer, Model Year 2024

Model	Drive Type	EPA Size Class	Range (Miles)
Lucid Air G Touring XR AWD with 20-inch wheels	EV	Large Cars	485
Lucid Air G Touring XR AWD with 21-inch wheels	EV	Large Cars	450
Lucid Air G Touring XR AWD with19-inch wheels	EV	Large Cars	516
Lucid Air Pure RWD with 19-inch wheels	EV	Large Cars	419
Lucid Air Pure RWD with 20-inch wheels	EV	Large Cars	394
Lucid Air Sapphire AWD	EV	Large Cars	427
Lucid Air Touring AWD with 19-inch wheels	EV	Large Cars	411
Lucid Air Touring AWD with 20-inch wheels	EV	Large Cars	382
Lucid Air Touring AWD with 21-inch wheels	EV	Large Cars	365
Maserati Grancabrio Folgore	EV	Subcompact Cars	233
Maserati Granturismo Folgore	EV	Subcompact Cars	242
Mercedes-Benz AMG EQE 4matic Plus	EV	Midsize Cars	230
Mercedes-Benz AMG EQE 4matic Plus (SUV)	EV	Standard SUV 4WD	235
Mercedes-Benz AMG EQS 4matic Plus	EV	Large Cars	305
Mercedes-Benz EQB 250 Plus	EV	Small SUV 2WD	251
Mercedes-Benz EQB 300 4matic	EV	Small SUV 4WD	205
Mercedes-Benz EQB 350 4matic	EV	Small SUV 4WD	207
Mercedes-Benz EQE 350 4matic	EV	Midsize Cars	280
Mercedes-Benz EQE 350 4matic (SUV)	EV	Standard SUV 4WD	265
Mercedes-Benz EQE 350 Plus	EV	Midsize Cars	298
Mercedes-Benz EQE 350 Plus (SUV)	EV	Standard SUV 2WD	307
Mercedes-Benz EQE 500 4matic	EV	Midsize Cars	298
Mercedes-Benz EQE 500 4matic (SUV)	EV	Standard SUV 4WD	282
Mercedes-Benz EQS 450 4matic	EV	Large Cars	345
Mercedes-Benz EQS 450 4matic (SUV)	EV	Standard SUV 4WD	330
Mercedes-Benz EQS 450 Plus	EV	Large Cars	352
Mercedes-Benz EQS 450 Plus (SUV)	EV	Standard SUV 2WD	339
Mercedes-Benz EQS 580 4matic	EV	Large Cars	345
Mercedes-Benz EQS 580 4matic (SUV)	EV	Standard SUV 4WD	330
Mercedes-Benz EQS 680 4matic Maybach (SUV)	EV	Standard SUV 4WD	280
Mercedes-Benz EQS 680 4matic Maybach (SUV)	EV	Standard SUV 4WD	321
MINI Cooper SE Hardtop 2 door	EV	Subcompact Cars	114
Nissan ARIYA ENGAGE e-4ORCE 63kWh	EV	Small Station Wagons	205
Nissan ARIYA ENGAGE FWD 63kWh	EV	Small Station Wagons	216
Nissan ARIYA ENG+/EVOL+ e-4ORCE 87kWh	EV	Small Station Wagons	272
Nissan ARIYA EVOL+/EMPOW+ FWD 87kWh	EV	Small Station Wagons	289
Nissan ARIYA PLAT+e-4ORCE 87kWh 19in. wheels	EV	Small Station Wagons	267
Nissan ARIYA PLAT+ e-4ORCE 87kWh 20in. wheels	EV	Small Station Wagons	257
Nissan ARIYA VENTURE Plus FWD 87kWh	EV	Small Station Wagons	304
Nissan LEAF	EV	Midsize Cars	149
Nissan LEAF SV	EV	Midsize Cars	212
Polestar 2 Dual Motor (19-Inch Wheels)	EV	Midsize Cars	276
Polestar 2 Dual Motor (20-Inch Wheels)	EV	Midsize Cars	266
Polestar 2 Dual Motor Performance Pack	EV	Midsize Cars	247
Polestar 2 Single Motor (19-Inch Wheels)	EV	Midsize Cars	320
Polestar 2 Single Motor (20-Inch Wheels)	EV	Midsize Cars	307
Porsche Macan 4 Electric	EV	Small SUV 4WD	308
Porsche Macan Turbo Electric	EV	Small SUV 4WD	288
Porsche Taycan 4 Cross Turismo	EV	Midsize Cars	235
Porsche Taycan 4S Cross Turismo	EV	Midsize Cars	230
Porsche Taycan 4S Performance Battery	EV	Compact Cars	206
Porsche Taycan 4S Performance Battery Plus	EV	Compact Cars	235
Porsche Taycan GTS	EV	Compact Cars	246
Porsche Taycan GTS Sport Turismo	EV	Compact Cars	233
Porsche Taycan Performance Battery	EV	Compact Cars	208
Porsche Taycan Performance Battery Plus	EV	Compact Cars	242
Porsche Taycan Turbo	EV	Compact Cars	238
Porsche Taycan Turbo Cross Turismo	EV	Midsize Cars	233

Table 6.7 (Continued)
Light-Duty All-Electric and Fuel Cell Vehicles Available by Manufacturer, Model Year 2024

Model	Drive Type	EPA Size Class	Range (Miles)
Porsche Taycan Turbo S	EV	Compact Cars	222
Porsche Taycan Turbo S Cross Turismo	EV	Midsize Cars	222
Rivian R1S All-Terrain Dual Large (20in)	EV	Standard SUV 4WD	307
Rivian R1S All-Terrain Dual Max (20in)	EV	Standard SUV 4WD	355
Rivian R1S All-Terrain Dual Standard Plus (20in)	EV	Standard SUV 4WD	277
Rivian R1S All-Terrain Performance Dual Large (20in)	EV	Standard SUV 4WD	307
Rivian R1S All-Terrain Performance Dual Max (20in)	EV	Standard SUV 4WD	355
Rivian R1S All-Terrain Quad Large (20 inch)	EV	Standard SUV 4WD	274
Rivian R1S AT Performance Dual Standard Plus (20in)	EV	Standard SUV 4WD	277
Rivian R1S Dual Large (21in)	EV	Standard SUV 4WD	352
Rivian R1S Dual Large (22in)	EV	Standard SUV 4WD	341
Rivian R1S Dual Max (21in)	EV	Standard SUV 4WD	400
Rivian R1S Dual Max (22in)	EV	Standard SUV 4WD	380
Rivian R1S Dual Standard (21in)	EV	Standard SUV 4WD	270
Rivian R1S Dual Standard (22in)	EV	Standard SUV 4WD	255
Rivian R1S Dual Standard Plus (21in)	EV	Standard SUV 4WD	315
Rivian R1S Dual Standard Plus (22in)	EV	Standard SUV 4WD	300
Rivian R1S Performance Dual Large (21in)	EV	Standard SUV 4WD	352
Rivian R1S Performance Dual Large (22in)	EV	Standard SUV 4WD	341
Rivian R1S Performance Dual Max (21in)	EV	Standard SUV 4WD	400
Rivian R1S Performance Dual Max (22in)	EV	Standard SUV 4WD	380
Rivian R1S Performance Dual Standard (22in)	EV	Standard SUV 4WD	300
Rivian R1S Performance Dual Standard Plus (21in)	EV	Standard SUV 4WD	315
Rivian R1S Quad Large (20in)	EV	Standard SUV 4WD	289
Rivian R1S Quad Large (21in)	EV	Standard SUV 4WD	321
Rivian R1S Quad Large (22in)	EV	Standard SUV 4WD	303
Rivian R1T All-Terrain Dual Large (20in)	EV	Standard Pickup Trucks 4WD	307
Rivian R1T All-Terrain Dual Max (20in)	EV	Standard Pickup Trucks 4WD	355
Rivian R1T All-Terrain Dual Standard Plus (20in)	EV	Standard Pickup Trucks 4WD	277
Rivian R1T All-Terrain Performance Dual Large (20in)	EV	Standard Pickup Trucks 4WD	307
Rivian R1T All-Terrain Performance Dual Max (20in)	EV	Standard Pickup Trucks 4WD	355
Rivian R1T All-Terrain Quad Large (20in)	EV	Standard Pickup Trucks 4WD	274
Rivian R1T AT Performance Dual Standard Plus (20in)	EV	Standard Pickup Trucks 4WD	277
Rivian R1T Dual Large (21in)	EV	Standard Pickup Trucks 4WD	352
Rivian R1T Dual Large (22in)	EV	Standard Pickup Trucks 4WD	341
Rivian R1T Dual Max (21in)	EV	Standard Pickup Trucks 4WD	410
Rivian R1T Dual Max (22in)	EV	Standard Pickup Trucks 4WD	380
Rivian R1T Dual Standard (21in)	EV	Standard Pickup Trucks 4WD	270
Rivian R1T Dual Standard (22in)	EV	Standard Pickup Trucks 4WD	255
Rivian R1T Dual Standard Plus (21in)	EV	Standard Pickup Trucks 4WD	315
Rivian R1T Dual Standard Plus (22in)	EV	Standard Pickup Trucks 4WD	300
Rivian R1T Performance Dual Large (21in)	EV	Standard Pickup Trucks 4WD	352
Rivian R1T Performance Dual Large (22in)	EV	Standard Pickup Trucks 4WD	341
Rivian R1T Performance Dual Max (21in)	EV	Standard Pickup Trucks 4WD	410
Rivian R1T Performance Dual Max (22in)	EV	Standard Pickup Trucks 4WD	380
Rivian R1T Performance Dual Standard Plus (21in)	EV	Standard Pickup Trucks 4WD	315
Rivian R1T Performance Dual Standard Plus (22in)	EV	Standard Pickup Trucks 4WD	300
Rivian R1T Quad Large (20in)	EV	Standard Pickup Trucks 4WD	289
Rivian R1T Quad Large (21in)	EV	Standard Pickup Trucks 4WD	328
Rivian R1T Quad Large (22in)	EV	Standard Pickup Trucks 4WD	303
Rolls-Royce Spectre (22-inch wheels)	EV	Compact Cars	291
Rolls-Royce Spectre (23-inch wheels)	EV	Compact Cars	266
Rolls-Royce Spectre Black Badge (22-inch wheels)	EV	Compact Cars	280
Rolls-Royce Spectre Black Badge (23-inch wheels)	EV	Compact Cars	264
Subaru Solterra AWD	EV	Small SUV 4WD	227
Subaru Solterra Limited/Touring AWD	EV	Small SUV 4WD	222
Tesla Model 3 Long Range AWD	EV	Midsize Cars	342
Tesla Model 3 Long Range AWD-E	EV	Midsize Cars	341
Tesla Model 3 Long Range RWD	EV	Midsize Cars	363
Tesla Model 3 Performance AWD	EV	Midsize Cars	303
Tesla Model 3 RWD	EV	Midsize Cars	272

Table 6.7 (Continued)
Light-Duty All-Electric and Fuel Cell Vehicles Available by Manufacturer, Model Year 2024

Model	Drive Type	EPA Size Class	Range (Miles)
Tesla Model S	EV	Large Cars	402
Tesla Model S Plaid (19in wheels)	EV	Large Cars	359
Tesla Model S Plaid (21in wheels)	EV	Large Cars	320
Tesla Model X	EV	Standard SUV 4WD	335
Tesla Model X Plaid (20in wheels)	EV	Standard SUV 4WD	326
Tesla Model X Plaid (22in wheels)	EV	Standard SUV 4WD	300
Tesla Model Y Long Range AWD	EV	Small SUV 4WD	310
Tesla Model Y Long Range AWD-I	EV	Small SUV 4WD	308
Tesla Model Y Long Range RWD	EV	Small SUV 2WD	320
Tesla Model Y Performance AWD	EV	Small SUV 4WD	279
Tesla Model Y RWD	EV	Small SUV 2WD	260
Toyota bZ4X	EV	Small SUV 2WD	252
Toyota bZ4X AWD	EV	Small SUV 4WD	228
Toyota bZ4X Limited	EV	Small SUV 2WD	236
Toyota bZ4X Limited AWD	EV	Small SUV 4WD	222
Vinfast VF8 Eco	EV	Special Purpose 4WD	256
Vinfast VF8 Plus	EV	Special Purpose 4WD	235
Vinfast VF 9 Eco	EV	Special Purpose 4WD	330
Vinfast VF 9 Plus	EV	Special Purpose 4WD	291
Volkswagen ID.4	EV	Small SUV 2WD	206
Volkswagen ID.4 AWD Pro	EV	Small SUV 4WD	263
Volkswagen ID.4 AWD Pro S	EV	Small SUV 4WD	263
Volkswagen ID.4 Pro	EV	Small SUV 2WD	291
Volkswagen ID.4 Pro S	EV	Small SUV 2WD	291
Volkswagen ID.4 S	EV	Small SUV 2WD	206
Volvo C40 Recharge	EV	Small SUV 2WD	297
Volvo C40 Recharge twin	EV	Small SUV 4WD	257
Volvo XC40 Recharge	EV	Small SUV 2WD	293
Volvo XC40 Recharge twin	EV	Small SUV 4WD	254
Hyundai Nexo	FCEV	Small SUV 2WD	354
Hyundai Nexo Blue	FCEV	Small SUV 2WD	380
Toyota Mirai Limited	FCEV	Compact Cars	357
Toyota Mirai XLE	FCEV	Compact Cars	402
Volvo XC40 Recharge twin	EV	Small SUV 4WD	254

Note: EV = electric vehicle; FCEV = hydrogen fuel cell vehicle.

Source:
U.S. Department of Energy and U.S. Environmental Protection Agency, Fuel Economy Website, Power Search www.fueleconomy.gov/feg/powerSearch.jsp . Data accessed March 27, 2025.

In 1991 there were only two alternative fuel vehicle (AFV) models on the market which were fueled by M85. In 2024 there were 159 different models of AFV on the market, with 94% of those being electric vehicles which include plug-in hybrid vehicles. Another 3% of the models available in 2024 were fueled by E85.

Table 6.8
Number of Light-Duty Alternative Fuel Vehicle Models Available, 1991–2024
(number of models available)

Model year	Propane[a]	CNG[a]	Ethanol (E85)	Methanol (M85)	Electric vehicle[b]	Hydrogen	Total
1991	0	0	0	2	0	0	2
1995	0	10	0	2	1	0	13
2000	2	15	8	0	12	0	37
2001	5	16	11	0	10	0	42
2002	5	18	16	0	6	0	45
2003	1	16	22	0	5	0	44
2004	1	16	19	0	1	0	37
2005	0	5	24	0	0	0	29
2006	0	5	22	0	0	0	27
2007	0	1	31	0	0	0	32
2008	1	1	31	0	1	0	34
2009	1	1	36	0	1	0	39
2010	0	1	34	0	1	0	36
2011	0	1	72	0	2	0	75
2012	1	6	62	0	6	1	76
2013	6	11	84	0	15	1	117
2014	14	19	90	0	16	2	141
2015	10	17	84	0	27	3	141
2016	5	12	66	0	29	3	115
2017	8	9	45	0	51	2	115
2018	7	9	53	0	57	2	128
2019	7	7	40	0	72	4	130
2020	8	10	25	0	83	4	130
2021	4	4	14	0	95	5	122
2022	0	0	17	0	132	5	154
2023	0	0	10	0	116	5	131
2024	0	0	5	0	149	5	159
			Average annual percentage change				
1991-2024	[c]	[c]	[c]	-100.0%	[c]	[c]	14.2%
2014-2024	-100.0%	-100.0%	-25.1%	[c]	25.0%	9.6%	1.2%

Note: Model count differs from data on Tables 6.4-6.7 because heavier vehicles, such as Ford F-250 or RAM 2500 are included.

Source:
U.S. Department of Energy, Alternative Fuels Data Center website, "Light-Duty AFV, HEV, and Diesel Model Offerings, By Fuel Type," www.afdc.energy.gov/data/10303, April 2025.
(Additional resources: www.afdc.energy.gov)

[a] Dedicated and bi-fuel vehicles.
[b] Electric vehicles include plug-in hybrid vehicles but do not include neighborhood electric vehicles, low-speed electric vehicles, or two-wheeled electric vehicles.
[c] Average annual percentage change cannot be calculated from zero.

Table 6.9
Hybrid Medium/Heavy-Duty Trucks and Buses Available by Manufacturer, 2024

Manufacturer - Model	Drive type	Truck type
Elgin Broom Bear Plug-In Hybrid	Diesel/Hybrid Electric	Street Sweeper
Elgin Pelican Plug-In Hybrid	Diesel/Hybrid Electric	Street Sweeper
ENC AXESS 32'	Diesel/Hybrid Electric	Transit Bus
ENC AXESS 35'	Diesel/Hybrid Electric	Transit Bus
ENC AXESS 40'	Diesel/Hybrid Electric	Transit Bus
ENC E-Z RIDER II 30'	Diesel/Hybrid Electric	Transit Bus
ENC E-Z RIDER II 32'	Diesel/Hybrid Electric	Transit Bus
ENC E-Z RIDER II 35'	Diesel/Hybrid Electric	Transit Bus
Ford F-59 Stripped Chassis	CNG - Compressed Natural Gas|CNG - Bi-fuel|Propane - Bi-fuel|E85/Hybrid Electric|Propane	Vocational/Cab Chassis
Gillig BRT, BRT Plus, Commuter	Diesel/Hybrid Electric	Transit Bus
Gillig Low Floor, Low Floor Plus	Diesel/Hybrid Electric	Transit Bus
Global M4 Hybrid	Diesel/Hybrid Electric	Street Sweeper
Hometown Manufacturing Streetcar	Diesel/Hybrid Electric	Passenger Van/Shuttle Bus
New Flyer Xcelsior Hybrid 35'	Diesel/Hybrid Electric	Transit Bus
New Flyer Xcelsior Hybrid 40'	Diesel/Hybrid Electric	Transit Bus
New Flyer Xcelsior Hybrid 60'	Diesel/Hybrid Electric	Transit Bus

Source:
U.S. Department of Energy, Alternative Fuels Data Center website, www.afdc.energy.gov/vehicles/search, March 28, 2025. (Additional resources: www.afdc.energy.gov)

Table 6.10
Electric-Drive Medium/Heavy-Duty Trucks and Buses Available by Manufacturer, 2024

Manufacturer - Model	Drive type	Truck type
Elgin Broom Bear CNG Hybrid	Plug-in Hybrid Electric	Street Sweeper
Elgin Broom Bear Plug-In Hybrid	Plug-in Hybrid Electric	Street Sweeper
Elgin Pelican Plug-In Hybrid	Plug-in Hybrid Electric	Street Sweeper
Autocar E-ACTT	Electric	Tractor
Battle Motors LOW ENTRY TILT 2	Electric	Vocational/Cab Chassis
Battle Motors LOW NARROW TILT	Electric	Vocational/Cab Chassis
Blue Bird All American RE Electric	Electric	School Bus
Blue Bird All American RE Electric Activity	Electric	Passenger Van/Shuttle Bus
Blue Bird D-Series Electric	Electric	Passenger Van/Shuttle Bus
Blue Bird Micro Bird Activity G5 Electric	Electric	Passenger Van/Shuttle Bus
Blue Bird Micro Bird G5 Electric	Electric	School Bus
Blue Bird Vision Electric	Electric	School Bus
Blue Bird Vision Electric Activity	Electric	Passenger Van/Shuttle Bus
Bollinger Motors B4 - Class 4	Electric	Vocational/Cab Chassis
BYD Achiever Type A (26')	Electric	School Bus
BYD C10M (45')	Electric	Passenger Van/Shuttle Bus
BYD C10MS (45' double decker)	Electric	Transit Bus
BYD C8M (35')	Electric	Passenger Van/Shuttle Bus
BYD C8MS (35' double decker)	Electric	Transit Bus
BYD Creator Type C (36')	Electric	School Bus
BYD Dreamer Type D (39')	Electric	School Bus
BYD K11M (60')	Electric	Transit Bus
BYD K7M (30')	Electric	Transit Bus
BYD K7M ER (30')	Electric	Transit Bus
BYD K8M (35')	Electric	Transit Bus
BYD K9MD (40')	Electric	Transit Bus
Cenntro Logistar 400	Electric	Vocational/Cab Chassis
Cenntro Logistar 400	Electric	Van
COBUS Industries e.COBUS 2700	Electric	Transit Bus
COBUS Industries e.COBUS 2700S	Electric	Transit Bus
COBUS Industries e.COBUS 3000	Electric	Transit Bus
Collins Bus Corp. Ford E-Transit	Electric	School Bus
Elgin Broom Bear Electric	Electric	Street Sweeper
ENC Axess EVO-BEB 32'	Electric	Transit Bus
ENC Axess EVO-BEB 35'	Electric	Transit Bus
ENC Axess EVO-BEB 40'	Electric	Transit Bus
Envirotech Cutaway Van	Electric	Vocational/Cab Chassis
Envirotech Logistics Van	Electric	Van
Envirotech Urban Truck	Electric	Vocational/Cab Chassis
Ford E-Transit Cargo Van	Electric	Van
Ford E-Transit Cutaway/Chassis Cab	Electric	Vocational/Cab Chassis
Freightliner Custom Chassis MT-50e	Electric	Vocational/Cab Chassis
Freightliner eCascadia	Electric	Tractor
Freightliner eM2	Electric	Vocational/Cab Chassis
Gillig Low Floor Plus	Electric	Transit Bus
Global M3EV - Class 7	Electric	Street Sweeper
Global M4EV - Class 7	Electric	Street Sweeper
GM BrightDrop Zevo 400	Electric	Van
GM BrightDrop Zevo 600	Electric	Van
GreenPower Motor Company AV Star	Electric	Passenger Van/Shuttle Bus

Table 6.10 (Continued)
Electric-Drive Medium/Heavy-Duty Trucks and Buses Available by Manufacturer, 2024

GreenPower Motor Company BEAST	Electric	School Bus
GreenPower Motor Company EV Star	Electric	Passenger Van/Shuttle Bus
GreenPower Motor Company EV Star Cab & Chassis	Electric	Vocational/Cab Chassis
GreenPower Motor Company EV Star Cargo	Electric	Van
GreenPower Motor Company EV Star Cargo+	Electric	VanVocational/Cab Chassis
GreenPower Motor Company EV Star+	Electric	Passenger Van/Shuttle Bus
GreenPower Motor Company EV250	Electric	Transit Bus
GreenPower Motor Company EV350	Electric	Transit Bus
GreenPower Motor Company EV500/EV550	Electric	Transit Bus
GreenPower Motor Company Mega BEAST	Electric	School Bus
GreenPower Motor Company Nano BEAST/Access	Electric	School Bus
Heil Environmental Rear Loader	Electric	Refuse
Heil Environmental Side Loader	Electric	Refuse
Hometown Manufacturing Commuter	Electric	Transit Bus
Hometown Manufacturing Low-Floor Urban	Electric	Transit Bus
Hometown Manufacturing Mainstreet	Electric	Passenger Van/Shuttle Bus
Hometown Manufacturing Streetcar	Electric	Passenger Van/Shuttle Bus
Hometown Manufacturing View	Electric	Transit Bus
Hometown Manufacturing Villager	Electric	Passenger Van/Shuttle Bus
IC Bus Electric CE Series	Electric	School Bus
International eMV	Electric	Vocational/Cab Chassis
Isuzu NRR-EV - Class 5	Electric	Vocational/Cab Chassis
Kalmar TX Electric Terminal Tractor	Electric	Tractor
Kenworth K270/K370	Electric	Vocational/Cab Chassis
Kenworth T680E	Electric	Tractor
Lion Electric LION5	Electric	Vocational/Cab Chassis
Lion Electric LION6	Electric	Vocational/Cab Chassis
Lion Electric LION8 - Class 8	Electric	Vocational/Cab Chassis
Lion Electric LION8 - Class 8	Electric	Tractor
Lion Electric LIONC	Electric	School Bus
Lion Electric LIOND	Electric	School Bus
Mack LR Electric	Electric	Vocational/Cab Chassis
Mack LR Electric	Electric	Refuse
Mack MD Electric	Electric	Vocational/Cab Chassis
MCI D45 CRT CHARGE/LE CHARGE	Electric	Transit Bus
MCI J4500 CHARGE	Electric	Transit Bus
McNeilus Volterra ZSL	Electric	Refuse
Mercedez-Benz eSprinter	Electric	Van
Morgan-Olson (various models)	Electric	Step Van
Mullen Automotive Mullen Campus	Electric	Van
Mullen Automotive Mullen One	Electric	Van
Mullen Automotive Mullen Three	Electric	Vocational/Cab Chassis
New Flyer Xcelsior AV	Electric	Transit Bus
New Flyer Xcelsior CHARGE NG 35'	Electric	Transit Bus
New Flyer Xcelsior CHARGE NG 40'	Electric	Transit Bus
New Flyer Xcelsior CHARGE NG 60'	Electric	Transit Bus
Nikola Tre BEV - Class 8	Electric	Tractor
Optimal-EV E1	Electric	Vocational/Cab Chassis
Optimal-EV S1	Electric	Passenger Van/Shuttle Bus
Orange EV e-TRIEVER	Electric	Tractor
Orange EV HUSK-e Rail and Port	Electric	Tractor
Peterbilt 220EV Class 6/7	Electric	Vocational/Cab Chassis
Peterbilt 520EV - Class 8	Electric	Refuse
Peterbilt 579EV - Class 8	Electric	Tractor
REE Automotive P7-C - Class 4	Electric	Vocational/Cab Chassis
REE Automotive P7-S	Electric	Vocational/Cab Chassis
Rizon e16/e16L	Electric	Vocational/Cab Chassis

Table 6.10 (Continued)
Electric-Drive Medium/Heavy-Duty Trucks and Buses Available by Manufacturer, 2024

Starcraft Allstar 22	Electric	Passenger Van/Shuttle Bus
Starcraft E-Quest	Electric	School Bus
Starcraft E-Quest XL	Electric	School Bus
Tesla Semi	Electric	Tractor
Thomas Built Saf-T-Liner C2 Jouley	Electric	School Bus
TICO Pro Spotter Electric	Electric	Tractor
Utilimaster (various models)	Electric	Step Van
Van Hool CX45E	Electric	Transit Bus
Van Hool TDX25E	Electric	Transit Bus
Volvo VNR Electric	Electric	Tractor
Volvo VNR Electric - Class 7	Electric	Vocational/Cab Chassis
Workhorse W4 CC	Electric	Vocational/Cab Chassis
Workhorse W56	Electric	Step Van
Workhorse W750	Electric	Step Van
Xos HDXT - Class 8	Electric	Tractor
Xos MDXT	Electric	Vocational/Cab Chassis
Xos SV	Electric	Step Van
ENC AXESS EVO-FC 40'	Hydrogen Fuel Cell	Transit Bus
Global M4/M4HSD Hydrogen Fuel Cell - Class 7	Hydrogen Fuel Cell	Street Sweeper
New Flyer Xcelsior CHARGE FC 40'	Hydrogen Fuel Cell	Transit Bus
New Flyer Xcelsior CHARGE FC 60'	Hydrogen Fuel Cell	Transit Bus
Nikola Tre FCEV - Class 8	Hydrogen Fuel Cell	Tractor
Peterbilt 579HFC - Class 8	Hydrogen Fuel Cell	Tractor
Morgan-Olson (various models)	Hydrogen Fuel Cell	Step Van

Source:
U.S. Department of Energy, Alternative Fuels Data Center website, www.afdc.energy.gov/vehicles/search, March 28, 2025. (Additional resources: www.afdc.energy.gov)

This list includes public and private refuel sites; therefore, not all of these sites are available to the public.

Table 6.11
Number of Alternative Refuel Sites by State and Fuel Type, 2024

State	B20 sites	CNG sites	E85 sites	Electric stations	Electric charging outlets	Hydrogen sites	LNG sites	LPG sites	Totals by State[a]
Alabama	10	21	38	592	1,680	0	2	59	1,810
Alaska	0	0	0	74	154	0	0	1	155
Arizona	77	26	26	1,525	4,463	0	5	71	4,668
Arkansas	39	14	73	390	972	0	0	34	1,132
California	68	312	513	19,284	62,740	67	37	254	64,632
Colorado	5	25	99	2,608	6,476	1	0	55	6,661
Connecticut	1	14	4	1,413	4,109	0	0	20	4,148
Delaware	0	3	3	273	695	0	0	18	719
Dist. of Columbia	9	2	4	431	1,372	1	0	6	1,394
Florida	5	63	164	4,183	12,822	0	3	128	13,185
Georgia	3	51	67	2,404	6,517	0	2	85	6,725
Hawaii	11	0	1	413	976	2	0	2	992
Idaho	0	12	4	258	627	0	1	26	671
Illinois	483	29	293	1,645	4,567	0	2	87	5,461
Indiana	37	31	241	731	1,971	0	1	54	2,335
Iowa	343	9	337	481	1,112	0	0	34	1,835
Kansas	22	17	68	631	1,343	0	1	35	1,486
Kentucky	1	7	78	377	1,043	0	1	20	1,151
Louisiana	1	19	21	346	904	0	0	49	994
Maine	1	0	0	556	1,263	0	0	9	1,273
Maryland	25	15	70	1,936	5,455	0	0	33	5,598
Massachusetts	1	12	7	3,833	9,366	1	0	32	9,419
Michigan	7	14	248	1,784	4,174	1	0	110	4,554
Minnesota	307	15	416	995	2,617	0	0	48	3,403
Mississippi	2	4	8	214	643	0	1	71	729
Missouri	27	18	138	1,452	3,267	0	1	55	3,506
Montana	0	1	3	169	452	0	0	27	484
Nebraska	17	6	117	300	658	0	0	25	823
Nevada	3	5	19	717	2,745	0	0	23	2,795
New Hampshire	2	4	0	321	787	0	0	18	811
New Jersey	5	32	10	1,697	5,177	1	1	16	5,243
New Mexico	0	13	20	372	898	0	1	61	993
New York	14	45	80	5,182	17,716	1	0	51	17,909
North Carolina	108	36	110	1,960	5,401	0	1	79	5,735
North Dakota	0	0	39	106	245	0	0	16	300
Ohio	4	48	216	1,934	4,741	2	4	100	5,115
Oklahoma	18	102	100	422	1,656	0	0	111	1,987
Oregon	30	12	5	1,624	3,987	1	2	45	4,088
Pennsylvania	4	74	173	2,159	5,439	1	2	95	5,788
Rhode Island	1	1	0	397	1,026	0	0	5	1,033
South Carolina	33	13	63	719	1,867	0	1	44	2,021
South Dakota	0	0	78	123	329	0	0	16	423
Tennessee	5	23	88	1,080	2,756	0	4	53	2,929
Texas	8	100	269	4,195	11,926	1	10	357	12,671
Utah	1	39	2	1,035	2,844	0	0	40	2,926
Vermont	2	2	0	483	1,258	0	0	2	1,264
Virginia	7	25	86	2,015	5,712	2	2	81	5,915
Washington	23	22	16	2,827	7,680	2	2	75	7,821
West Virginia	1	2	37	184	510	0	0	16	566
Wisconsin	22	44	259	791	1,888	0	1	63	2,277
Wyoming	0	7	10	122	294	0	0	17	329
Totals by Fuel	1,793	1,389	4,721	79,763	229,320	84	88	2,832	240,882

Source:
U.S. Department of Energy, Alternative Fuels Data Center website, www.afdc.energy.gov/stations, March 2025. (Additional resources: www.afdc.energy.gov)

[a] Totals by State is the total number of fuel types available at stations. Stations are counted once for each type of fuel available. For electric, the number of charging outlets was used.

There were nearly 3,300 propane stations in the United States in 1992 making up 89% of all alternative refueling stations. Electric vehicle stations are counted as all other fuels, with a station being one geographic location where electricity is provided. There were more electric vehicle refueling stations in 2024 than any other alternative fuel.

Table 6.12
Number of Alternative Refuel Stations, 1992–2024
(number of stations)

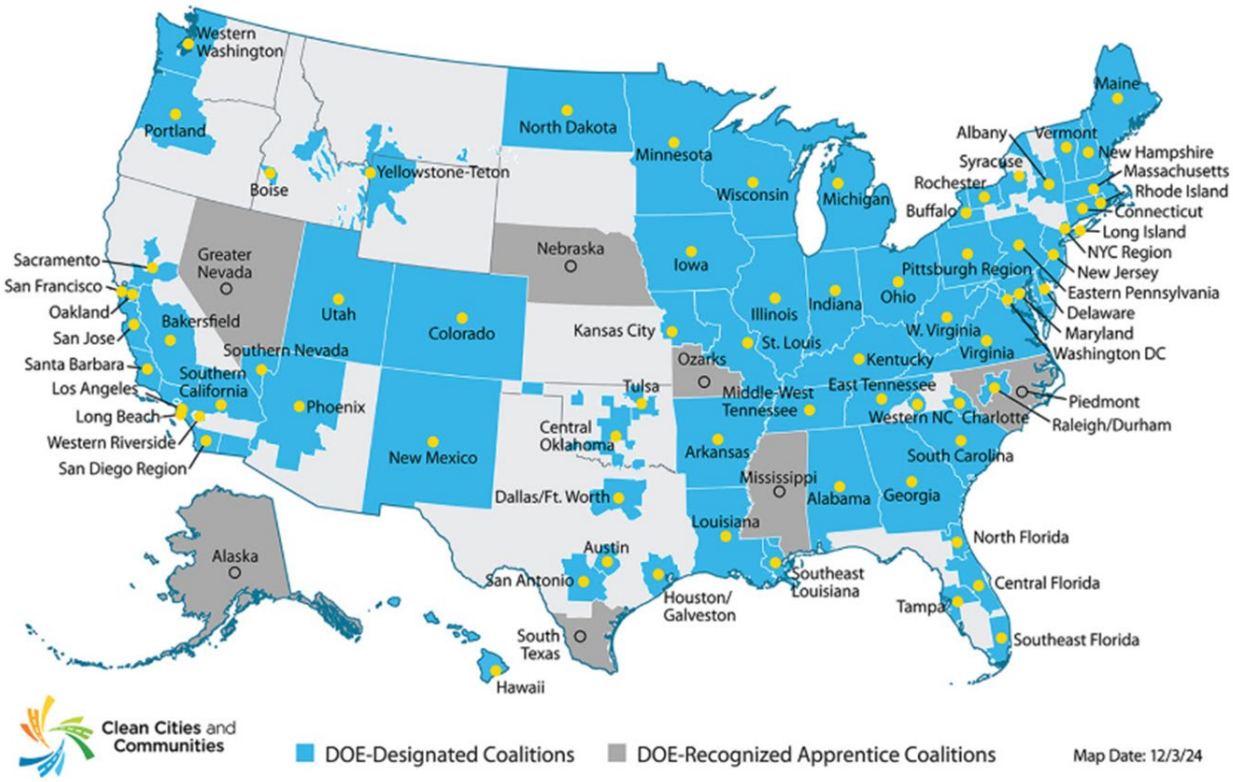
Year	Propane	CNG	LNG	Biodiesel[a]	Ethanol (E85)	Methanol (M85)	Electric vehicle[b]	Hydrogen	Total
1992	3,297	349			2	43			3,691
1993	3,297	497			7	50			3,851
1994	3,299	1,042			32	82			4,455
1995	3,299	1,065			37	88	188		4,677
1996	4,252	1,419	72		68	95	194		6,100
1997	4,255	1,426	71		71	106	310		6,239
1998	5,318	1,268	66		40	91	486		7,269
1999	4,153	1,267	46		49	51	490		6,056
2000	3,268	1,217	44	2	113	3	558		5,205
2001	3,403	1,232	44	16	154		693		5,542
2002	3,431	1,166	36	79	149		873	7	5,741
2003	3,966	1,035	62	142	188		830	7	6,230
2004	3,689	917	58	176	200		671	9	5,720
2005	2,995	787	40	304	436		588	14	5,164
2006	2,619	732	37	459	762		465	17	5,091
2007	2,331	731	35	805	1,325		432	33	5,692
2008	2,110	771	38	633	1,699		440	51	5,742
2009	2,420	803	37	660	1,982		484	63	6,449
2010	2,604	869	43	615	2,296		626	58	7,111
2011	2,551	941	43	633	2,494		2,100	56	8,818
2012	2,644	1,155	61	690	2,519		6,200	58	13,327
2013	2,967	1,290	84	832	2,616		8,100	53	15,942
2014	2,931	1,495	103	783	2,840		10,712	51	18,915
2015	3,749	1,607	117	713	3,012		13,696	35	22,929
2016	3,654	1,730	140	716	3,095		17,723	58	27,116
2017	3,510	1,682	137	704	3,379		19,792	63	29,267
2018	3,319	1,621	129	680	3,627		22,826	62	32,264
2019	3,176	1,576	118	611	3,786		26,959	64	36,290
2020	2,956	1,549	106	712	3,946		31,738	63	41,070
2021	2,869	1,532	102	722	4,196		47,040	67	56,528
2022	2,700	1,390	98	1,196	4,452		53,568	71	63,475
2023	2,813	1,392	94	1,700	4,495		64,315	76	74,885
2024	2,832	1,389	88	1,793	4,721		79,763	84	90,670
				Average annual percentage change					
1992-2024	-0.5%	4.4%	[c]	[c]	27.5%	-100.0%	[c]	[c]	10.5%
2014-2024	-0.3%	-0.7%	-1.6%	8.6%	5.2%	[c]	22.2%	5.1%	17.0%

Source:
U.S. Department of Energy, Alternative Fuels Data Center website, "U.S. Alternative Fueling Stations by Fuel Type," www.afdc.energy.gov/data/10332, March 2025. (Additional resources: www.afdc.energy.gov)

[a] Stations selling biodiesel blends less than B20 are included in the station count for years 2005-2007 only.
[b] For all years, an electric vehicle station is one geographic location where electric vehicles can charge.
[c] Data are not available.

Clean Cities and Communities is a locally-based government/industry partnership, coordinated by the U.S. Department of Energy to expand the use of alternative fuels. By combining the decision-making with voluntary action by partners, the "grass-roots" approach of the partnership departs from traditional "top-down" Federal programs.

Figure 6.1. Clean Cities and Communities Coalitions



Source:
U.S. Department of Energy, Clean Cities and Communities website, "Coalition Locations," cleancities.energy.gov/coalitions/locations, March 2025. (Additional resources: cleancities.energy.gov)

Table 6.13
Properties of Conventional and Alternative Liquid Fuels

Property	Gasoline/ E10	Ethanol (E100)	Low-sulfur diesel	Biodiesel	Renewable diesel	Liquefied Natural Gas (LNG)	Methanol
Standard chemical formula[a]	C_4 to C_{12} and ethanol ≤ 10%	CH_3CH_2OH	C_8 to C_{25}	C_{12} to C_{22}	C_8 to C_{25}	CH_4 majority, C_2H_6 and inert gases	CH_3OH
Physical state	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid
Main fuel source(s)	Crude oil	Corn, grains, or agricultural waste	Crude oil	Fats and oils from sources such as soybeans, waste cooking oil, animal fats, and rapeseed	Fats, oils, and greases (including used cooking oil)	Underground reserves and renewable biogas	Natural gas, coal, or woody biomass
Gasoline gallon equivalent (GGE)	1.0 GGE	0.67 GGE	1.12 GGE	1.05 GGE *B20* 1.11 GGE *B100*	1.08 GGE	0.19 GGE	0.50 GGE
Diesel gallon equivalent (DGE)	0.88 DGE	0.59 DGE	1.0 DGE	0.93 DGE *B20* 0.99 DGE	0.96 DGE	0.17 DGE	0.45 DGE
Cetane number	[b]	0-54	40-55	45-65	70-85	[b]	[b]
Pump octane number	84-93	110	[b]	[b]	[b]	120+	
Flash point (F°)	-45°	55°	165°	266°-338°	>125.6°	-306°	52°
Autoignition temperature (F°)	495°	793°	~600°	[b]	[b]	1,004°	897°

Source:
U.S. Department of Energy, Alternative Fuels Data Center website, "Fuel Properties Comparison," afdc.energy.gov/files/u/publication/fuel_comparison_chart.pdf, September 2025.

[a] Standard chemical formulas represent idealized fuels. Some table values are expressed in ranges to represent typical fuel variations that are encountered in the field.
[b] Not applicable.

Table 6.14
Properties of Gaseous Fuels

Property	Gaseous Fuels		
	Propane (LPG)	CNG	Hydrogen
Standard chemical formula[a]	C_3H_8	CH_4	H_2
Physical state	Pressurized liquid	Compressed gas	Compressed gas or liquid
Main fuel source(s)	A by-product of petroleum refining or natural gas processing	Underground reserves and renewable biogas	Natural gas, methanol, and electrolysis of water
Gasoline gallon equivalent	1 gal = 0.74 GGE	1 lb = 0.18 GGE	1 lb = 0.45 GGE
Diesel gallon equivalent	1 gal = 0.66 DGE	1 lb = 0.16 DGE	1 lb = 0.40 DGE
Cetane number	n/a	n/a	n/a
Pump octane number	105 (g)	120+ (h)	130+ (g)
Flash point	-100° to -150°F (j)	-300°F (j)	n/a
Autoignition temperature (F˚)	850° to 950°F (j)	1,004°F (j)	1,050° to 1,080°F (j)

Note: n/a = not applicable.

Source:
U.S. Department of Energy, Alternative Fuels Data Center website, "Fuel Properties Comparison," afdc.energy.gov/files/u/publication/fuel_comparison_chart.pdf, September 2025.

[a] Standard Chemical Formulas represent idealized fuels. Some table values are expressed in ranges to represent typical fuel variations that are encountered in the field.

TRANSIT & OTHER SHARED MOBILITY

Chapter 7



Credit: John Coletti/The Image Bank/Getty Images

In 2007, the data changed substantially due to improved estimation methodologies. Unfortunately, those data are no longer comparable to the rest of the historical series.

Table 7.1
Summary Statistics on Transit Buses and Trolleybuses, 1994–2023

Year	Number of active buses	Vehicle miles (millions)	Passenger-miles (millions)	Btu/passenger-mile	Energy use (trillion Btu)
1994	68,766	2,176	19,019	4,225	80.4
1995	67,802	2,198	19,005	4,271	81.2
2000	75,665	2,329	21,433	4,506	96.6
2001	76,675	2,389	22,209	4,123	91.6
2002	76,806	2,425	22,029	4,110	90.5
2003	78,000	2,435	21,438	4,191	89.8
2004	81,630	2,484	21,550	4,342	93.6
2005	82,642	2,498	21,998	4,229	93.0
2006	83,689	2,507	22,985	4,297	98.8 [a]
2007	65,808	2,314	21,132	4,352	92.0
2008	67,096	2,388	21,918	4,328	94.9
2009	65,363	2,345	21,645	4,233	91.6
2010	66,810	2,425	21,172	4,107	86.9
2011	69,654	2,425	21,574	4,232	91.3
2012	70,757	2,417	21,251	4,023	89.5
2013	71,699	2,425	22,306	4,052	90.4
2014	71,603	2,445	22,614	3,810	86.2
2015	72,686	2,439	21,822	4,059	88.6
2016	72,557	2,495	21,452	4,283	91.9
2017	72,877	2,513	20,209	4,535	91.6
2018	72,314	2,543	19,559	4,560	89.2
2019	73,237	2,566	19,311	4,634	89.5
2020	72,874	2,300	13,205	5,889	77.8
2021	72,012	2,190	9,154	7,949	72.8
2022	71,972	2,250	11,399	6,581	75.0
2023	71,839	2,276	13,639	5,612	76.5
			Average annual percentage change		
1994-2023	0.2%	0.2%	-1.1%	1.0%	-0.2%
2013-2023	0.0%	-0.6%	-4.8%	3.3%	-1.6%

Source:
American Public Transportation Association, *2025 Public Transportation Fact Book*, Washington, DC, August 2025, Appendix A. (Additional resources: www.apta.com)

[a] Data are not continuous between 2006 and 2007 due to changes in estimation methodology. See source document for details.

Demand response vehicles (also called paratransit or dial-a-ride) are widely used by transit agencies. The vehicles do not operate over a fixed route or on a fixed schedule. The vehicle may be dispatched to pick up several passengers at different pick-up points before taking them to their respective destinations and may even be interrupted en route to these destinations to pick up other passengers. Demand response service is provided primarily by vans. In 2007, the data changed substantially due to improved estimation methodologies. Unfortunately, those data are no longer comparable to the rest of the historical series.

Table 7.2
Summary Statistics on Demand Response Vehicles, 1994–2023

Year	Number of agencies	Number of active vehicles	Vehicle miles (millions)	Average annual miles per vehicle	Passenger-miles (millions)	Average load factor [a]	Energy use (trillion Btu)	
1994	5,214	28,729	464	16,140	577	[b]	9.5	
1995	5,214	29,352	507	17,256	607	1.41	9.2	
2000	5,252	33,080	759	22,941	839	1.30	10.8	
2001	5,251	34,661	789	22,772	855	1.28	11.3	
2002	5,251	34,699	803	23,130	853	1.24	11.6	
2003	5,346	35,954	864	24,031	930	1.27	12.9	
2004	5,960	37,078	890	23,990	962	1.25	13.3	
2005	5,960	41,958	978	23,316	1,058	1.25	14.8	
2006	5,960	43,509	1,013	23,283	1,078	1.24	15.5	[c]
2007	7,300	64,865	1,471	22,684	1,502	1.18	24.7	
2008	7,200	65,799	1,495	22,724	1,412	1.09	24.7	
2009	6,700	68,957	1,529	22,176	1,477	1.12	23.1	
2010	6,741	68,621	1,694	24,680	1,494	1.03	22.8	
2011	6,600	65,336	1,612	24,669	1,580	1.13	24.1	
2012	6,511	68,632	1,618	23,576	1,756	1.24	24.8	
2013	6,270	68,559	1,565	22,829	2,171	1.59	26.4	
2014	6,370	71,359	1,595	22,353	2,267	1.65	32.0	
2015	6,340	71,299	1,617	22,679	2,056	1.48	26.0	
2016	6,532	68,059	1,692	24,855	1,976	1.35	25.8	
2017	6,426	69,316	1,705	24,594	2,031	1.38	26.6	
2018	6,343	70,093	1,702	24,281	1,821	1.24	26.7	
2019	[b]	73,155	1,629	22,262	1,823	1.24	28.3	
2020	[b]	72,051	1,305	18,112	1,242	1.14	20.6	
2021	[b]	73,029	1,123	15,378	869	0.92	19.5	
2022	[b]	70,153	1,243	17,713	1,012	0.96	20.4	
2023	[b]	68,842	1,431	20,785	1,247	1.02	24.2	
			Average annual percentage change					
1994-2023		3.1%	4.0%	0.9%	2.7%	-1.1%	3.3%	
2013-2023		0.0%	-0.9%	-0.9%	-5.4%	-4.3%	-0.9%	

Note: See Glossary for a detailed definition of demand response.

Source:
American Public Transportation Association, *2025 Public Transportation Fact Book,* Washington, DC, August 2025.
(Additional resources: www.apta.com)

[a] Load factor for revenue service.
[b] Data are not available.
[c] Data are not continuous between 2006 and 2007 due to changes in estimation methodology. See source document for details.

Commuter rail, which is also known as regional rail or suburban rail, is long-haul rail passenger service operating between metropolitan and suburban areas, whether within or across state lines. Commuter rail lines usually have reduced fares for multiple rides and commutation tickets for regular, recurring riders.

Table 7.3
Summary Statistics for Commuter Rail Operations, 1984–2023

Year	Number of passenger vehicles	Vehicle miles (millions)	Passenger trips (millions)	Passenger-miles (millions)	Average trip length (miles)	Energy intensity (Btu/passenger-mile) [a]	Energy use (trillion Btu) [a]
1984	4,075	167.9	267	6,207	23.2	1,798	11.2
1985	4,035	182.7	275	6,534	23.8	1,720	11.2
1990	4,982	212.7	328	7,082	21.6	1,622	11.5
1995	5,164	237.7	344	8,244	24.0	1,580	13.0
1996	5,240	241.9	352	8,351	23.7	1,541	12.9
1997	5,426	250.7	357	8,038	22.5	1,630	13.1
1998	5,536	259.5	381	8,704	22.8	1,612	14.0
1999	5,550	265.9	396	8,766	22.1	1,670	14.6
2000	5,498	270.9	413	9,402	22.8	1,542	14.5
2001	5,572	277.3	419	9,548	22.8	1,533	14.6
2002	5,724	283.7	414	9,504	22.9	1,542	14.7
2003	5,959	286.0	410	9,559	23.3	1,542	14.7
2004	6,228	294.7	414	9,719	23.5	1,536	14.9
2005	6,392	303.4	423	9,473	22.4	1,658	15.7
2006	6,403	314.7	441	10,361	23.5	1,539	15.9
2007	6,391	325.7	459	11,153	24.3	1,543	17.2
2008	6,617	310.2	472	11,049	23.4	1,579	17.4
2009	6,941	343.5	468	11,232	24.0	1,714	19.2
2010	6,927	345.3	464	10,874	23.4	1,753	19.1
2011	7,193	345.2	466	11,427	24.5	1,681	19.2
2012	7,059	346.4	471	11,181	23.7	1,703	19.0
2013	7,310	359.1	480	11,862	24.7	1,676	19.9
2014	7,337	370.8	490	11,718	23.9	1,638	19.2
2015	7,216	373.7	495	11,813	23.9	1,661	19.6
2016	7,350	376.0	504	11,899	23.6	1,705	20.3
2017	7,290	378.2	503	12,384	24.6	1,657	20.5
2018	7,184	376.6	505	12,821	25.4	1,580	20.3
2019	7,209	381.8	511	12,928	25.3	1,583	20.5
2020	7,685	316.5	262	6,124	23.4	3,294	20.2
2021	7,706	305.8	149	3,829	25.6	5,054	19.4
2022	7,806	345.9	266	6,164	23.2	2,984	18.4
2023	7,758	368.1	323	7,292	22.6	2,566	18.7
			Average annual percentage change				
1984-2023	1.7%	2.0%	0.5%	0.4%	-0.1%	0.9%	1.3%
2013-2023	0.6%	0.2%	-3.9%	-4.7%	-0.9%	4.3%	-0.6%

Source:
American Public Transportation Association, *2025 Public Transportation Fact Book*, Washington, DC, August 2025, Appendix A. (Additional resources: www.apta.com)

[a] Only end-use energy was counted for electricity. Before Edition 36, primary energy use (which included generation and distribution losses) was shown in this table.

This table on transit rail operations includes data on light rail and heavy rail systems. Light rail vehicles are usually single vehicles driven electrically with power drawn from overhead wires. Heavy rail is characterized by high speed and rapid acceleration of rail cars operating on a separate right-of-way.

Table 7.4
Summary Statistics for Rail Transit Operations, 1970–2023[a]

Year	Number of passenger vehicles	Vehicle miles (millions)	Passenger trips (millions)[b]	Passenger miles (millions)[c]	Average trip length (miles)[d]	Energy intensity (Btu/passenger-mile)[e]	Energy use (trillion Btu)[e]
1970	10,548	440.8	2,116	12,273	[f]	712	8.7
1975	10,617	446.9	1,797	10,423	[f]	866	9.0
1980	10,654	402.2	2,241	10,939	4.9	763	8.3
1985	11,109	467.8	2,422	10,777	4.4	927	10.0
1990	11,332	560.9	2,521	12,046	4.8	998	12.0
1995	11,156	571.8	2,284	11,419	5.0	1,102	12.6
2000	12,168	648.0	2,952	15,200	5.1	923	14.0
2001	12,084	662.4	3,064	15,615	5.1	925	14.4
2002	12,479	681.9	3,025	15,095	5.0	948	14.3
2003	12,236	694.2	3,005	15,082	5.0	936	14.1
2004	12,480	709.7	3,098	15,930	5.1	907	14.5
2005	12,755	715.4	3,189	16,118	5.1	919	14.8
2006	12,853	726.4	3,334	16,587	5.0	893	14.8
2007	13,032	741.2	3,879	18,070	4.7	851	15.4
2008	13,346	762.8	4,001	18,941	4.7	832	15.8
2009	13,529	775.3	3,955	19,004	4.8	830	15.8
2010	13,614	759.6	4,007	18,580	4.6	832	15.5
2011	13,328	744.1	4,083	19,520	4.8	812	15.8
2012	12,455	749.5	4,192	19,835	4.7	791	15.7
2013	12,434	774.3	4,275	20,381	4.8	793	16.2
2014	12,608	780.9	4,411	20,829	4.7	786	16.4
2015	12,820	803.2	4,339	20,710	4.8	777	16.1
2016	12,912	810.2	4,346	20,922	4.8	761	15.9
2017	12,848	823.6	4,314	20,169	4.7	788	15.9
2018	13,046	826.3	4,211	19,452	4.6	844	16.4
2019	13,523	842.9	4,269	19,859	4.7	851	16.9
2020	13,379	771.7	2,109	10,631	5.0	1,437	15.3
2021	13,332	742.1	1,784	8,373	4.7	1,715	14.4
2022	13,273	762.3	2,523	11,170	4.4	1,295	14.5
2023	13,545	786.3	2,912	12,917	4.4	1,127	14.6
Average annual percentage change							
1970-2023	0.5%	1.1%	0.6%	0.1%	-0.6%	0.9%	1.0%
2013-2023	0.9%	0.2%	-3.8%	-4.5%	-0.8%	3.6%	-1.1%

Sources:

American Public Transportation Association, *2025 Public Transportation Fact Book*, Washington, DC, August 2025, Appendix A. (Additional resources: www.apta.com)

Energy use – See Appendix A for Rail Transit Energy Use.

[a] Heavy rail and light rail. Series not continuous between 1983 and 1984 because of a change in data source by the American Public Transit Association (APTA). Beginning in 1984, data provided by APTA are taken from mandatory reports filed with the Urban Mass Transit Administration (UMTA). Data for prior years was provided on a voluntary basis by APTA members and expanded statistically.

[b] 1970–79 data represents total passenger rides; after 1979, data represents unlinked passenger trips.

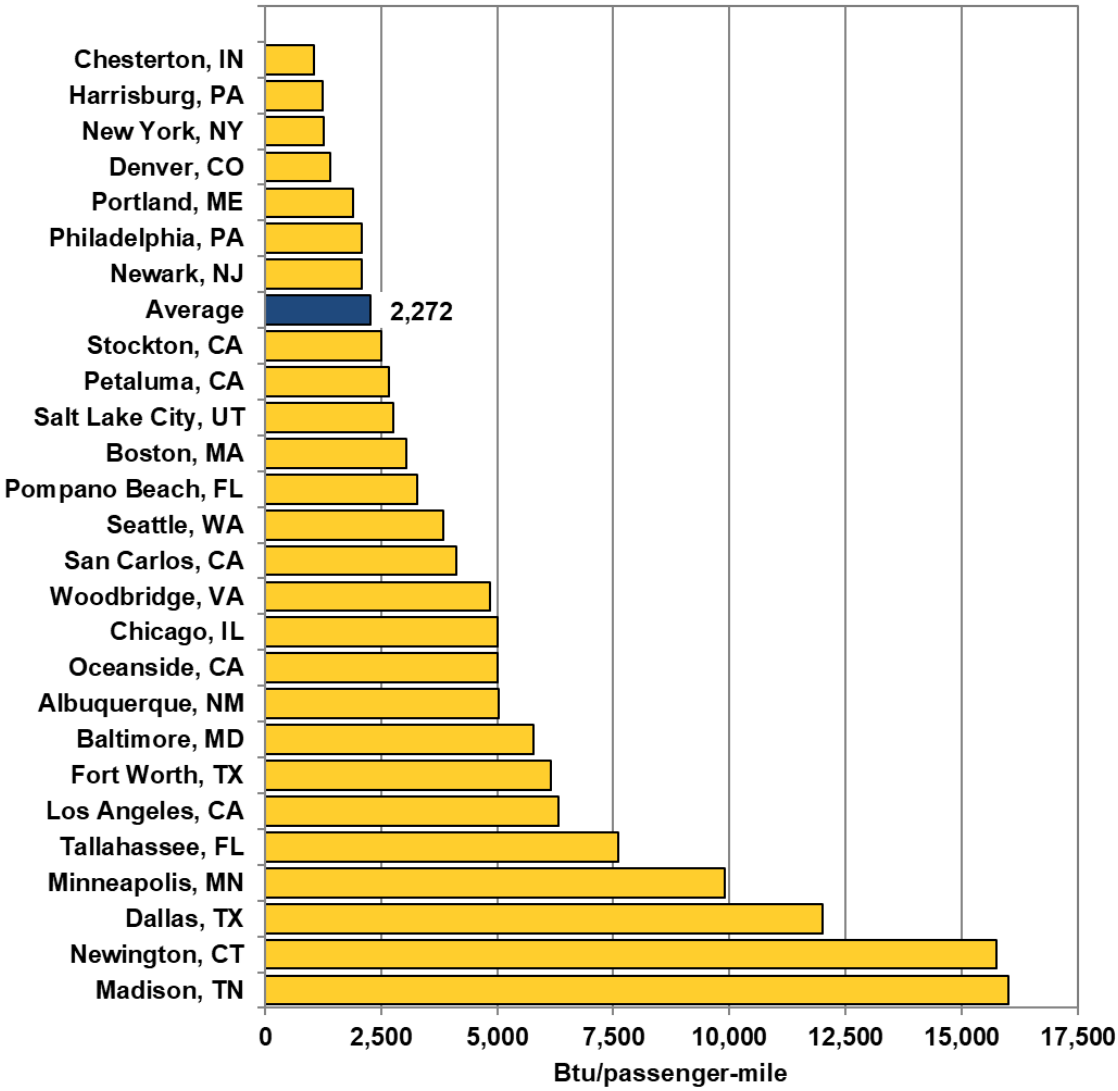
[c] Estimated for years 1970–76 based on an average trip length of 5.8 miles.[d] Calculated as the ratio of passenger-miles to passenger trips.

[e] Only end-use energy was counted for electricity. Before Edition 36, primary energy use (which included generation and distribution losses) was shown in this table. Large system-to-system variations exist for energy intensities.

[f] Data are not available.

The energy intensity of commuter rail systems, measured in Btu per passenger-mile, varies greatly. The average of all commuter rail systems in 2024 was 2,272 Btu/passenger-mile. Most of these 27 systems used diesel power, but five systems used both diesel and electricity, and another four systems used only electricity.

Figure 7.1. Energy Intensity of Commuter Rail Systems[a], 2024



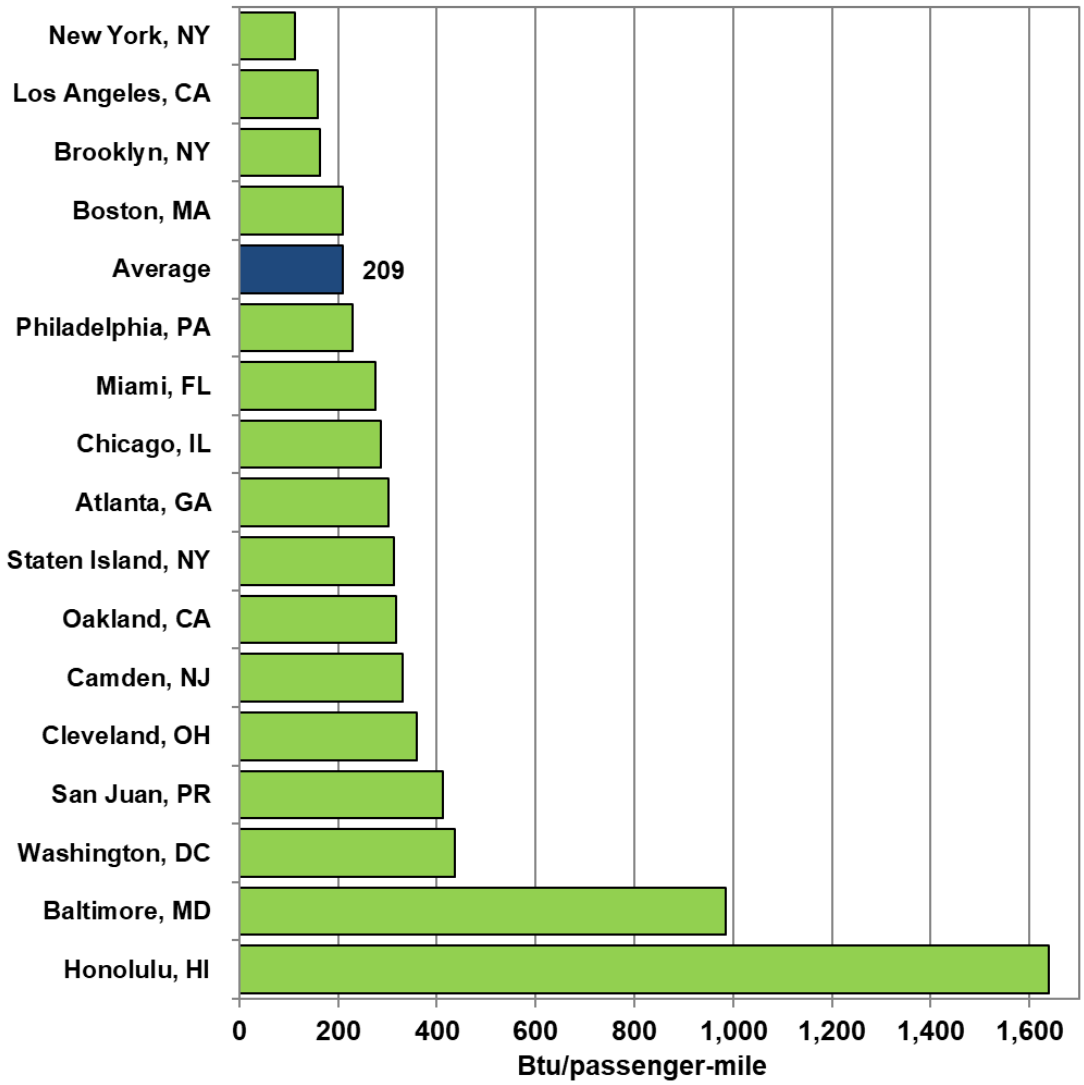
Note: Does not include systems classified as hybrid rail, which is a subset of commuter rail operating exclusively on freight railroad right-of-way.

Source:
U.S. Department of Transportation, *2024 National Transit Database*, 2025.
(Additional resources: www.transit.dot.gov/ntd)

[a] Electric railcar or diesel-propelled railway for urban passenger train service between a central city and adjacent suburbs. Only end-use energy was counted for electricity. Before Edition 36, primary energy use (which included generation and distribution losses) was shown in this figure.

The energy intensity of heavy rail systems, measured in Btu per passenger-mile, varies greatly. The average of all heavy rail systems in 2024 was 209 Btu/passenger-mile.

Figure 7.2. Energy Intensity of Heavy Rail Systems[a], 2024

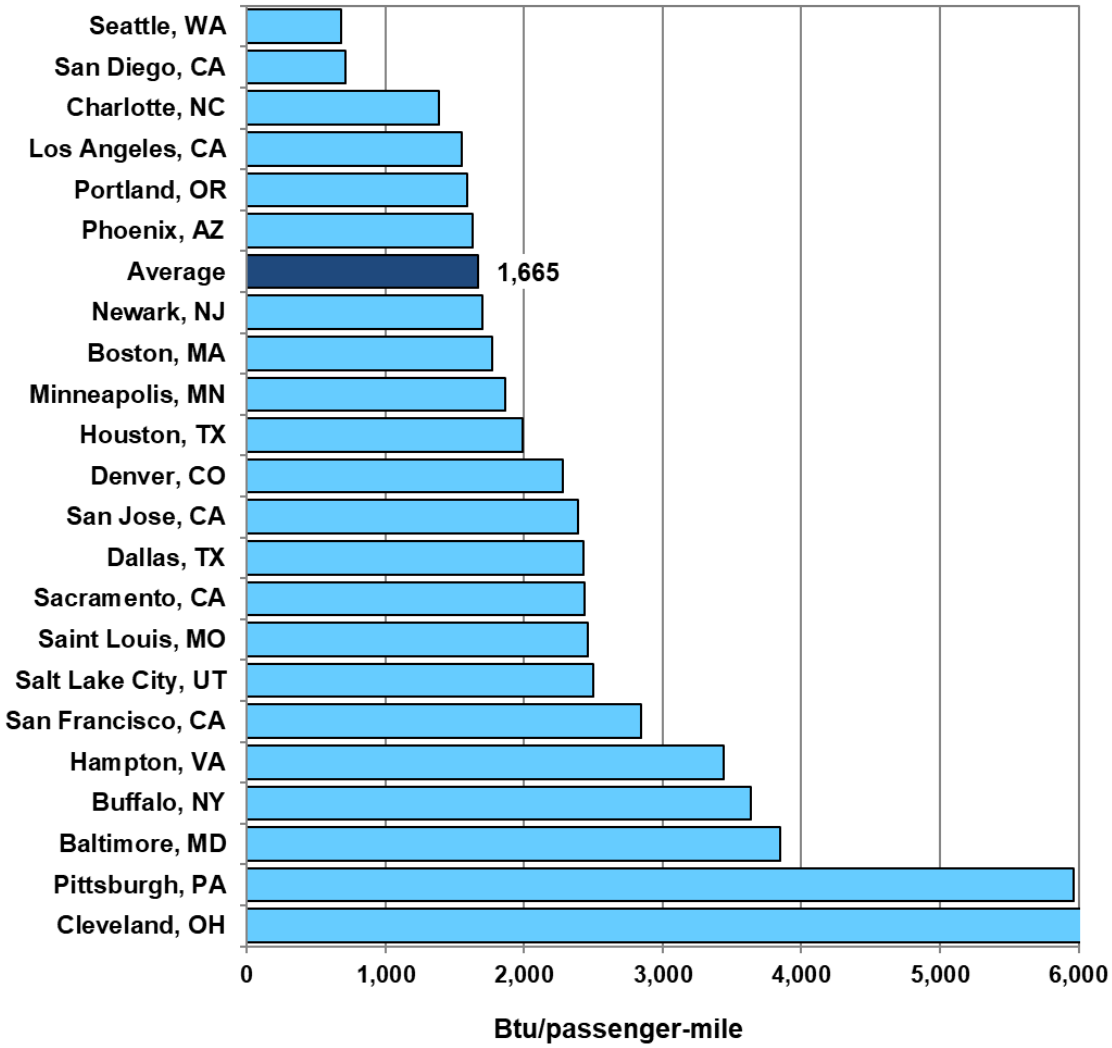


Source:
U.S. Department of Transportation, *2024 National Transit Database*, 2025.
(Additional resources: www.transit.dot.gov/ntd)

[a] An electric railway with the capacity for a heavy volume of traffic. Only end-use energy was counted for electricity. Before Edition 36, primary energy use (which included generation and distribution losses) was shown in this figure.

The energy intensity of light rail systems, measured in Btu per passenger-mile, varies greatly. The average of all light rail systems in 2024 was 1,665 Btu/passenger-mile.

Figure 7.3. Energy Intensity of Light Rail Transit Systems[a], 2024



Source:
U.S. Department of Transportation, *2024 National Transit Database*, 2025.
(Additional resources: www.transit.dot.gov/ntd)

[a] An electric railway with a light volume traffic capacity with power drawn from an overhead electric line. Only end-use energy was counted for electricity. Before Edition 36, primary energy use (which included generation and distribution losses) was shown in this figure.

Uber is the United States' largest transportation network company (TNC), which allows customers to hail a ride on demand via a phone app. The ride fare and tip are paid via credit card stored in the app and feedback is encouraged after each ride.

Table 7.5
Uber Ride Hailing Statistics, 2024

First Uber trip taken	July 5, 2010
Countries in which Uber operates	72
Cities in which Uber operates	13,000
Number of Uber users	156 million
Number of drivers	8 million
Number of worldwide trips	11.27 billion
Number of trips per day	30.3 million

Source:
Uber Technologies company data, 2025. (Additional information: www.uber.com/newsroom)

Lyft is the second-largest transportation network company (TNC) in the United States. As with Uber, a mobile app is used to hail a ride on demand. The company, which began in 2012 as Zimride, operates in the United States and Canada.

Table 7.6
Lyft Ride Hailing Statistics for the United States and Canada, 2024

Active Riders on December 31, 2024	24.7 million
Number of Rides in 2024	828.3 million
Share of riders who do not own or lease a car in 2024	41%
Trip Purpose	**Share of Riders**
Work commute	37%
Job interviews	20%
Travel to airports	61%
Connect to public transit	49%
Run errands	30%
Healthcare-related trips	28%
Get around on vacation	46%
Get to/from recreation/entertainment	62%

Note: Weighted ridership survey data do not add to 100% because trip purposes were not mutually exclusive (respondents were able to choose multiple ride purposes).

Sources:
Lyft, Inc., *Economic Impact Report 2024*, www.lyft.com/impact/economic-impact-report, website accessed October 15, 2025.
Lyft, Inc., Financial and Operational Results through the Fourth Quarter of 2024, investor.lyft.com/news-and-events/news/news-details/2025/Lyft-Reports-Record-Q4-and-Full-Year-2024-Results/default.aspx, website accessed October 15, 2025.

Shared Micro

Shared micromobility refers to small fleets of fully or partially human-powered vehicles including bikes, e-bikes and e-scooters. Many cities in the United States now have some form of shared micromobility available. Two different sources for shared micromobility data are highlighted in Tables 7.7 and 7.8 and Figures 7.4 through 7.8.

The National Association of City Transportation Officials (NACTO) began collecting data on U.S. micromobility as early as 2010 and has published the data in annual reports entitled *Shared Micromobility in the U.S.* The latest data available are for calendar year 2023. NACTO's trip count includes systems with over 150 bikes or scooters. More detailed data were collected from 39 NACTO member cities in the United States and Canada. It does not include private or closed campus systems like those operating on university campuses. Data from several cities are combined to report more details on shared micromobility, such as miles/minutes per trip, reasons for using shared bikes, and mode replacement data.

In 2019 the North American Bikeshare and Scootershare Association (NABSA) began publishing a report entitled *Shared Micromobility State of the Industry Report*. Six reports have been published from 2019 to 2024. The scope of this report is all of North America (Canada, Mexico, United States). The primary data for this report was collected through surveys distributed to all known shared micromobility operators and agencies in North America.

In North American micromobility systems, large cities had a higher number of vehicles per system than small and medium cities in 2024. Utilization of bikes was 50% higher in large cities than in small and medium cities in 2024. Utilization of e-scooters was 70% higher in large cities.

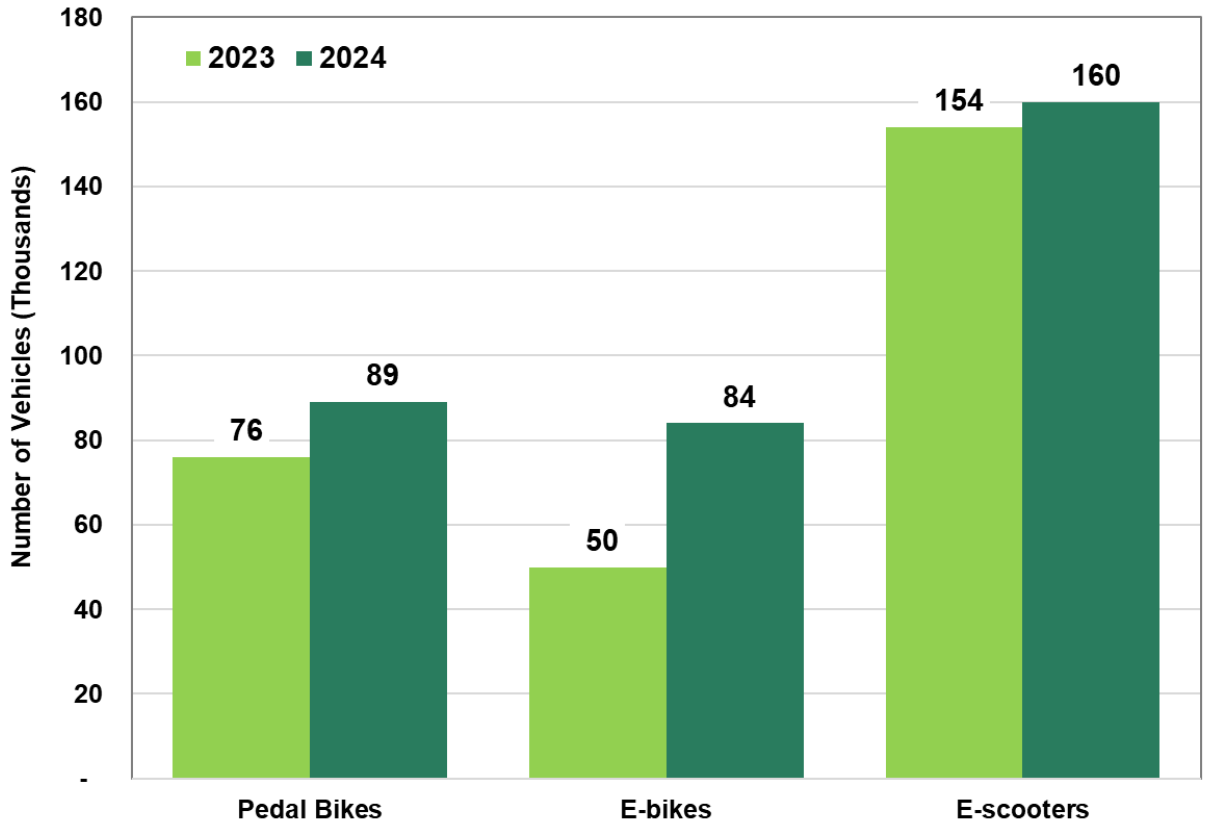
Table 7.7
North American Shared Micromobility Systems, 2024

	Small and Medium Cities		Large Cities	
Metric	Bikes	E-scooters	Bikes	E-scooters
Number of systems	247	200	44	38
Average vehicles per system	286	400	2,950	1,794
Average vehicles per 1,000 people	1.9	3.6	3	3
Average vehicles per square mile	10	18	43	32
Average trips per vehicle per service day (utilization)	1.6	1.0	2.4	1.7
Median number of operators per city	1		2	

Source:
North American Bikeshare and Scootershare Association (NABSA), 6th Annual Shared Micromobility State of the Industry Report, 2024. (Additional information: nabsa.net)

The number of shared e-bikes that North Americans had access to increased by 68% from 2023 to 2024. There was a 17% increase in the number of shared pedal bikes and a 4% increase in e-scooters.

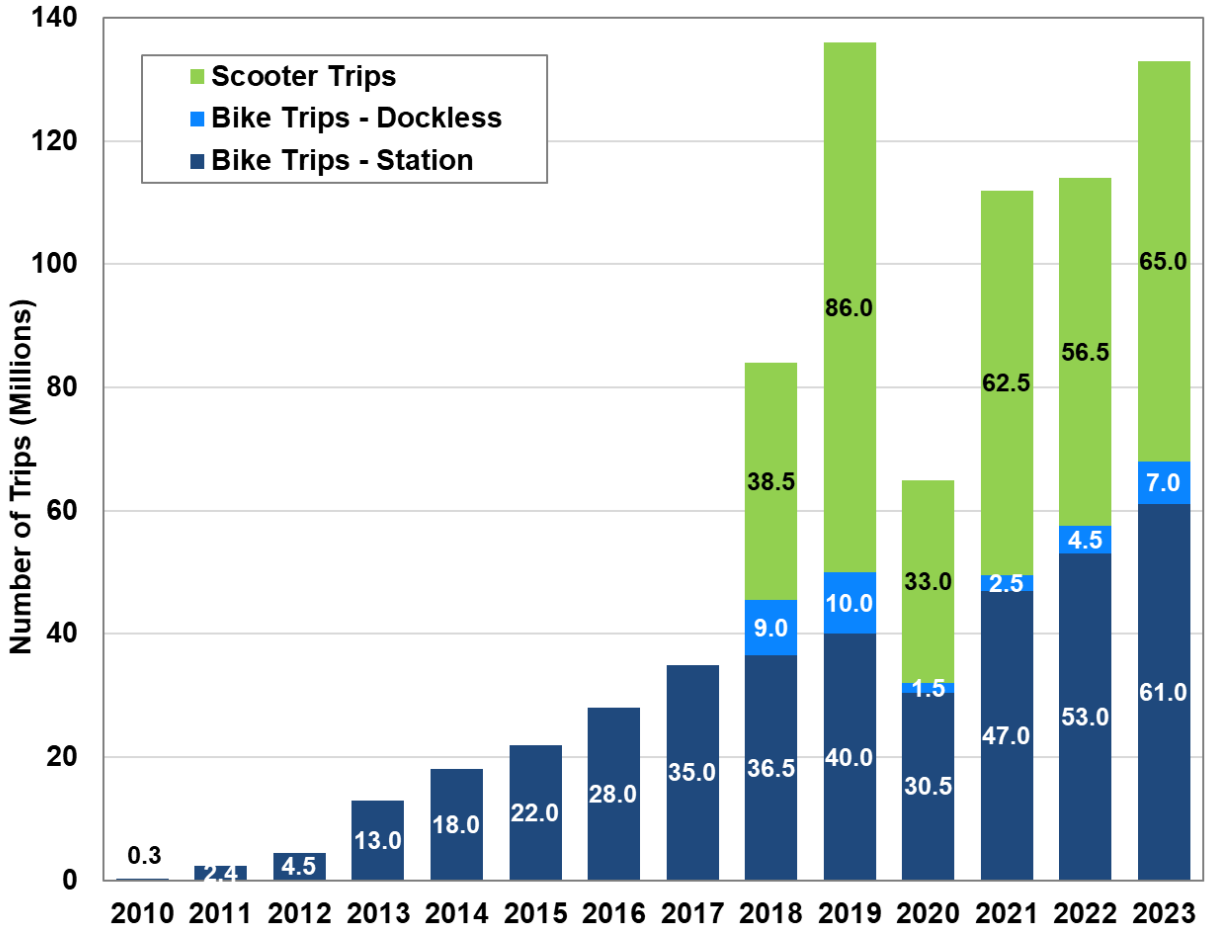
Figure 7.4. Shared Micromobility Vehicles in North America, 2023–2024



Source:
North American Bikeshare and Scootershare Association (NABSA), 6th Annual Shared Micromobility State of the Industry Report, 2024. (Additional information: nabsa.net)

Micromobility sharing services (bikes and scooters) have expanded rapidly in cities across the United States. The number of shared bike trips in the largest U.S. cities has been estimated by the National Association of City Transportation Officials (NACTO). The number of station bike trips increased from 321 thousand in 2010 to 61 million in 2023. Shared scooter trips were added to the NACTO study in 2018. There were 86 million scooter trips in 2019 representing 63% of the 136 million shared micromobility trips taken. In 2023, scooters accounted for 49% of micromobility trips.

Figure 7.5. Shared Micromobility Trips in the United States, 2010–2023



Notes: Includes systems with over 150 bikes or scooters and only includes data reported by large cities (more than 500,000 people). Does not include private or closed campus systems like those operating on university campuses. For more details, see the full report.

Source:
National Association of City Transportation Officials (NACTO), *Shared Micromobility in the U.S.: 2023*, 2024.
(Additional information: nacto.org/shared-micromobility-report-2023)

The most common reasons cited for bike sharing trips were recreation/exercise and social outings (each at 27% of trips). Connection to transit, which was calculated independently of the other trip purposes, accounted for 18% of trips. Seventy- four percent of riders used micromobility to connect to transit and 22% used it on a weekly basis.

Table 7.8
Reasons for Using Micromobility in North America, 2024

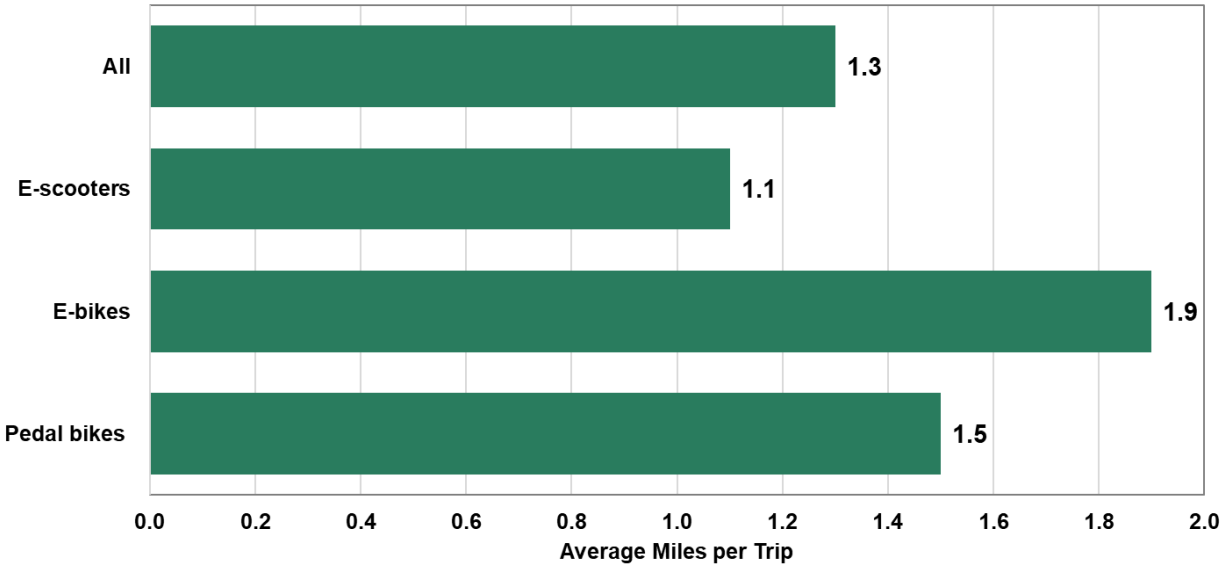
Why people ride?	Share of micromobility trips
Recreation/Exercise	27%
Social/entertainment/dining out	27%
Shopping/errands/ appointments	22%
Work/school	24%
All	100%
Data relating to transit connections	
Share of trips connecting to transit	18%
Share of riders connecting to transit	74%
Share of riders connecting to transit on a weekly basis	22%

Note: Averages from published survey data collected in 24 systems or cities between 2021 and 2024.

Source:
North American Bikeshare and Scootershare Association (NABSA), 6th Annual Shared Micromobility State of the Industry Report, 2024. (Additional information: nabsa.net)

E-bikes travel the furthest in terms of average miles per trip (1.9 miles) while pedal bikes had the longest trip duration (14.4 minutes).

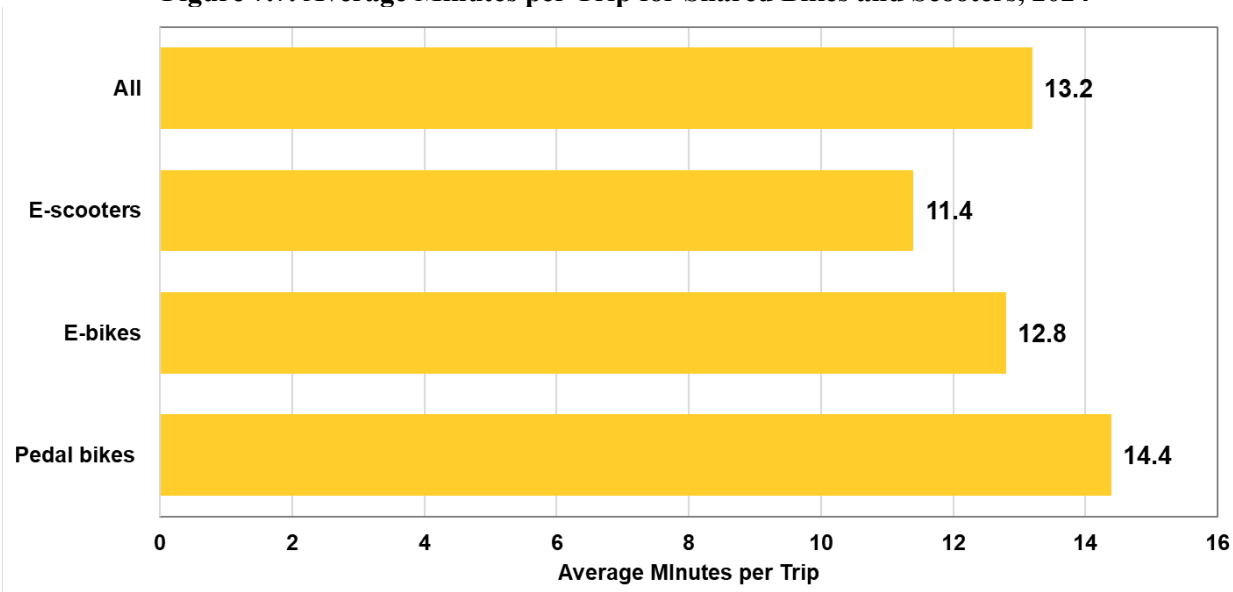
Figure 7.6. Average Miles per Trip for Shared Bikes and Scooters, 2024



Note: Data are for North America.

Source:
North American Bikeshare and Scootershare Association (NABSA), 6th Annual Shared Micromobility State of the Industry Report, 2024. (Additional information: nabsa.net)

Figure 7.7. Average Minutes per Trip for Shared Bikes and Scooters, 2024

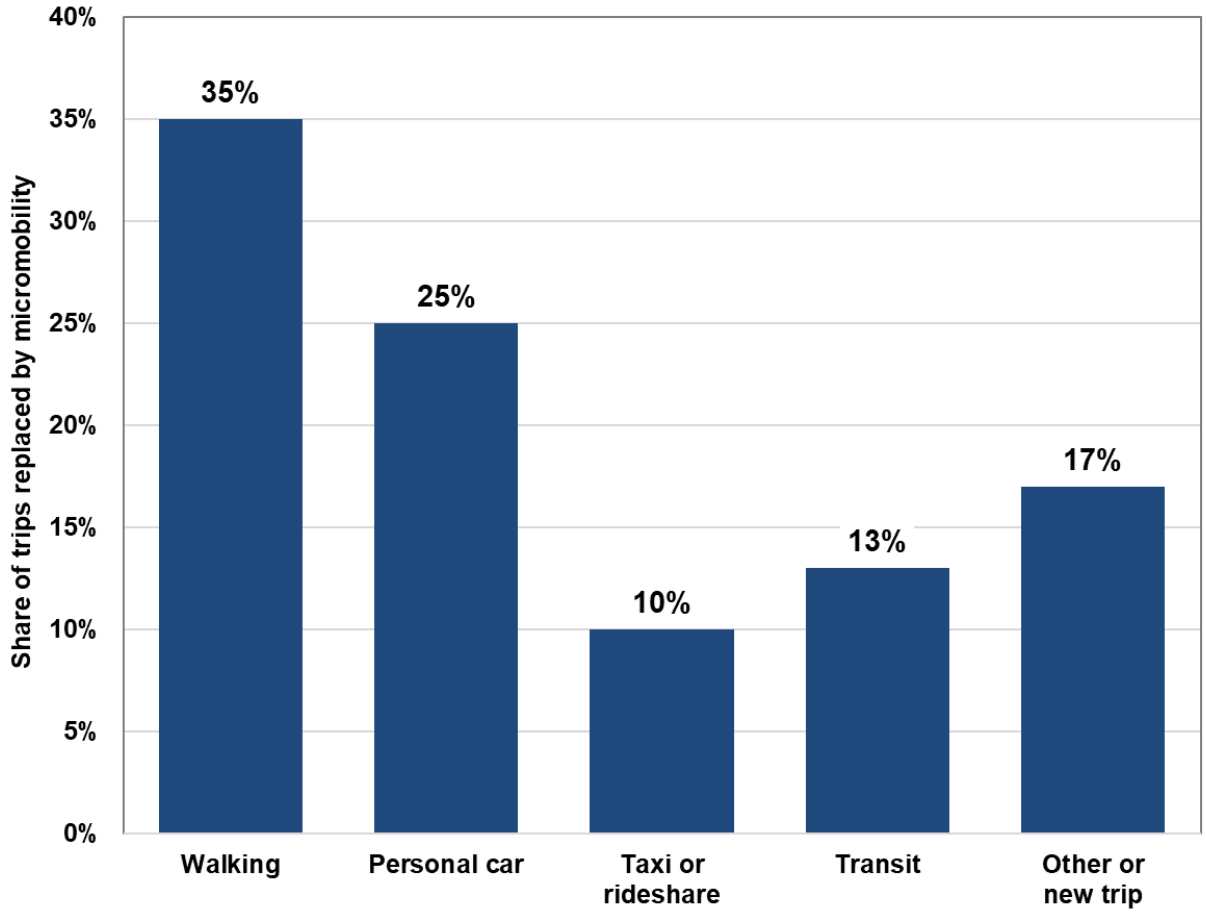


Note: Data are for North America.

Source:
North American Bikeshare and Scootershare Association (NABSA), 6th Annual Shared Micromobility State of the Industry Report, 2024. (Additional information: nabsa.net)

One-quarter of micromobility trips in 2024 replaced trips that would have otherwise been made by personal car. Another 10% of trips replaced taxi or rideshare. Micromobility trips most often replaced walking trips.

Figure 7.8. Share of Trips Replaced by Micromobility by Mode, 2024



Note: Data are for North America. "Other or new trip" category includes personal bike.

Source:
North American Bikeshare and Scootershare Association (NABSA), 6th Annual Shared Micromobility State of the Industry Report, 2024. (Additional information: nabsa.net)

HOUSEHOLD VEHICLES & CHARACTERISTICS

Chapter 8



Credit: Benjamin Rondel/The Image Bank/Getty Images

The number of vehicles in the United States is growing faster than the population. The growth in vehicle miles has slowed to less than 1% per year from 2013-2023. See Table 8.2 for vehicles per capita and vehicle miles per capita.

Table 8.1
Population and Vehicle Profile, 1950–2023

Year	Resident population[a] (thousands)	Total households (thousands)	Number of vehicles in operation (thousands)	Total vehicle miles (millions)	Number of licensed drivers (thousands)	Number of civilian employed persons (thousands)
1950	151,868	43,554	49,162	458,246	62,193	58,918
1955	165,069	47,874	62,689	605,646	74,686	62,170
1960	179,979	52,799	73,858	718,762	87,253	65,778
1965	193,526	57,436	90,358	887,812	98,502	71,088
1970	205,052	63,401	111,242	1,109,724	111,543	78,678
1975	215,973	71,120	137,913	1,327,664	129,791	85,846
1980	227,726	80,776	161,490	1,527,295	145,295	99,303
1985	238,466	86,789	177,133	1,774,826	156,868	107,150
1990	250,132	93,347	193,057	2,144,362	167,015	118,793
1995	266,557	98,990	205,297	2,422,696	176,628	124,900
2000	282,385	104,705	225,821	2,746,925	190,625	136,891
2001	285,309	108,209	235,331	2,797,287	191,276	136,933
2002	288,105	109,297	234,625	2,855,508	194,296	136,485
2003	290,820	111,278	236,760	2,890,450	196,166	137,736
2004	293,463	112,000	243,024	2,964,788	198,889	139,252
2005	296,186	113,343	247,421	2,989,430	200,549	141,730
2006	298,996	114,384	250,845	3,014,371	202,810	144,427
2007	302,004	116,011	254,403	3,031,124	205,742	146,047
2008	304,798	116,783	255,918	2,976,528	208,321	145,362
2009	307,439	117,181	254,213	2,956,764	209,618	139,877
2010	309,322	117,538	250,070	2,967,266	210,115	139,064
2011	311,557	118,682	253,244	2,950,402	211,875	139,869
2012	313,831	121,084	253,639	2,969,433	211,815	142,469
2013	315,994	122,459	255,876	2,988,280	212,160	143,929
2014	318,301	123,229	260,720	3,025,656	214,092	146,305
2015	320,635	124,587	263,610	3,095,373	218,084	148,834
2016	322,941	125,819	268,799	3,174,408	221,712	151,436
2017	324,986	126,224	270,126	3,212,347	225,346	153,337
2018	326,688	127,586	273,596	3,240,327	227,558	155,761
2019	328,240	128,579	276,491	3,261,772	228,680	157,538
2020	331,578	128,451	275,936	2,903,622	228,196	147,795
2021	332,100	129,224	281,185	3,132,411	232,782	152,581
2022	334,017	131,202	282,175	3,196,191	235,086	158,291
2023	336,806	131,434	284,614	3,246,817	237,656	161,037
			Average annual percentage change			
1950-2023	1.1%	1.5%	2.4%	2.7%	1.9%	1.4%
2013-2023	0.6%	0.7%	1.1%	0.8%	1.1%	1.1%

Sources:

Resident population, households, and civilian employed persons – U.S. Department of Commerce, Bureau of the Census, Online Data Retrieval, Washington, DC, 2025. (Additional resources: www.census.gov)

Vehicles in operation, licensed drivers and vehicle miles – U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics 2023*, Tables DL-20 and VM-1, 2025, and previous editions. (Additional resources: www.fhwa.dot.gov)

[a] Estimates as of July 1. Includes Armed Forces in the United States.

In 2021, vehicles per capita reached a new high of 0.850. Vehicle miles per capita were over 10,000 miles from 2004 to 2007 but were 9,640 miles in 2023. There were 1.767 vehicles for every employed civilian in the United States in 2023.

Table 8.2
Vehicles and Vehicle Miles per Capita, 1950–2023[a]

Year	Vehicles per capita	Vehicles per household	Vehicles per licensed driver	Vehicles per civilian employed persons	Vehicle miles per capita	Vehicle miles per licensed driver
1950	0.324	1.129	0.790	0.834	3,017	7,368
1955	0.380	1.309	0.839	1.008	3,669	8,109
1960	0.410	1.399	0.846	1.123	3,994	8,238
1965	0.467	1.573	0.917	1.271	4,588	9,013
1970	0.543	1.755	0.997	1.414	5,412	9,949
1975	0.639	1.939	1.063	1.607	6,147	10,229
1980	0.709	1.999	1.111	1.626	6,707	10,512
1985	0.743	2.041	1.129	1.653	7,443	11,314
1990	0.772	2.068	1.156	1.625	8,573	12,839
1995	0.770	2.074	1.162	1.644	9,089	13,716
2000	0.800	2.157	1.185	1.650	9,728	14,410
2001	0.825	2.175	1.230	1.719	9,804	14,624
2002	0.814	2.147	1.208	1.719	9,911	14,697
2003	0.814	2.128	1.207	1.719	9,939	14,735
2004	0.828	2.170	1.222	1.745	10,103	14,907
2005	0.835	2.183	1.234	1.746	10,093	14,906
2006	0.839	2.193	1.237	1.737	10,082	14,863
2007	0.842	2.193	1.237	1.742	10,037	14,733
2008	0.840	2.191	1.228	1.761	9,766	14,288
2009	0.827	2.169	1.213	1.817	9,617	14,105
2010	0.808	2.128	1.190	1.798	9,593	14,122
2011	0.813	2.134	1.195	1.811	9,470	13,925
2012	0.808	2.095	1.197	1.780	9,462	14,019
2013	0.810	2.089	1.206	1.778	9,457	14,085
2014	0.819	2.116	1.218	1.782	9,506	14,132
2015	0.822	2.116	1.209	1.771	9,654	14,193
2016	0.832	2.136	1.212	1.775	9,830	14,318
2017	0.831	2.140	1.199	1.762	9,885	14,255
2018	0.837	2.144	1.202	1.757	9,919	14,240
2019	0.842	2.150	1.209	1.755	9,937	14,263
2020	0.832	2.148	1.209	1.867	8,757	12,724
2021	0.847	2.176	1.208	1.843	9,432	13,456
2022	0.845	2.151	1.200	1.783	9,569	13,596
2023	0.845	2.165	1.198	1.767	9,640	13,662
			Average annual percentage change			
1950-2023	1.3%	0.9%	0.6%	1.0%	1.6%	0.8%
2013-2023	0.4%	0.4%	-0.1%	-0.1%	0.2%	-0.3%

Sources:

Resident population, households, and civilian employed persons – U.S. Department of Commerce, Bureau of the Census, Online Data Retrieval, Washington, DC, 2025. (Additional resources: www.census.gov)

Vehicles in operation, licensed drivers, and vehicle miles – U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics 2023*, Table VM-1, 2025, and previous editions. (Additional resources: www.fhwa.dot.gov)

[a] Includes all vehicles (light-duty and heavy-duty).

Montana had 2.08 vehicles per capita in 2023 – more than any other state. The highest vehicle miles of travel (VMT) per capita is 16,270 miles for Wyoming. The lowest VMT was in the District of Columbia.

Table 8.3
Vehicles and Vehicle Miles per Capita by State, 2023

State	Vehicles per capita	Vehicle miles of travel per capita
Alabama	1.06	14,125
Alaska	0.92	7,627
Arizona	0.86	10,076
Arkansas	1.09	12,739
California	0.79	8,077
Colorado	0.88	9,261
Connecticut	0.78	8,373
Delaware	0.43	9,376
Dist. of Columbia	0.50	5,064
Florida	0.85	10,443
Georgia	0.83	11,418
Hawaii	0.88	7,240
Idaho	1.04	10,004
Illinois	0.80	8,137
Indiana	0.84	12,385
Iowa	1.19	10,332
Kansas	0.84	10,784
Kentucky	1.00	10,766
Louisiana	0.99	12,110
Maine	0.98	10,637
Maryland	0.79	9,226
Massachusetts	0.74	8,597
Michigan	0.98	9,748
Minnesota	1.02	10,090
Mississippi	0.76	13,912
Missouri	0.89	13,019
Montana	2.08	12,110
Nebraska	0.99	10,702
Nevada	0.83	8,641
New Hampshire	1.00	9,638
New Jersey	0.64	8,317
New Mexico	0.90	13,280
New York	0.47	6,083
North Carolina	0.80	11,236
North Dakota	1.34	12,542
Ohio	0.95	9,576
Oklahoma	0.84	11,260
Oregon	0.99	8,655
Pennsylvania	0.83	7,691
Rhode Island	0.75	6,855
South Carolina	0.98	11,284
South Dakota	1.51	11,265
Tennessee	0.97	11,668
Texas	0.76	9,774
Utah	0.90	10,044
Vermont	0.97	11,057
Virginia	0.91	10,044
Washington	0.95	7,611
West Virginia	0.86	9,016
Wisconsin	0.98	11,340
Wyoming	1.52	16,270
Total	0.85	9,640.01

Source:
U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics 2023*, Tables MV-1, VM-2, 2025, and previous editions. (Additional resources: www.fhwa.dot.gov)

In 1950 there was 1.265 licensed drivers per vehicle in the United States. By 2023, there are more vehicles than licensed drivers. On average, there were nearly 9 licensed drivers for every 10 people over 16 years old and this has been the case since 1990.

Table 8.4
Licensed Driver Statistics, 1950–2023[a]

Year	Licensed drivers per capita	Licensed drivers per capita 16 years old and up	Licensed drivers per household	Licensed drivers per vehicle	Licensed drivers per civilian employed persons
1950	0.410	[b]	1.428	1.265	1.056
1955	0.452	[b]	1.560	1.191	1.201
1960	0.485	[b]	1.653	1.181	1.326
1965	0.509	[b]	1.715	1.090	1.386
1970	0.544	[b]	1.759	1.003	1.418
1975	0.601	[b]	1.825	0.941	1.512
1980	0.638	[b]	1.799	0.900	1.463
1985	0.658	[b]	1.807	0.886	1.464
1990	0.668	0.861	1.789	0.865	1.406
1995	0.663	0.878	1.784	0.860	1.414
2000	0.675	0.886	1.821	0.844	1.393
2001	0.670	0.868	1.768	0.813	1.397
2002	0.674	0.869	1.778	0.828	1.424
2003	0.675	0.868	1.763	0.829	1.424
2004	0.678	0.870	1.776	0.818	1.428
2005	0.677	0.867	1.769	0.811	1.415
2006	0.678	0.866	1.773	0.809	1.404
2007	0.681	0.870	1.773	0.809	1.409
2008	0.683	0.873	1.784	0.814	1.433
2009	0.682	0.870	1.789	0.825	1.499
2010	0.679	0.862	1.788	0.840	1.511
2011	0.680	0.860	1.785	0.837	1.515
2012	0.675	0.852	1.749	0.835	1.487
2013	0.671	0.846	1.732	0.829	1.474
2014	0.673	0.846	1.737	0.821	1.463
2015	0.680	0.854	1.750	0.827	1.465
2016	0.687	0.860	1.762	0.825	1.464
2017	0.693	0.867	1.785	0.834	1.470
2018	0.697	0.869	1.784	0.832	1.461
2019	0.697	0.868	1.779	0.827	1.452
2020	0.688	0.858	1.777	0.827	1.544
2021	0.701	0.872	1.801	0.828	1.526
2022	0.704	0.875	1.792	0.833	1.485
2023	0.706	0.877	1.808	0.835	1.476
			Average annual percentage change		
1950-2023	0.8%	[b]	0.3%	-0.6%	0.5%
2013-2023	0.5%	0.4%	0.4%	0.1%	0.0%

Sources:

Resident population, population 16 years and older, households and civilian employed persons – U.S. Department of Commerce, Bureau of the Census, Online Data Retrieval, Washington, DC, 2025. (Additional resources: www.census.gov)

Vehicles in operation and licensed drivers – U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics 2023*, Table VM-1, 2025, and previous editions. (Additional resources: www.fhwa.dot.gov)

[a] Includes all vehicles (light-duty and heavy-duty).
[b] Data are not available.

Household vehicle ownership shows a dramatic increase from 1960 to 1990. In 1960, nearly 79% of households owned less than two vehicles; by 1990, it declined to 45%. Census data prior to 1990 indicated that the majority of households owned one vehicle; in 1990 that changed to two vehicles. Since 2000, less than 10% of households had no vehicles. The share of households with three or more vehicles was highest in 2020. The American Community Survey now collects these data on an annual basis; thus, annual data are available after 2010.

Table 8.5
Household Vehicle Ownership, 1960–2023
(percentage)

	No vehicles	One vehicle	Two vehicles	Three or more vehicles
1960	21.5%	56.9%	19.0%	2.5%
1970	17.5%	47.7%	29.3%	5.5%
1980	12.9%	35.5%	34.0%	17.5%
1990	11.5%	33.7%	37.4%	17.3%
2000	9.4%	33.8%	38.6%	18.3%
2010	9.1%	33.8%	37.6%	19.5%
2011	9.3%	34.1%	37.5%	19.1%
2012	9.2%	34.1%	37.3%	19.3%
2013	9.1%	33.9%	37.3%	19.7%
2014	9.1%	33.7%	37.3%	19.9%
2015	8.9%	33.5%	37.2%	20.3%
2016	8.7%	33.2%	37.1%	21.0%
2017	8.6%	32.7%	37.3%	21.5%
2018	8.5%	32.5%	37.1%	21.9%
2019	8.6%	32.7%	37.2%	21.4%
2020	8.5%	32.5%	37.1%	22.0%
2021	8.0%	32.9%	37.1%	21.9%
2022	8.3%	33.2%	36.9%	21.6%
2023	8.4%	33.3%	36.5%	21.7%

Source:
U.S. Department of Transportation, Volpe National Transportation Systems Center, *Journey-to-Work Trends in the United States and its Major Metropolitan Area, 1960–1990*, Cambridge, MA, 1994, p. 2-2.
2000 data – U.S. Bureau of the Census, American Fact Finder, factfinder.census.gov, Table QT-04, August 2001. (Additional resources: www.census.gov)
2010-2019 and 2021-2023 data – U.S. Bureau of the Census, American Community Survey, 1-year estimates, Table CP04, 2025.
2023 data – U.S. Bureau of the Census, American Community Survey, 5-year estimates, 2022.

2022 National Household Travel Survey Daily Trip Data

The U. S. Department of Transportation (DOT) collected data on daily trips in 1969, 1977, 1983, 1990 and 1995 via the Nationwide Personal Transportation Survey (NPTS). For 2001, the DOT combined the collection of long trip and daily trip data into the 2001 National Household Travel Survey (NHTS).

The NHTS is the nation's inventory of daily travel. The survey includes demographic characteristics of households, people, vehicles, and detailed information on daily travel for all purposes by all modes. NHTS survey data are collected from a sample of U.S. households and expanded to provide national estimates of trips and miles by travel mode, trip purpose, and a host of household attributes.

The NHTS was designed to continue the NPTS series, but as with all data surveys, caution should be used when comparing statistics from one survey to another due to changes in terminology, survey procedures, and target population. The NHTS surveys collected data on trips of children under 5 years of age, while the previous NPTS did not. Improved methodologies first used in the collection of trip information in the 1995 NPTS make it difficult to compare these data with past NPTS survey data. Thus, the 1990 NPTS trip data have been adjusted to make it comparable with the later surveys.

In the 2017 survey, households were able to respond online as well as by phone. The online survey included a mapping feature that allowed more accurate trip distances to be collected. These derived trip distances appear to be about 10% shorter than self-reported trips.

A vehicle trip in the NHTS is defined as a one-way trip by a single privately-operated vehicle regardless of the number of persons in the vehicle. A person trip is defined as a movement in the public space between two identifiable points. Two household members traveling together in one car would be counted as two person trips and one vehicle trip. Trips made in other highway vehicles, such as buses, streetcars, taxis (including Uber/Lyft), and school buses are collected in the NHTS, but these are shown as person trips by those modes because there is no way to trace movement of those vehicles throughout the day.

Table 8.6
Demographic Statistics: 1969, 1977, 1983, 1990, 1995 NPTS and 2001, 2009, 2017, 2022 NHTS

	1969	1977	1983	1990	1995	2001	2009	2017	2022	Percent Change 1969 - 2022
Persons per household	3.16	2.83	2.69	2.56	2.63	2.58	2.50	2.55	2.40	-24%
Vehicles per household	1.16	1.59	1.68	1.77	1.78	1.89	1.87	1.88	1.83	58%
Workers per household	1.21	1.23	1.21	1.27	1.33	1.35	1.34	1.33	1.24	2%
Licensed drivers per household	1.65	1.69	1.72	1.75	1.78	1.77	1.88	1.89	1.82	10%
Vehicles per worker	0.96	1.29	1.39	1.40	1.34	1.39	1.40	1.41	1.47	53%
Vehicles per licensed driver	0.70	0.94	0.98	1.01	1.00	1.06	1.00	0.99	1.00	43%
Average vehicle trip length (miles)	8.89	8.34	7.90	8.98	9.06	9.87	9.72	9.55	11.50	29%

Note: Average vehicle trip length for 1990 and 1995 is calculated using only those records with trip mileage information present. The 1969 survey does not include pickups and other light-duty trucks as household vehicles. Data on vehicles per household and licensed drivers per household will not match 8.2 and 8.4 because they are from different sources.

Sources:

U.S. Department of Transportation, Federal Highway Administration, *1990 Nationwide Personal Transportation Survey: Summary of Travel Trends*, FHWA-PL-92-027, Washington, DC, March 1992, Table 2. Data for 1995, 2001, 2009, 2017, and 2022 were generated from the National Household Travel Survey website, 2025, nhts.ornl.gov. (Additional resources: www.fhwa.dot.gov)

Due to methodology improvements in collecting trip information, the 1995 and later data should be compared only to the 1990 adjusted data. The original 1990 data are comparable to all previous surveys; however, comparisons should always be made with caution because of differing survey methodologies.

Table 8.7
Average Annual Vehicle Miles, Vehicle Trips, and Trip Length per Household
1969, 1977, 1983, 1990, 1995 NPTS and 2001, 2009, 2017, 2022 NHTS

	Journey-to-work[a]	All trips
Average annual vehicle miles per household		
1969	4,183	12,423
1977	3,815	12,036
1983	3,538	11,739
1990 original	4,853	15,100
1990 adjusted	4,853	18,161
1995	6,492	20,895
2001	5,724	21,171
2009	5,513	19,850
2017	5,379	20,629
2022	4,357	25,076
Average annual vehicle trips per household		
1969	445	1,396
1977	423	1,442
1983	414	1,486
1990 original	448	1,702
1990 adjusted	448	2,077
1995	553	2,321
2001	479	2,171
2009	457	2,068
2017	450	1,865
2022	324	1,262
Average vehicle trip length (miles)		
1969	9.4	8.9
1977	9.0	8.4
1983	8.5	7.9
1990 original	11.0	9.0
1990 adjusted	11.0	8.9
1995	11.8	9.1
2001	12.2	9.9
2009	12.2	9.7
2017	12.0	9.6
2022	13.5	11.5

Note: A vehicle trip is defined as one start and end movement from location to location in a single privately-operated vehicle regardless of the number of people in the vehicle.

Sources:

U.S. Department of Transportation, Federal Highway Administration, *1990 Nationwide Personal Transportation Survey: Summary of Travel Trends*, FHWA-PL-92-027, Washington, DC, March 1992, Table 7. 1990 adjusted data – Oak Ridge National Laboratory, Oak Ridge, TN, August 1998. 1995 NPTS, 2001, 2009, 2017, 2022 NHTS data were generated from the National Household Travel Survey website, 2025, nhts.ornl.gov. (Additional resources: www.fhwa.dot.gov)

[a] It is believed that the methodology changes in the 1995 NPTS did not impact the journey-to-work trips; therefore, no adjustment is necessary.

The number of drivers in a household makes a difference in vehicle miles of travel (vmt), as does the presence of children in the household. Households with children have 64% more vmt than households without children in 2017. Rural households have more vehicles, on average, than urban households.

Table 8.8
Average Number of Vehicles and Vehicle Travel per Household, 1990 NPTS and 2001, 2009, 2017, 2022 NHTS

	Average number of vehicles per household					Average Vehicle miles traveled per household[a]				
Number of licensed drivers	**1990**	**2001**	**2009**	**2017**	**2022**	**1990**	**2001**	**2009**	**2017**	**2022**
1	1.5	1.2	1.1	1.2	1.7	15,200	9,700	8,800	11,700	19,000
2	2.1	2.2	2.2	2.2	2.6	22,900	25,800	23,500	24,500	28,000
3	2.9	3.0	3.0	3.1	3.2	29,400	37,900	37,700	35,900	37,400
4 or more	3.8	3.8	3.9	4.1	4.2	40,500	47,200	55,200	48,400	46,000
Household size										
1 person	1.2	1.0	1.0	1.0	1.8	11,400	7,500	7,100	9,300	16,000
2 persons	1.9	2.0	2.0	2.0	2.5	19,300	21,200	17,500	20,100	21,900
3 persons	2.2	2.3	2.3	2.3	3.0	23,700	28,400	27,900	26,800	32,800
4 persons	2.4	2.4	2.4	2.5	2.9	25,300	28,600	33,200	30,000	36,900
5 persons	2.4	2.4	2.4	2.6	3.0	24,900	33,200	33,700	32,500	36,800
6 or more persons	2.7	2.5	2.4	2.7	3.2	29,200	33,800	33,600	34,400	38,100
Household urban status										
Urban	1.9	1.8	1.7	1.8	2.5	19,000	19,300	17,600	19,200	24,200
Rural	2.1	2.3	2.4	2.5	3.0	22,200	28,400	27,700	27,100	28,500
Household composition										
With children	2.2	2.2	2.2	2.2	2.9	24,100	28,300	30,400	27,800	36,100
Without children	1.8	1.7	1.7	1.7	2.4	17,600	16,700	14,400	17,100	19,900
All households	**1.8**	**1.9**	**1.9**	**1.9**	**1.8**	**18,300**	**21,200**	**19,900**	20,600	25,100

Note: The 2017 survey featured some online trip mapping which collected more accurate trip distances. The derived distances appear to be about 10% shorter than self-reported trips.

Source:
Generated from the U.S. Department of Transportation, Federal Highway Administration, Nationwide Personal Transportation Survey Public Use Files, Washington, DC, 2000 and the National Household Travel Survey website, 2025, nhts.ornl.gov.

[a] Average vehicle miles traveled per household is the total movement in miles of all privately operated vehicles, regardless of the number of people in the vehicle, divided by the total number of households in the survey.

Nearly one quarter of all trips in 2022 were for "other social/recreational" purpose which is more than 10% higher than in 2001. About 18% of vehicle trips were traveling to and from work and 17% of trips were for shopping. Shopping is done close to home, as the average trip length for shopping was less than six miles.

Table 8.9
Trip Statistics[a] by Trip Purpose, 2001 and 2022 NHTS

	Share of trips		Share of vehicle-miles traveled		Trip length (miles)		Trip length (minutes)	
Trip purpose	2001	2022	2001	2022	2001	2022	2001	2022
To/from work	22.1%	18.4%	27.0%	18.8%	12.1	13.2	22.3	26.7
Work-related business	4.1%	3.5%	8.4%	0.9%	20.3	18.4	30.9	31.4
Shopping	21.1%	16.9%	14.5%	8.6%	6.7	5.8	14.4	16.5
Other family/personal business	24.7%	15.1%	18.7%	8.9%	7.5	8.4	15.2	19.5
School/church	4.9%	11.3%	3.7%	3.8%	7.5	6.6	15.8	19.5
Medical/dental	2.2%	3.2%	2.2%	0.7%	9.9	12.0	20.7	26.1
Visit friends/relatives	6.3%	5.3%	9.4%	4.6%	14.9	29.4	24.4	36.1
Other social/recreational	13.7%	24.3%	13.2%	52.7%	9.6	18.8	18.2	28.6
Other	0.5%	1.9%	1.0%	1.0%	18.1	71.3	31.4	45.5
All	100.0%	100.0%	100.0%	100.0%	9.9	14.0	18.7	24.5

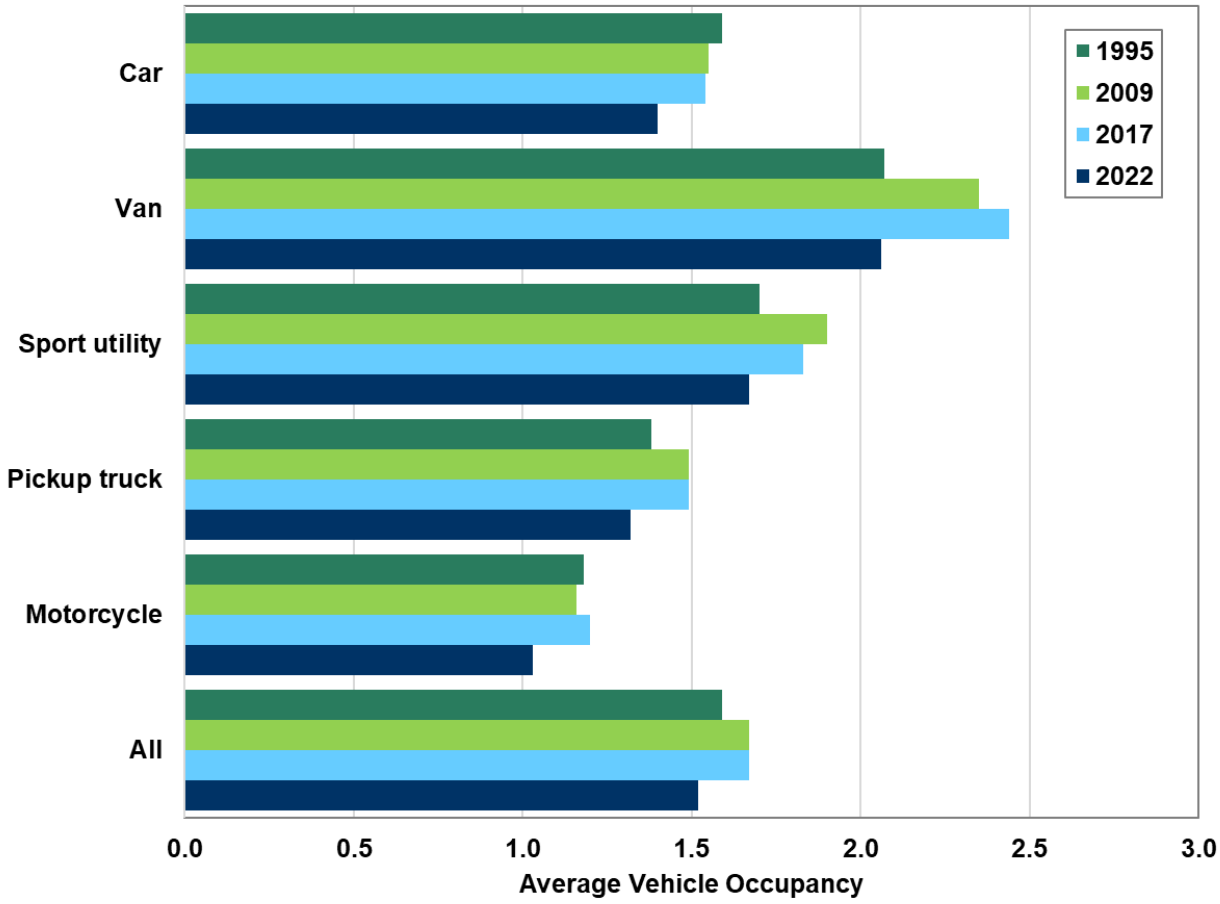
Note: The "All" category for average trip length and duration includes records for which trip purpose was not identified.

Source:
Generated from the National Household Travel Survey website, 2025, nhts.ornl.gov.

[a] Percentages may not sum to totals due to rounding.

Overall, household vehicle occupancy was 1.4 in 2022 – lower than any other year listed. Van occupancy declined from a high of 2.44 in 2017 to a low of 2.06 in 2022. Low vehicle occupancies in 2022 could be a lingering result of the 2020 pandemic.

Figure 8.1. Average Household Vehicle Occupancy by Vehicle Type, 1995 NPTS and 2009, 2017, 2022 NHTS



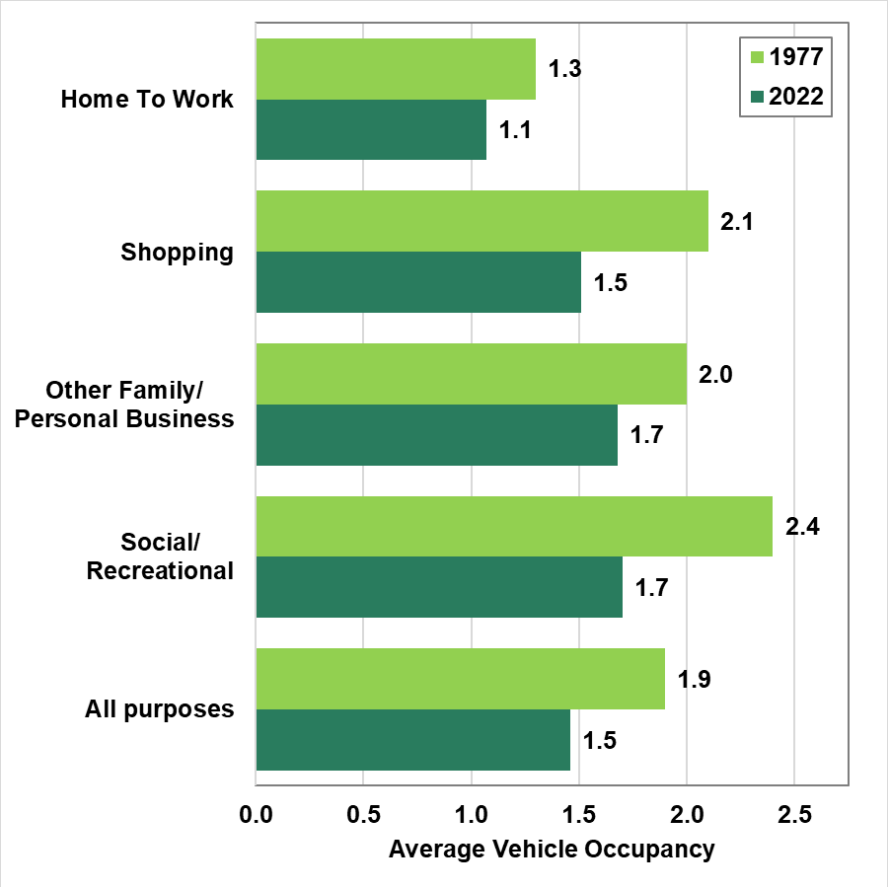
Note: Average vehicle occupancy is mileage-weighted and only includes privately operated household vehicles.

Sources:

Generated from the U. S. Department of Transportation, Federal Highway Administration, Nationwide Personal Transportation Survey Public Use Files, Washington, DC, 2000 and the National Household Travel Survey website, 2025, nhts.ornl.gov.

The average vehicle occupancy, calculated as person-miles per vehicle-mile, is highest for social and recreational purposes. Occupancy rates in 2022 are lower than in 1977. The increase in number of vehicles per household and the decrease in average household size could contribute to the decline in occupancy rates.

Figure 8.2. Average Household Vehicle Occupancy by Trip Purpose, 1977 NPTS and 2022 NHTS



Note: Average vehicle occupancy is mileage-weighted and only includes privately operated household vehicles. The "All purposes" category includes other purposes not shown above, such as trips to school, church, doctor, dentist, and work-related business.

Sources:

U.S. Department of Transportation, Federal Highway Administration, *1990 Nationwide Personal Transportation Survey: Summary of Travel Trends*, FHWA-PL-92027, Washington, DC, March 1992, Figure 6. Data from 2022 NHTS were generated from the National Household Travel Survey website, 2025, nhts.ornl.gov. (Additional resources: www.fhwa.dot.gov)

The 2022 household survey reports the highest average annual miles per vehicle and the 1993 survey reports the lowest. The 1983 through 2017 survey showed a general trend of younger vehicles being driven more than older vehicles. The 2022 data show a different trend of newer vehicles being driven less than many of the older vehicle categories. A possible explanation would be that improved vehicle quality allows vehicles to be driven longer distances regardless of age.

Table 8.10
Average Annual Miles per Household Vehicle by Vehicle Age,
1983, 1990, 1995 NPTS and 2001, 2009, 2017, 2022 NHTS

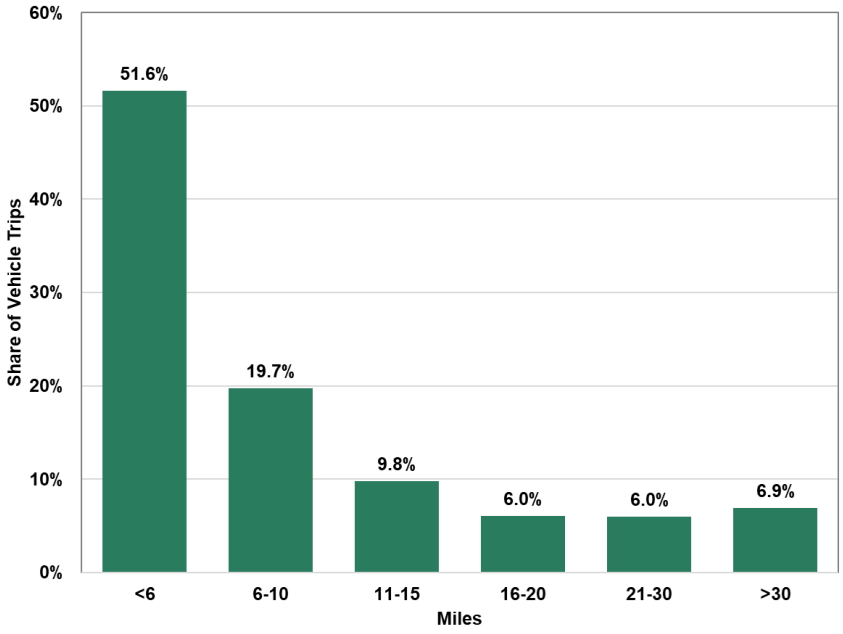
Vehicle age (years)	1983	1990	1995	2001	2009	2017	2022
Under 1	8,200	19,600	15,900	15,500	13,200	13,000	11,200
1	15,200	16,800	16,800	14,300	14,600	14,000	13,700
2	16,800	16,600	15,500	14,000	13,900	14,200	12,100
3	14,500	14,700	14,400	13,100	12,700	12,400	14,300
4	13,000	13,600	14,100	12,500	12,600	12,900	16,100
5	12,100	12,900	13,500	12,000	12,800	13,100	13,700
6	11,300	13,200	13,200	11,800	12,100	12,400	16,700
7	10,000	12,400	12,800	11,600	11,900	12,300	12,700
8	9,800	12,600	12,200	10,900	11,500	11,400	14,200
9	9,000	11,500	12,200	10,800	11,300	12,000	13,700
10 and older	7,300	9,200	8,900	7,400	9,300	9,400	14,300
All household vehicles	10,400	12,500	12,200	11,100	11,300	11,200	14,000

Note: Data include all household vehicles and have been rounded to the nearest hundred.

Sources:

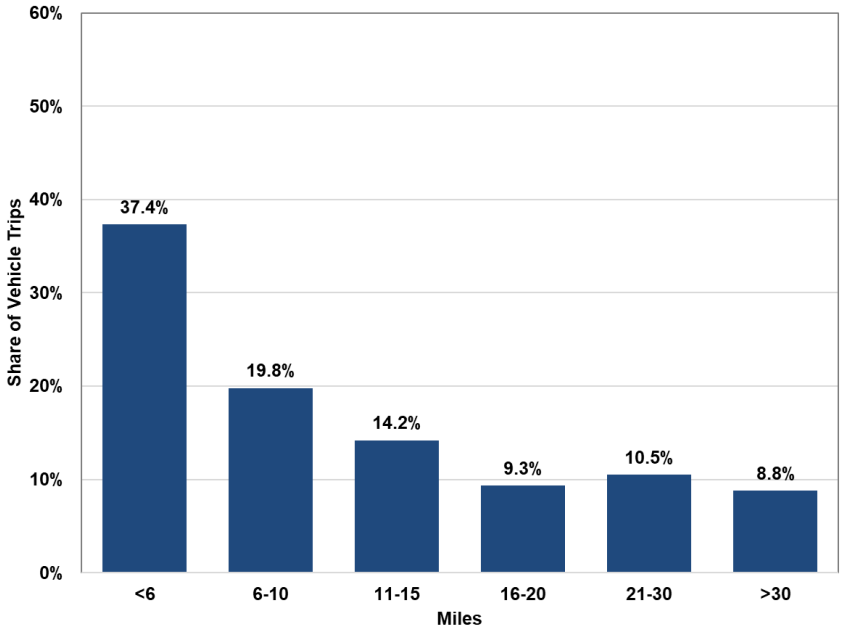
Nationwide Personal Transportation Study—1983: D. Klinger and J. Richard Kuzmyak, COMSIS Corporation, *Personal Travel in the United States, Volume 1: 1983–84 Nationwide Personal Travel Study*, prepared for the U.S. Department of Transportation, Washington, DC, August 1986, Table 4-22, p. 4-21. 1990: Generated from the *1990 Nationwide Personal Transportation Study Public Use Tape*, March 1992. 1995, 2001, 2009, and 2017 and 2022: Generated from the National Household Travel Survey website, 2025, nhts.ornl.gov.

Figure 8.3. Share of Vehicle Trips by Trip Distance, 2022 NHTS



Source:
Generated from the National Household Travel Survey website, 2025, nhts.ornl.gov.

Figure 8.4. Share of Vehicle Trips to Work by Trip Distance, 2022 NHTS



Source:
Generated from the National Household Travel Survey website, 2025, nhts.ornl.gov.

More than one-third of new vehicles (1-year-old and under) travel over12,000 miles per year. Two-thirds of vehicles over 20 years old travel less than 4,000 miles in a year.

Table 8.11
Share of Vehicles by Annual Miles of Travel and Vehicle Age, 2022 NHTS

	Vehicle age (years)						
Annual vehicle miles of travel	1 and under	2	3	4	5	6	7
< 1,000 miles	8%	6%	6%	8%	8%	11%	8%
1 - 2,000 miles	4%	8%	6%	4%	6%	3%	7%
2 - 4,000 miles	10%	7%	11%	10%	8%	9%	11%
4 - 6,000 miles	10%	10%	11%	14%	10%	10%	13%
6 - 8,000 miles	12%	9%	11%	9%	8%	11%	7%
8 - 10,000 miles	10%	8%	9%	8%	8%	7%	7%
10 - 12,000 miles	9%	15%	13%	12%	15%	14%	11%
12 - 15,000 miles	14%	10%	10%	10%	10%	13%	9%
15 - 20,000 miles	11%	10%	9%	7%	11%	8%	8%
20 - 30,000 miles	7%	7%	7%	8%	6%	5%	6%
>30,000 miles	5%	10%	6%	10%	10%	9%	13%
All	100%	100%	100%	100%	100%	100%	100%

	Vehicle age (years)					
	8	9	10	11-15	16-20	Over 20
< 1,000 miles	11%	10%	11%	13%	21%	38%
1 - 2,000 miles	7%	7%	8%	9%	10%	14%
2 - 4,000 miles	9%	12%	12%	14%	17%	14%
4 - 6,000 miles	12%	13%	14%	13%	13%	9%
6 - 8,000 miles	8%	10%	9%	9%	6%	4%
8 - 10,000 miles	7%	6%	7%	6%	5%	3%
10 - 12,000 miles	15%	13%	12%	12%	8%	4%
12 - 15,000 miles	9%	8%	7%	5%	4%	3%
15 - 20,000 miles	9%	7%	7%	5%	4%	2%
20 - 30,000 miles	6%	6%	6%	4%	4%	2%
>30,000 miles	8%	8%	8%	9%	8%	6%
All	100%	100%	100%	100%	100%	100%

Source:
Generated from the National Household Travel Survey website, 2025, nhts.ornl.gov.

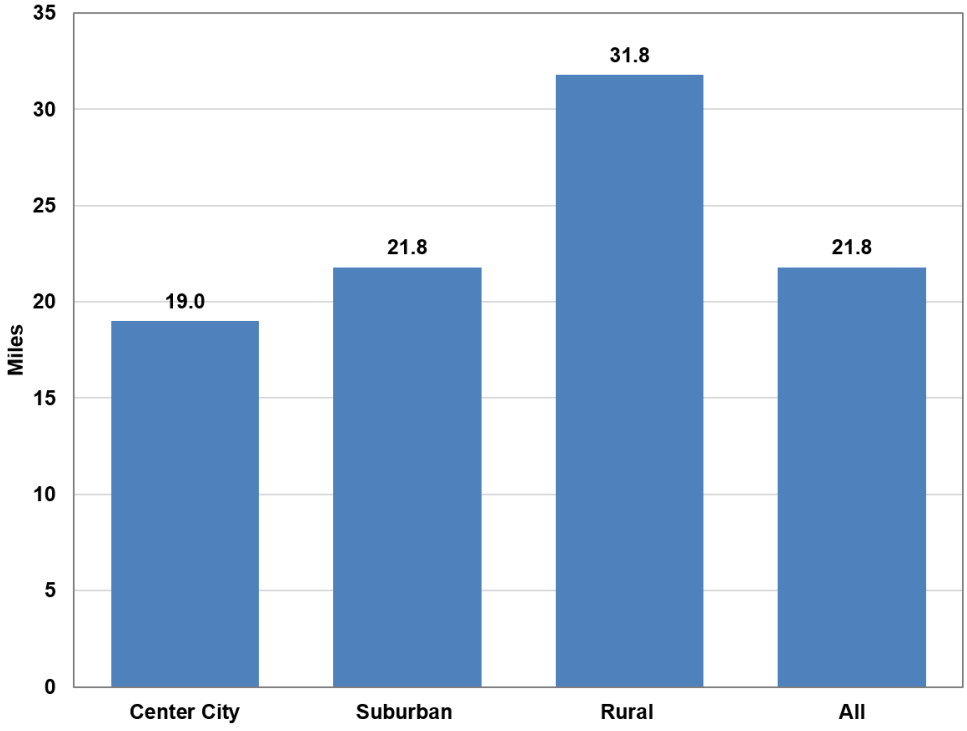
The average driver made 1.9 trips per day with an average of 11.5 miles for each trip in 2022.

Table 8.12
Household Vehicle Trips, 1990, 1995 NPTS and 2001, 2009, 2017, 2022 NHTS

	Number of daily vehicle trips (per driver)	Average vehicle trip length (miles)	Daily vehicle miles of travel (per driver)
1990	3.3	8.9	28.5
1995	3.6	9.1	32.1
2001	3.4	9.9	32.7
2009	3.0	9.7	29.0
2017	2.7	9.6	25.9
2022	1.9	11.5	21.8

Source:
Generated from the National Household Travel Survey website, 2025, nhts.ornl.gov.

Figure 8.5. Average Daily Miles Driven (per Driver), 2022 NHTS



Note: Center city = urban area; suburban = urban cluster and area surrounded by urban areas; rural = not in urban area.

Source:
Generated from the National Household Travel Survey website, 2025, nhts.ornl.gov.

Table 8.13
Daily Vehicle Miles of Travel (per Vehicle) by Number of Vehicles in the Household, 2001, 2009, 2017, 2022 NHTS

	Daily miles per vehicle			
Number of household vehicles	2001	2009	2017	2022
1	25.6	29.1	30.9	50.2
2	27.5	32.7	32.2	41.2
3	24.2	31.3	30.6	33.6
4	23.0	30.2	28.3	25.4
5	21.1	27.6	27.4	30.3
More than 5	18.4	27.2	24.7	17.5
All	25.2	31.1	30.5	42.1

Source:
Generated from the National Household Travel Survey website, 2025, nhts.ornl.gov.

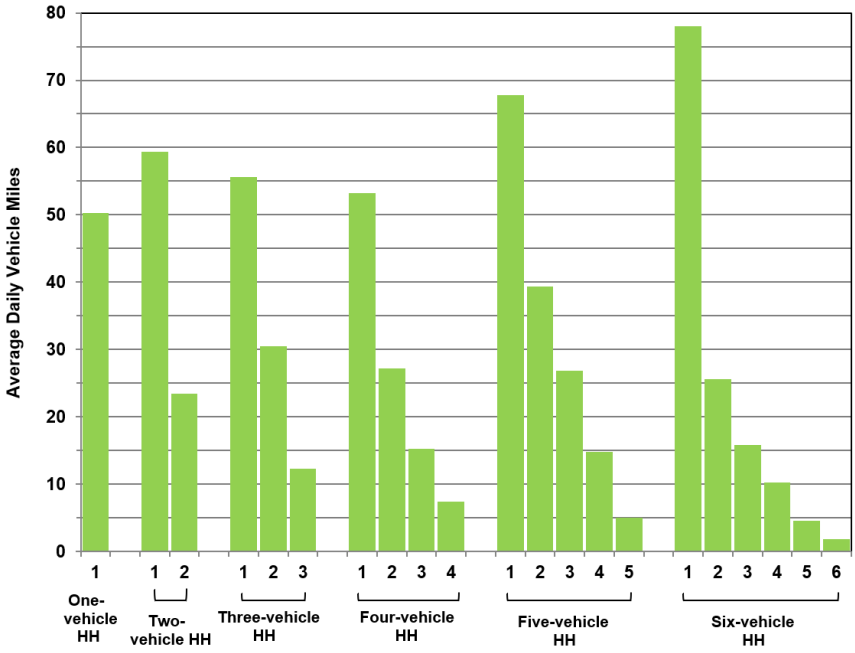
Table 8.14
Daily and Annual Vehicle Miles of Travel and Average Age for Each Vehicle in a Household, 2022 NHTS

Vehicle number	Average daily miles	Average annual miles	Average age (years)
One-vehicle household			
1	50.2	18,300	9.5
Two-vehicle household			
1	59.4	21,700	8.0
2	23.5	8,600	10.2
Three-vehicle household			
1	55.6	20,300	8.5
2	30.5	11,100	10.1
3	12.2	4,500	13.3
Four-vehicle household			
1	53.2	19,400	8.7
2	27.2	9,900	11.0
3	15.3	5,600	14.2
4	7.4	2,700	16.1
Five-vehicle household			
1	67.7	24,700	9.5
2	39.4	14,400	11.6
3	26.9	9,800	12.5
4	14.8	5,400	13.3
5	5.0	1,800	18.7
Six-vehicle household			
1	78.0	28,500	8.3
2	25.6	9,300	12.3
3	15.9	5,800	14.9
4	10.3	3,700	16.0
5	4.5	1,700	18.8
6	1.8	700	19.9

Note: Households with more than six vehicles were excluded from this table.

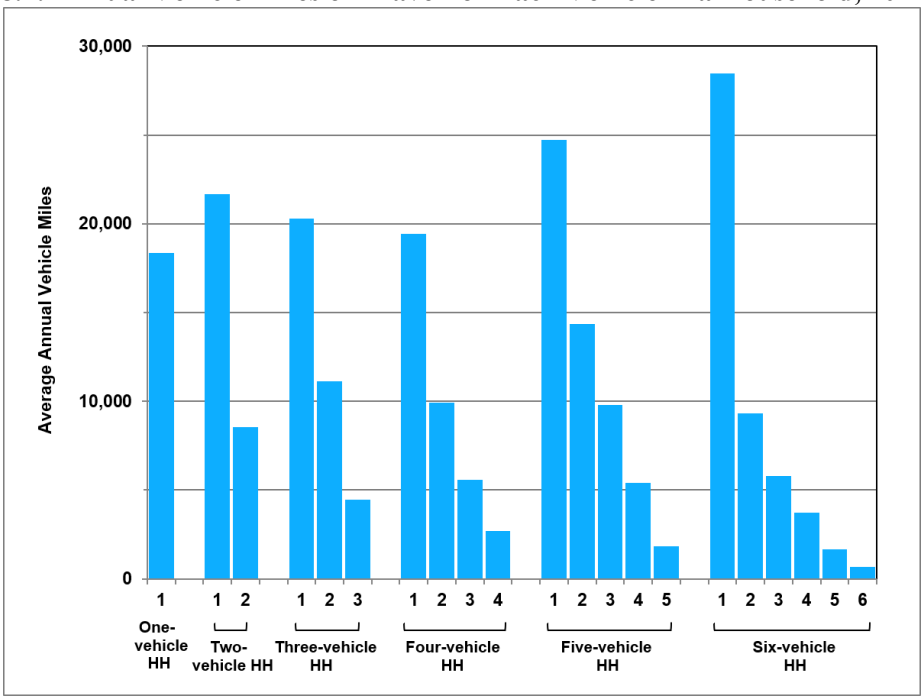
Source:
Generated from the National Household Travel Survey website, 2025, nhts.ornl.gov.

Figure 8.6. Daily Vehicle Miles of Travel for Each Vehicle in a Household, 2022 NHTS



Source:
Generated from the National Household Travel Survey website, 2025, nhts.ornl.gov.

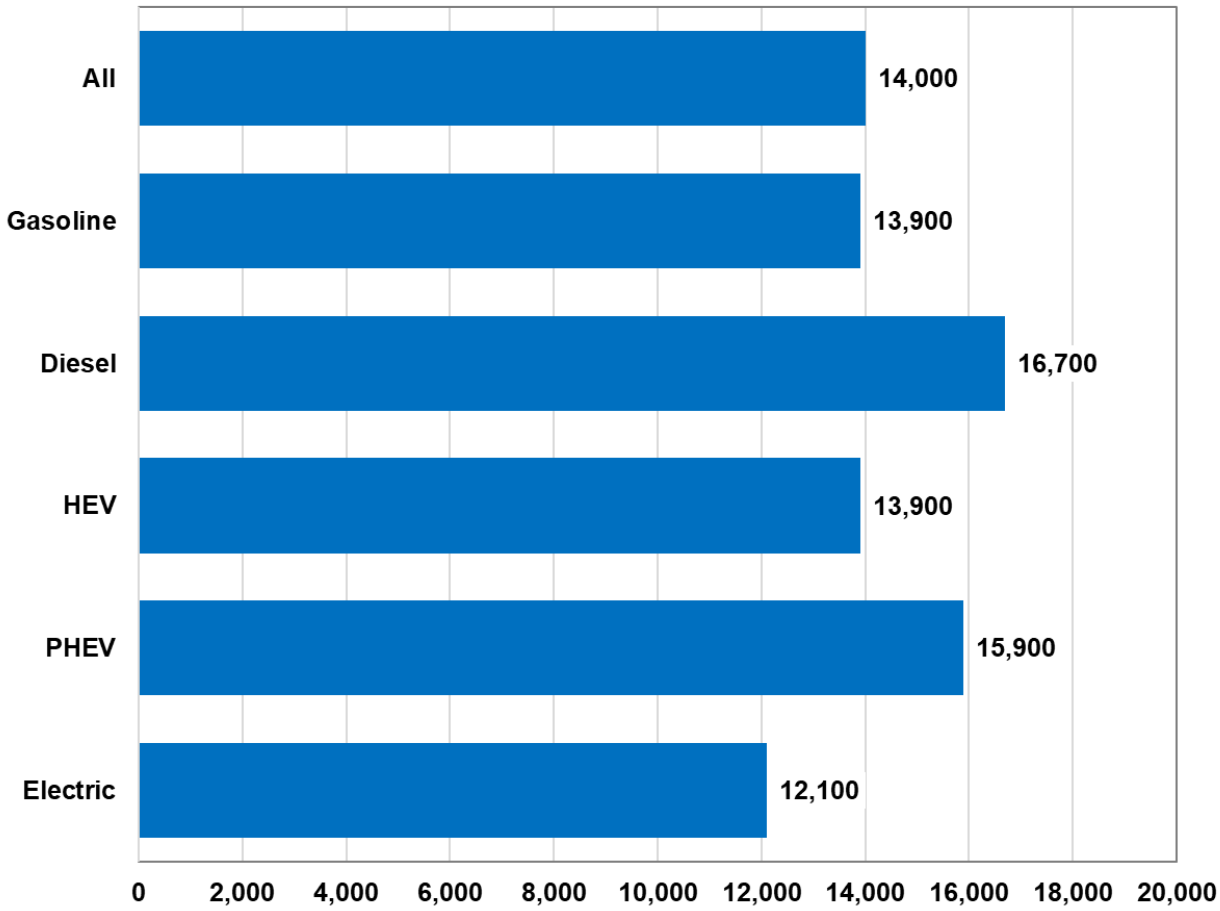
Figure 8.7. Annual Vehicle Miles of Travel for Each Vehicle in a Household, 2022 NHTS



Source:
Generated from the National Household Travel Survey website, 2025, nhts.ornl.gov.

Household vehicles fueled with gasoline were driven an average of 13,900 miles in 2022, while electric vehicles were driven an average of 12,100. Diesel vehicles were driven the longest distances in 2022.

Figure 8.8. Annual Vehicle Miles of Travel by Fuel Type, 2022 NHTS



Note: HEV = hybrid-electric vehicle. PHEV = plug-in hybrid vehicle. Includes household vehicles only.

Source:
Generated from the National Household Travel Survey website, 2025, nhts.ornl.gov.

The ability to charge an electric vehicle (EV) at home depends upon access to electricity. A home with a garage or carport is more likely to have electricity access close to the vehicle, thus making it more convenient to refuel. More than three-fourths of newly constructed homes and 82% of single-unit dwellings had a garage or carport in 2023.

Table 8.15
Housing Unit Characteristics, 2023

	Share of occupied housing units	Percent with garage or carport
Housing unit age		
New construction (< 2 years)	0.8%	75.6%
New construction (2-5 years)	2.3%	73.6%
Older construction (6+ years)	96.9%	67.4%
Housing unit structure		
Single-unit dwelling	70.1%	82.4%
Multi-unit dwelling	24.4%	31.8%
Manufactured/mobile homes	5.4%	38.1%
Other	0.1%	[a]
Geographic location (Census Region)		
Northeast	17.5%	53.7%
Midwest	21.6%	74.8%
South	38.5%	62.4%
West	22.4%	80.3%
Urban/Rural location		
Rural	1.3%	[a]
Urban, adjacent to metropolitan area	13.1%	65.3%
Metropolitan area	85.6%	67.9%
Household Income		
Less than $10,000	7.0%	48.2%
$10,000 to $19,999	6.8%	44.9%
$20,000 to $29,999	7.0%	51.8%
$30,000 to $39,999	7.3%	56.6%
$40,000 to $49,999	7.1%	60.5%
$50,000 to $59,999	6.9%	61.6%
$60,000 to $79,999	12.3%	67.6%
$80,000 to $99,999	9.8%	71.6%
$100,000 to $119,999	7.5%	77.1%
$120,000 or more	28.2%	83.9%
Household Race		
White only	77.0%	70.9%
Black only	14.3%	48.4%
American Indian or Alaska Native only	1.2%	54.2%
Asian only	5.5%	75.6%
Pacific Islander only	0.3%	69.2%
Two or more races	1.7%	60.5%
Tenure		
Owner	65.2%	81.8%
Renter	34.8%	40.9%
All occupied units	133,231,000	67.6%

Note: The American Housing Survey is updated every two years.

Source:
U.S. Bureau of the Census, *2023 American Housing Survey*, Table Creator, accessed October 31, 2025.
(Additional information: www.census.gov/programs-surveys/ahs)

[a] Data withheld.

Trips to and from work by 20 different modes averaged 13.2 miles and 26.7 minutes according to the 2022 NHTS. Census Bureau data show that 62% of workers commuted less than 30 minutes to work in 2023.

Table 8.16
Average Length and Duration of Trips To and From Work by Mode, 2022 NHTS

Mode	Trip Length (miles)	Trip Duration (minutes)
Car	10.9	22.7
Van	10.6	21.8
SUV/Crossover	13.0	24.5
Pickup truck	14.4	26.1
Recreational Vehicle	69.4	94.0
Motorcycle	8.7	22.1
Public or commuter bus	6.6	40.7
School bus	5.9	28.3
Street car or trolley car	5.1	42.2
Subway or elevated rail	8.3	43.0
Commuter rail	29.8	64.6
Amtrak	241.4	318.8
Airplane	1,252.4	241.7
Taxicab or limo service	9.6	30.6
Other ride-sharing service	8.0	25.0
Paratransit/ Dial a ride	8.2	23.9
Bicycle (including bikeshare, ebike, etc.)	2.8	26.9
E-scooter	1.1	13.2
Walked	0.8	22.1
Something Else	12.1	36.4
All	13.2	26.7

Note: A trip is defined as a movement in the public space between two identifiable points.

Source:
Generated from the National Household Travel Survey website, 2025, nhts.ornl.gov.

Table 8.17
Workers by Commute Time, 1990, 2000, 2010, 2020, 2023

Commute time (one-way)	1990	2000	2010	2020	2023
Less than 15 minutes	32.5%	29.4%	28.6%	25.5%	25.9%
15–29 minutes	37.0%	36.1%	36.2%	36.0%	36.5%
30–39 minutes	15.2%	15.8%	16.1%	16.9%	16.9%
40–59 minutes	9.2%	10.7%	11.1%	12.3%	12.0%
60 minutes or more	6.1%	8.0%	8.0%	9.3%	8.7%
Average travel time (minutes)	22.4	25.5	25.2	26.9	26.6

Sources:
1990-2000 – U.S. Bureau of the Census, *Journey to Work: 2000*, Tables 1 and 2, 1990-2000, March 2004.
2010-2023 – U.S. Bureau of the Census, *2019-2023 American Community Survey, 5-Year Estimates*, Tables B08303 and DP03. (Additional www.census.gov, data.census.gov/cedsci)

According to the U.S. Census data, the share of workers who carpooled has dropped from 19.7% in 1980 to 8.5% in 2023. The share of workers using public transportation declined from 6.2% to 3.5% in the same time period. Those working at home increased. The average travel time increased by 4.9 minutes from 1980 to 2023. The American Community Survey (ACS) now collects journey-to-work data on an annual basis. It shows the average commute time as 26.6 minutes in 2023.

Table 8.18
Means of Transportation to Work, 1980, 1990, 2000, 2020, 2023

	1980 Census		1990 Census		2000 Census		2023 ACS	
Means of transportation	Number of workers (thousands)	Share	Number of workers (thousands)	Share	Number of workers (thousands)	Share	Number of workers (thousands)	Share
Private vehicle	81,258	84.1%	99,593	86.5%	112,737	87.9%	124,059	78.7%
Drove alone	*62,193*	*64.4%*	*84,215*	*73.2%*	*97,102*	*75.7%*	110,653	70.2%
Car pooled	*19,065*	*19.7%*	*15,378*	*13.4%*	*15,635*	*12.2%*	13,406	8.5%
Public transportation	6,008	6.2%	5,889	5.1%	5,868	4.6%	5,529	3.5%
Bus or trolley bus[a]	*3,925*	*4.1%*	*3,445*	*3.0%*	*3,207*	*2.5%*	2,629	1.7%
Streetcar or trolley car[a]	[b]	[b]	*78*	*0.1%*	*73*	*0.1%*	149	0.1%
Subway or elevated	*1,529*	*1.6%*	*1,755*	*1.5%*	*1,886*	*1.5%*	2,118	1.3%
Railroad	*554*	*0.6%*	*574*	*0.5%*	*658*	*0.5%*	569	0.4%
Ferryboat	[b]	[b]	*37*	*0.0%*	*44*	*0.0%*	64	0.0%
Taxicab	167	0.2%	179	0.2%	200	0.2%	353	0.2%
Motorcycle	419	0.4%	237	0.2%	142	0.1%	195	0.1%
Bicycle	468	0.5%	467	0.4%	488	0.4%	706	0.4%
Walked only	5,413	5.6%	4,489	3.9%	3,759	2.9%	3,785	2.4%
Other means	703	0.7%	809	0.7%	901	0.7%	1,750	1.1%
Worked at home	2,180	2.3%	3,406	3.0%	4,184	3.3%	21,267	13.5%
Total workers	96,616	100.0%	115,069	100.0%	128,279	100.0%	157,645	100.0%
Average travel time (minutes)	21.7		22.4		25.5		26.6	

Sources:

1980-1990 data – Provided by the Journey-to-Work and Migration Statistics Branch, Population Division, U.S. Bureau of the Census.

2000 data – U.S. Bureau of the Census, *Journey to Work: 2000*, Tables 1 and 2, 1990-2000, March 2004 (www.census.gov/population/www/socdemo/journey.html).

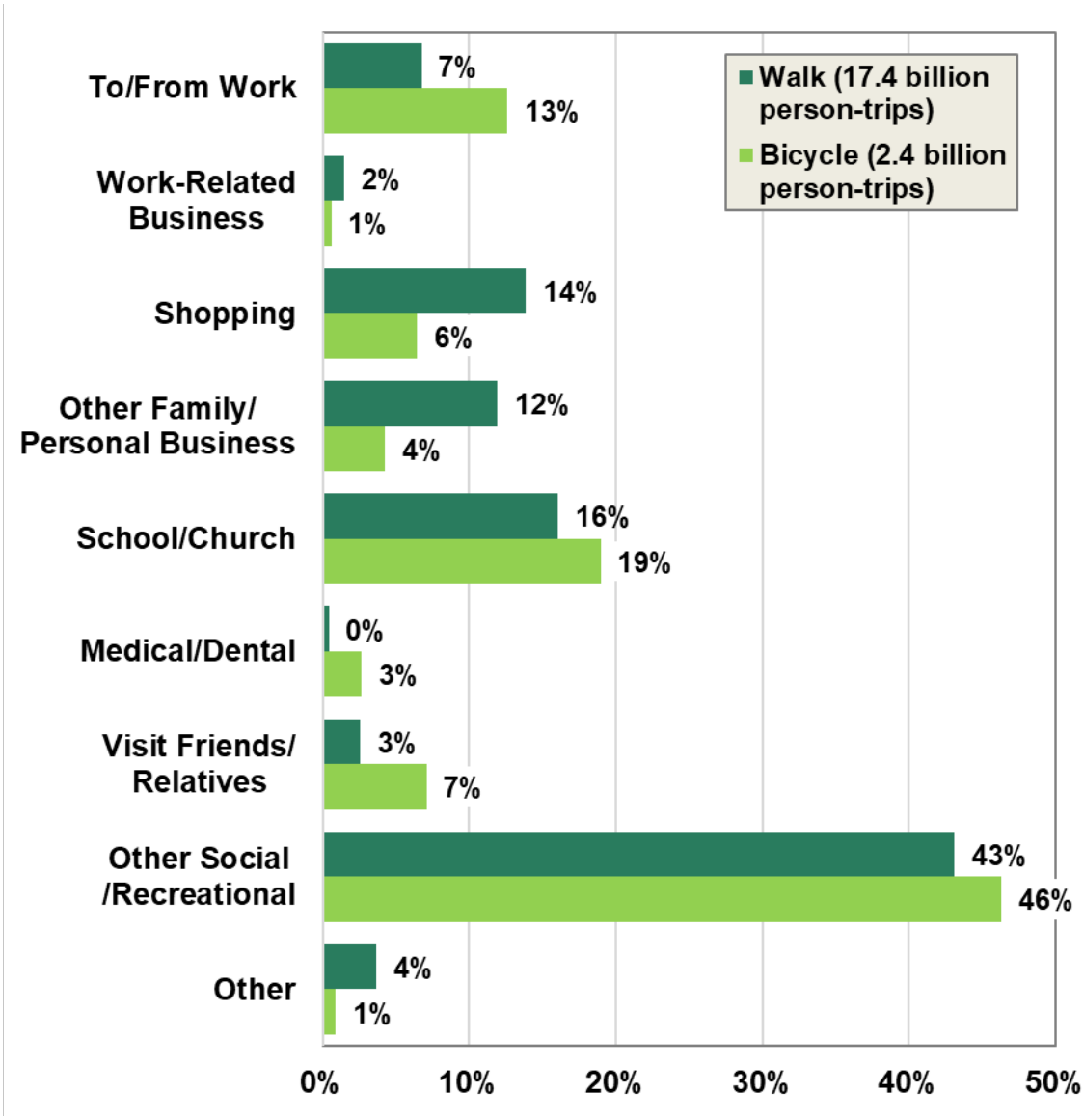
2023 data – U.S. Bureau of the Census, *2019-2023 American Community Survey Five-Year Estimates*, "Explore Census Data," Beta version. (Additional www.census.gov, data.census.gov/cedsci)

[a] This category was "Bus or streetcar" in 1980.

[b] Data are not available.

In 2022, 7% of walk trips and 13% of bike trips were to/from work. Forty-six percent of all bike trips were for social/recreational purposes. Fourteen percent of walk trips were shopping trips.

Figure 8.9. Walk and Bike Trips by Trip Purpose, 2022 NHTS



Note: Percentages may not sum to totals due to rounding. Bike includes bike share and e-bike but does not include gasoline/diesel powered bikes.

Source:
Generated from the National Household Travel Survey website, 2025, nhts.ornl.gov.

In the 2022 NHTS data were collected on the number of long-distance trips in the past 30 days with detailed data for the most recent trip. The data cannot be used for calculating total long-distance trips but are useful for characterizing long-distance trips.

Table 8.19
Long-Distance Trip[a] Characteristics, 2022 NHTS

Trip characteristic	Share of person trips	Share of person miles of travel[b]
Principal means of transportation:		
Personal use vehicles	87.5%	56.0%
Airplane	10.0%	41.9%
Bus	0.6%	0.1%
Train	0.3%	0.1%
Other	1.3%	1.4%
Unknown	0.3%	0.4%
Main purpose of trip:		
Visit family or friends	38.4%	37.2%
Personal vacation	35.9%	42.7%
Business trip	7.4%	11.1%
Other, specify	17.9%	8.6%
Unknown	0.4%	0.4%
Household Income		
High Income ($100,000+)	45.7%	50.5%
Middle Income ($50,000-$99,999)	29.6%	27.1%
Lower-Middle Income ($25,000-$49,999)	14.9%	11.7%
Low Income (<$25,000)	8.8%	10.0%
Unknown	1.0%	0.8%
Age Group		
5-17 (Child/Adolescent)	17.1%	17.2%
18-24 (Young Adult)	8.0%	11.0%
25-44 (Prime Working & Family)	28.8%	28.5%
45-64 (Peak Career & Pre-Retirement)	28.8%	26.6%
65+ (Senior & Retiree)	17.3%	16.8%
Nights away from home:		
None	24.5%	7.7%
1 to 3 nights	16.6%	12.0%
4 to 7 nights	5.9%	11.1%
8 or more nights	2.8%	5.9%
Unknown	50.2%	63.4%
Trip Frequency (Last 30 days)		
0 trip	96.9%	96.5%
1 trip	1.6%	1.7%
2 trips	1.0%	1.5%
3 trips	0.1%	0.1%
4 trips	0.2%	0.1%
5+ trips	0.3%	0.2%

Note: Data collected for the last long-distance trip taken by the respondent.

Source:
Generated from the National Household Travel Survey website, 2025, nhts.ornl.gov.

[a] A long-distance trip is defined as a trip of 50 miles or more, one-way, from the respondent's home.
[b] Person miles of travel were calculated using the Great Circle Distance which is an "as-the-crow-flies" approximation, not the actual road network or flight path distance. Thus, these data are typically shorter than the actual miles traveled.

NONHIGHWAY MODES

Chapter 9



Credit: Bfk92/E+/Getty Images

Nonhighway transportation modes accounted for 19.6% of total transportation energy use in 2023.

Table 9.1
Nonhighway Energy Use Shares, 1970–2023

	Share of transportation energy use					
Year	Air	Water	Pipeline	Rail	Nonhighway total	Transportation total (trillion Btu) [a]
1970	8.5%	5.5%	5.4%	3.5%	22.9%	15,192
1975	7.2%	5.4%	4.0%	3.1%	19.7%	17,204
1980	7.6%	7.4%	3.9%	3.0%	22.0%	18,760
1981	7.8%	6.8%	4.0%	2.9%	21.6%	18,558
1982	8.0%	5.9%	3.8%	2.5%	20.3%	18,055
1983	7.9%	5.4%	3.2%	2.5%	19.0%	18,188
1984	8.6%	5.1%	3.3%	2.7%	19.7%	18,773
1985	8.8%	4.6%	3.1%	2.5%	19.0%	19,017
1986	9.1%	6.6%	2.9%	2.3%	20.8%	20,086
1987	9.2%	6.7%	3.0%	2.3%	21.2%	20,578
1988	9.4%	6.7%	3.4%	2.3%	21.7%	21,131
1989	9.2%	7.1%	3.4%	2.2%	21.9%	21,487
1990	9.6%	6.7%	3.6%	2.2%	22.1%	21,383
1991	9.1%	7.3%	3.3%	2.1%	21.8%	20,985
1992	9.0%	7.4%	3.2%	2.1%	21.6%	21,646
1993	9.0%	6.5%	3.3%	2.1%	20.9%	22,125
1994	9.1%	6.1%	3.5%	2.2%	20.9%	22,729
1995	9.2%	6.3%	3.5%	2.2%	21.2%	23,263
1996	9.3%	5.9%	3.4%	2.3%	20.9%	23,773
1997	9.5%	5.2%	3.5%	2.2%	20.5%	24,126
1998	9.3%	5.0%	3.0%	2.2%	19.5%	24,461
1999	9.6%	5.3%	2.9%	2.2%	20.0%	25,760
2000	9.8%	5.6%	2.8%	2.1%	20.4%	26,071
2001	9.3%	4.6%	2.8%	2.2%	18.9%	25,741
2002	8.5%	4.7%	2.9%	2.1%	18.3%	26,329
2003	8.5%	4.0%	2.6%	2.2%	17.3%	26,509
2004	9.1%	4.8%	2.5%	2.3%	18.6%	26,965
2005	9.3%	5.0%	2.5%	2.2%	19.0%	27,373
2006	9.1%	5.2%	2.5%	2.3%	19.1%	27,546
2007	8.7%	5.3%	2.5%	2.1%	18.6%	29,004
2008	8.4%	5.1%	2.6%	2.1%	18.2%	28,365
2009	7.9%	4.9%	2.9%	1.8%	17.5%	26,878
2010	8.0%	5.4%	2.9%	2.0%	18.2%	26,949
2011	8.2%	5.2%	3.0%	2.1%	18.5%	26,357
2012	8.0%	4.4%	3.2%	2.1%	17.8%	25,966
2013	7.9%	3.9%	3.6%	2.2%	17.6%	25,868
2014	7.9%	3.4%	3.1%	2.3%	16.7%	25,949
2015	8.1%	3.9%	3.0%	2.2%	17.1%	26,084
2016	8.2%	4.2%	3.0%	2.0%	17.4%	26,485
2017	8.4%	4.3%	3.1%	2.0%	17.8%	26,593
2018	8.8%	4.2%	3.7%	2.1%	18.7%	26,826
2019	8.9%	3.8%	4.0%	2.0%	18.7%	26,760
2020	6.4%	3.5%	4.9%	2.0%	16.9%	23,198
2021	7.9%	3.3%	4.9%	1.9%	17.9%	25,530
2022	9.0%	3.3%	5.4%	1.9%	19.5%	25,767
2023	9.4%	3.1%	5.3%	1.8%	19.6%	26,102

Source:
See Appendix A, Section 2.3. Nonhighway Energy Use.

[a] Only end-use energy was counted for electricity. Before Edition 36, primary energy use (which included generation and distribution losses) was shown in this table.

These data include ALL international and domestic certificated route air carrier statistics; therefore, the data are different than those in Chapter 2. Travel effects from the pandemic are evident for 2020, but revenue aircraft-miles, revenue passenger-miles, and available seat-miles rebounded to all-time highs in 2024.

Table 9.2
Summary Statistics for U.S. Domestic and International Certificated Route Air Carriers (Combined Totals), 1970–2024[a]

Year	Revenue aircraft-miles (millions)	Revenue passenger-miles (millions)	Available seat-miles (millions)	Available seats per aircraft[b]	Passenger load factor (percentage)[c]	Revenue cargo ton-miles (millions)	Energy use (trillion Btu)[d]
1970	2,542	148,137	264,904	104	55.9%	3,755	1,363.4
1975	2,241	173,324	315,823	141	54.9%	5,062	1,283.4
1980	2,924	267,722	448,479	153	59.7%	7,885	1,386.0
1985	3,462	351,073	565,677	163	62.1%	9,048	1,701.4
1990	4,724	472,236	753,211	159	62.7%	16,403	2,180.2
1995	5,627	558,794	832,081	148	67.2%	23,375	2,338.6
2000	6,946	708,926	981,080	141	72.3%	30,221	2,750.4
2001	6,814	664,849	950,519	139	69.9%	27,882	2,592.5
2002	6,834	655,215	913,898	134	71.7%	30,507	2,430.1
2003	7,367	674,160	922,440	125	73.1%	32,446	2,470.6
2004	7,479	752,341	1,000,193	134	75.2%	37,958	2,657.2
2005	7,716	795,117	1,029,316	133	77.2%	39,286	2,693.3
2006	8,220	810,086	1,027,526	125	78.8%	38,251	2,661.1
2007	8,415	842,007	1,060,093	126	79.4%	38,433	2,684.6
2008	8,142	823,783	1,040,840	128	79.1%	35,227	2,547.8
2009	7,534	779,997	975,307	129	80.0%	30,317	2,303.2
2010	7,666	809,051	991,934	129	81.6%	35,209	2,335.3
2011	7,783	825,916	1,012,597	130	81.6%	35,713	2,370.3
2012	7,727	832,733	1,012,261	131	82.3%	34,937	2,287.7
2013	7,725	848,000	1,025,616	133	82.7%	33,561	2,271.3
2014	7,740	869,677	1,048,107	135	83.0%	34,471	2,265.3
2015	7,877	908,795	1,090,185	138	83.4%	35,011	2,342.1
2016	8,077	939,240	1,131,983	140	83.0%	35,920	2,385.2
2017	8,223	969,904	1,168,055	142	83.0%	39,867	2,433.9
2018	8,545	1,016,994	1,220,539	143	83.3%	42,629	2,531.2
2019	8,763	1,061,005	1,259,515	144	84.2%	42,220	2,592.6
2020	5,324	383,919	659,885	124	58.2%	45,366	1,549.9
2021	7,097	692,554	945,209	133	73.3%	51,389	2,042.5
2022	7,999	953,015	1,153,773	144	82.6%	50,039	2,421.2
2023	8,584	1,083,401	1,306,598	152	82.9%	47,347	2,662.4
2024	8,929	1,134,122	1,366,036	153	83.0%	48,388	2,745.7
			Average annual percentage change				
1970-2024	2.4%	3.8%	3.1%	0.7%	0.7%	4.8%	1.3%
2014-2024	1.4%	2.7%	2.7%	1.2%	0.0%	3.4%	1.9%

Sources:
U.S. Department of Transportation, Bureau of Transportation Statistics, 2025, www.transtats.bts.gov. (Additional resources: www.bts.gov)
1970–76 Energy Use – U.S. Department of Transportation, Civil Aeronautics Board, *Fuel Cost and Consumption*, Washington, DC, 1981, and previous editions.

[a] Data are for all U.S. air carriers reporting on Form 41.
[b] Available seats per aircraft are calculated as the ratio of available seat-miles to revenue aircraft-miles.
[c] Passenger load factor is calculated as the ratio of revenue passenger-miles to available seat-miles for scheduled and nonscheduled services.
[d] Energy use includes fuel purchased abroad for international flights.

General aviation includes: (1) aircraft operating under general operating and flight rules; (2) not-for-hire airplanes with a seating capacity of 20 or more or a maximum payload capacity of 6,000 lb or more; (3) rotorcraft external load operations; (4) on-demand and commuter operations not covered under Federal Aviation Regulations Part 121; and (5) agricultural aircraft operations.

Table 9.3
Summary Statistics for General Aviation, 1970–2023

Calendar year	Total number of aircraft	Aircraft hours flown (thousands)	Energy use (trillion Btu)
1970	131,700[a]	26,030[b]	94.3
1975	168,475	30,298	110.7
1980	211,045	41,016	165.9
1985	196,500	31,456	143.9
1990	198,000	32,096	131.8
1995	188,089	26,612	106.6
2000	217,533	29,960	175.2
2001	211,446	27,017	165.1
2002	211,244	27,040	141.5
2003	209,708	27,329	141.4
2004	219,426	28,126	175.9
2005	224,352	26,982	242.4
2006	221,943	27,705	256.3
2007	231,607	27,852	243.6
2008	228,663	26,009	265.7
2009	223,877	23,763	210.3
2010	223,370	24,802	221.2
2011	220,770	24,570	227.1
2012	209,034	24,403	228.8
2013	199,927	22,876	203.6
2014	204,408	23,271	221.0
2015	210,030	24,142	208.9
2016	211,793	24,833	217.8
2017	211,757	25,212	232.2
2018	211,749	25,506	272.8
2019	210,981	25,566	227.1
2020	204,138	22,492	204.9
2021	209,195	26,441	284.2
2022	209,540	26,953	303.8
2023	214,222	28,563	269.4
	Average annual percentage change		
1970-2023	0.9%	0.2%	2.0%
2013-2023	0.7%	2.2%	2.8%

Sources:
U.S. Department of Transportation, Federal Aviation Administration, *General Aviation Part 135 Activity Surveys, CY 2023,* Tables 1.1, 1.4, 5.1, 2025, and previous editions. 2011 Data: *Aviation Forecasts*, Tables 28 and 29, May 2013. (Additional resources: https://www.faa.gov/data_research/aviation_data_statistics/general_aviation)

[a] Active fixed-wing general aviation aircraft only.
[b] Includes rotorcraft.

In the early seventies, domestic waterborne commerce accounted for over 60% of total tonnage, between 1990 and 1995 foreign tonnage grew to more than half all waterborne tonnage and 2023 accounted for more than two-thirds. Total foreign and domestic tons shipped reached a peak of 2.59 billion tons in 2006; in 2023 it was 2.38 billion tons.

Table 9.4
Tonnage Statistics for Domestic and International Waterborne Commerce, 1970–2023
(million tons shipped)

Year	Foreign and domestic total	Foreign total[a]	Domestic total[b]	Percent domestic of total
1970	1,532	581	951	62.1%
1975	1,695	749	946	55.8%
1980	1,999	921	1,077	53.9%
1985	1,788	774	1,014	56.7%
1990	2,164	1,042	1,122	51.8%
1995	2,240	1,147	1,093	48.8%
2000	2,425	1,355	1,070	44.1%
2001	2,393	1,351	1,042	43.5%
2002	2,340	1,319	1,021	43.6%
2003	2,394	1,378	1,016	42.4%
2004	2,552	1,505	1,050	41.0%
2005	2,527	1,499	1,029	40.7%
2006	2,588	1,565	1,028	39.5%
2007	2,564	1,543	1,022	39.9%
2008	2,477	1,521	956	38.6%
2009	2,211	1,354	858	38.8%
2010	2,335	1,441	894	38.3%
2011	2,368	1,480	892	37.5%
2012	2,307	1,422	890	38.4%
2013	2,274	1,383	891	39.2%
2014	2,346	1,409	937	39.9%
2015	2,279	1,374	905	39.7%
2016	2,292	1,415	877	38.3%
2017	2,385	1,512	873	36.6%
2018	2,438	1,589	849	34.8%
2019	2,361	1,543	818	34.6%
2020	2,226	1,483	743	33.4%
2021	2,347	1,587	760	32.4%
2022	2,363	1,603	760	32.1%
2023	2,379	1,635	745	31.3%
		Average annual percentage change		
1970-2023	0.8%	2.0%	-0.5%	
2013-2023	0.4%	1.7%	-1.8%	

Source:
1970-2016—U.S. Department of the Army, Corps of Engineers, Waterborne Commerce of the United States, Calendar Year 2016, Part 5—National Summaries, 2017, Table 1-1.
(Additional resources: https://www.iwr.usace.army.mil/About/Technical-Centers/WCSC-Waterborne-Commerce-Statistics-Center/)
2017-23—U.S. Department of the Army, Corps of Engineers, The U.S. Waterway System, 2023 Transportation Facts and Information, New Orleans, LA, March 2025, and previous editions.

[a] All movements between the United States and foreign countries and between Puerto Rico and the Virgin Islands and foreign countries are classified as foreign trade.

[b] All movements between U.S. ports, continental and noncontiguous, and on the inland rivers, canals, and connecting channels of the United States, Puerto Rico, and the Virgin Islands, excluding the Panama Canal. Beginning in 1996, fish was excluded for internal and intra-port domestic traffic.

The U.S. Army Corps of Engineers Navigation Data Center collects a wealth of waterborne commerce data. Energy use data, however, have never been collected as part of this effort. The average length of haul in domestic waterborne commerce was 578 miles in 2023.

Table 9.5
Summary Statistics for Domestic Waterborne Commerce, 1970–2023

Year	Number of vessels[a]	Ton-miles (billions)	Tons shipped[b] (millions)	Average length of haul (miles)
1970	25,832	596	949	628.2
1975	31,666	566	944	599.9
1980	38,792	922	1,074	856.4
1985	41,672	893	1,011	883.5
1990	41,119	834	1,118	745.7
1995	36,860	808	1,086	743.6
2000	40,665	646	1,064	606.8
2005	41,354	591	1,025	577.3
2006	40,104	563	1,022	551.3
2007	40,695	553	1,016	544.2
2008	40,301	521	952	546.7
2009	40,109	477	853	559.7
2010	39,883	502	889	565.0
2011	40,545	500	888	562.4
2012	40,530	475	888	535.0
2013	39,999	465	890	522.6
2014	40,381	505	936	539.1
2015	40,791	491	903	543.2
2016	42,674	478	875	546.1
2017	42,539	489	873	560.1
2018	42,138	492	849	579.5
2019	43,254	456	818	557.7
2020	44,500	439	743	591.8
2021	44,755	449	760	590.9
2022	45,459	459	760	605.0
2023	45,740	429	744	577.7
		Average annual percentage change		
1970-2023	1.1%	-0.6%	-0.5%	-0.2%
2013-2023	1.4%	-0.8%	-1.8%	1.0%

Sources:

Number of vessels 1970–92, 1995–2023 – U.S. Department of the Army, Corps of Engineers, Waterborne Transportation Lines of the United States, 2025, New Orleans, LA, 2018, Table 2 and previous editions. 1993–94 – U.S. Department of the Army, Corps of Engineers, The U.S. Waterway System-Facts, Navigation Data Center, New Orleans, Louisiana, January 1996, and previous editions.

Ton-miles, tons shipped, average length of haul. 1970-2016 – U.S. Department of the Army, Corps of Engineers, Waterborne Commerce of the United States, Calendar Year 2016, Part 5: National Summaries, New Orleans, LA, 2017, Table 1-4 and previous editions. 2017-23 – U.S. Department of the Army, Corps of Engineers, The U.S. Waterway System, 2023 Transportation Facts and Information, New Orleans, LA, 2025 and previous editions.

(Additional resources: https://www.iwr.usace.army.mil/About/Technical-Centers/WCSC-Waterborne-Commerce-Statistics-Center)

[a] Grand total for self-propelled and non-self-propelled.

[b] These figures are not consistent with the figures on Table 9.4 because intra-territory tons are not included in this table. Intra-territory traffic is between ports in Puerto Rico and the Virgin Islands.

The data displayed in this table come from 1970 to 1998 and are from the Environmental Protection Agency's MOVES2014a model. From 1999-2018, the data are from the updated MOVES2014b model. From 2019-2023 the data are from MOVES4.0.1 model.

Table 9.6
Recreational Boat Energy Use, 1970–2023

Year	Number of boats (thousands)	Diesel fuel	Gasoline	Total energy use
		(trillion Btu)		
1970	10,087	5.5	151.7	157.2
1975	10,337	10.7	156.4	167.1
1980	10,587	16.0	161.2	177.1
1985	10,837	21.2	165.9	187.1
1986	10,887	22.2	166.9	189.1
1987	10,937	23.3	167.8	191.1
1988	11,030	24.3	170.4	194.7
1989	11,122	25.4	172.9	198.3
1990	11,215	26.4	175.4	201.8
1991	11,327	27.5	178.7	206.2
1992	11,440	28.5	182.0	210.5
1993	11,553	29.5	185.3	214.8
1994	11,770	30.6	192.5	223.1
1995	11,988	31.6	199.7	231.3
1996	12,206	32.7	206.8	239.5
1997	12,244	33.7	207.2	240.9
1998	12,283	34.8	207.4	242.2
1999	12,358	38.0	207.6	245.6
2000	12,405	38.0	207.3	245.3
2001	12,465	38.1	207.1	245.2
2002	12,513	38.2	206.1	244.3
2003	12,573	38.3	204.9	243.2
2004	12,584	38.3	202.6	240.9
2005	12,777	38.7	202.7	241.5
2006	12,704	38.5	199.1	237.6
2007	12,776	38.7	197.6	236.3
2008	12,547	38.0	191.9	229.9
2009	12,583	38.1	190.0	228.1
2010	12,293	37.2	183.4	220.6
2011	12,064	36.6	177.7	214.2
2012	11,967	36.2	173.9	210.2
2013	11,907	36.0	171.0	207.0
2014	11,810	35.8	167.7	203.5
2015	11,978	37.6	168.0	205.6
2016	12,202	39.0	169.3	208.3
2017	12,397	39.9	170.4	210.3
2018	12,569	40.7	171.4	212.1
2019	12,692	41.4	171.9	213.3
2020	12,804	42.1	172.3	214.5
2021	12,903	42.8	172.8	215.5
2022	12,991	43.4	173.2	216.6
2023	13,079	44.2	173.7	217.9
		Average annual percentage change		
1970-2023	0.5%	4.0%	0.3%	0.6%
2013-2023	0.9%	2.1%	0.2%	0.5%

Sources:
1970-1998: U.S. Environmental Protection Agency, MOVES2014a model, 1998.
1999-2018: U.S. Environmental Protection Agency, MOVES2014b model, 2018
2019-2023: U.S. Environmental Protection Agency, MOVES4.0.1 model, 2025, www.epa.gov/moves

The Surface Transportation Board designates Class I railroads based on annual gross revenues. In 2023, seven railroads were given this designation. The number of railroads designated as Class I has changed considerably since 1976, when 52 railroads were designated Class 1.

Table 9.7
Class I Railroad Freight Systems in the United States
Ranked by Revenue Ton-Miles, 2023

Railroad	Revenue ton-miles (billions)	Percent
BNSF Railway Company	578.1	38.7%
Union Pacific Railroad Company	413.3	27.7%
CSX Transportation	196.4	13.2%
Norfolk Southern Railway	176	11.8%
Grand Trunk Corporation	57.1	3.8%
Soo Line Corporation	36.4	2.4%
Kansas City Southern Railway Company	35.9	2.4%
Total	**1,493**	**100.0%**

Source:
Association of American Railroads, Railroad Facts, 2024 Edition, Washington, DC, 2025, p. 64.
(Additional resources: www.aar.org)

Revenue ton-miles for Class I freight railroads were nearly 1.5 trillion in 2023. Though there are many regional and local freight railroads, the Class I freight railroads accounted for 93% of the railroad industry's freight revenue in 2023 and 67% of the industry's mileage operated. The energy intensity of Class I railroads hit an all-time low of 282 Btu/ton-mile in 2021.

Table 9.8
Summary Statistics for Class I Freight Railroads, 1970–2023

Year	Number of locomotives in service[a]	Number of freight cars (thousands)[b]	Train-miles (millions)	Car-miles (millions)	Tons originated[c] (millions)	Average length of haul (miles)	Revenue ton-miles (millions)	Energy intensity (Btu/ton-mile)	Energy use (trillion Btu)
1970	27,077[d]	1,424	427	29,890	1,485	515	764,809	691	528.1
1975	27,846	1,359	403	27,656	1,395	541	754,252	687	518.3
1980	28,094	1,168	428	29,277	1,492	616	918,958	597	548.7
1985	22,548	867	347	24,920	1,320	665	876,984	497	436.1
1990	18,835	659	380	26,159	1,425	726	1,033,969	420	434.7
1991	18,344	633	375	25,628	1,383	751	1,038,875	391	405.8
1992	18,004	605	390	26,128	1,399	763	1,066,781	393	419.2
1993	18,161	587	405	26,883	1,397	794	1,109,309	389	431.6
1994	18,505	591	441	28,485	1,470	817	1,200,701	388	465.4
1995	18,812	583	458	30,383	1,550	843	1,305,688	372	485.9
1996	19,269	571	469	31,715	1,611	842	1,355,975	368	499.4
1997	19,684	568	475	31,660	1,585	851	1,348,926	370	499.7
1998	20,261	576	475	32,657	1,649	835	1,376,802	365	502.0
1999	20,256	579	490	33,851	1,717	835	1,433,461	363	520.0
2000	20,028	560	504	34,590	1,738	843	1,465,960	352	516.0
2001	19,745	500	500	34,243	1,742	859	1,495,472	346	517.3
2002	20,506	478	500	34,680	1,767	853	1,507,011	345	520.3
2003	20,774	467	516	35,555	1,799	862	1,551,438	344	533.9
2004	22,015	474	535	37,071	1,844	902	1,662,598	341	566.2
2005	22,779	475	548	37,712	1,899	894	1,696,425	337	571.4
2006	23,732	475	563	38,995	1,957	906	1,771,897	330	584.5
2007	24,143	460	543	38,186	1,940	913	1,770,545	320	566.9
2008	24,003	450	524	37,226	1,934	919	1,777,236	305	542.5
2009	24,045	416	436	32,115	1,668	919	1,532,214	291	446.6
2010	23,893	398	476	35,541	1,851	914	1,691,004	289	488.1
2011	24,250	381	493	36,649	1,885	917	1,729,256	298	514.6
2012	24,707	381	500	36,525	1,760	973	1,712,567	294	504.0
2013	25,033	374	504	35,253	1,758	990	1,740,687	296	514.9
2014	25,916	372	518	37,193	1,840	1,006	1,851,229	292	540.5
2015	26,574	331	495	35,853	1,740	1,020	1,738,283	297	516.4
2016	26,716	315	453	32,572	1,554	1,021	1,585,440	299	474.2
2017	26,547	306	465	34,065	1,622	1,033	1,674,784	293	490.5
2018	26,086	294	477	35,018	1,653	1,046	1,729,638	296	512.8
2019	24,597	270	445	33,242	1,565	1,032	1,614,498	298	480.4
2020	23,544	252	380	29,364	1,389	1,037	1,439,814	289	416.2
2021	23,264	243	378	30,979	1,470	1,043	1,533,869	282	432.5
2022	23,184	252	378	30,886	1,459	1,051	1,533,416	284	436.1
2023	23,156	258	382	30,544	1,450	1,030	1,493,305	286	427.8
				Average annual percentage change					
1970-2023	-0.3%	-3.2%	-0.2%	0.0%	0.0%	1.3%	1.3%	-1.6%	-0.4%
2013-2023	-0.8%	-3.6%	-2.7%	-1.4%	-1.9%	0.4%	-1.5%	-0.3%	-1.8%

Source:
Association of American Railroads, Railroad Facts, 2024 Edition, Washington, DC, 2025, pp. 30, 31, 36, 37, 39, 50, and 65. (Additional resources: www.aar.org)

[a] Does not include self-powered units.
[b] Does not include private or shipper-owned cars. Beginning in 2001, Canadian-owned U.S. railroads are excluded.
[c] Tons originated is a more accurate representation of total tonnage than revenue tons. Revenue tons often produce double counting of loads switched between rail companies.
[d] Data represents total locomotives used in freight and passenger service. Separate estimates are not available.

Containerization has increased in the last two decades, evidenced by the 27% increase in the number of containers from 2003 to 2023. The number of trailers moved by rail declined to under one million in 2022 and continued to decline in 2023. With trailers on flatcars, the undercarriage and wheels add non-revenue weight to the haul and take up space, thus making containers more efficient.

Table 9.9
Intermodal Rail Traffic, 1965–2023[a]

Year	Trailers & containers	Trailers	Containers
1965	1,664,929	[b]	[b]
1970	2,363,200	[b]	[b]
1975	2,238,117	[b]	[b]
1980	3,059,402	[b]	[b]
1985	4,590,952	[b]	[b]
1990	6,206,782	3,451,953	2,754,829
1991	6,246,134	3,201,560	3,044,574
1992	6,627,841	3,264,597	3,363,244
1993	7,156,628	3,464,126	3,692,502
1994	8,128,228	3,752,502	4,375,726
1995	7,936,172	3,492,463	4,443,709
1996	8,143,258	3,302,128	4,841,130
1997	8,698,308	3,453,907	5,244,401
1998	8,772,663	3,353,032	5,419,631
1999	8,907,626	3,207,407	5,700,219
2000	9,176,890	2,888,630	6,288,260
2001	8,935,444	2,603,423	6,332,021
2002	9,312,360	2,531,338	6,781,022
2003	9,955,605	2,625,837	7,329,768
2004	10,993,662	2,928,123	8,065,539
2005	11,693,512	2,979,906	8,713,606
2006	12,282,221	2,882,699	9,399,522
2007	12,026,631	2,600,635	9,425,996
2008	11,499,978	2,478,890	9,021,088
2009	9,875,967	1,639,603	8,236,364
2010	10,992,794	1,565,495	9,427,299
2011	11,586,805	1,581,138	10,005,667
2012	11,953,437	1,407,669	10,545,768
2013	12,485,610	1,377,095	11,108,515
2014	13,112,670	1,413,282	11,699,388
2015	13,304,652	1,340,681	11,963,971
2016	13,103,165	1,060,247	12,042,918
2017	13,622,740	1,136,562	12,486,178
2018	14,361,474	1,306,422	13,055,052
2019	13,617,836	1,106,701	12,511,135
2020	13,342,275	1,065,072	12,277,203
2021	14,014,261	1,098,673	12,915,588
2022	13,324,519	839,662	12,484,857
2023	12,667,518	639,248	12,028,270
	Average annual percentage change		
1965–2023	3.6%	[b]	[b]
2013–2023	-0.1%	-8.1%	0.6%

Source:
Association of American Railroads, *Railroad Facts*, *2024 Edition*, Washington, DC, 2025, p. 29. (Additional resources: www.aar.org)

[a] Beginning in 1995, the Grand Trunk Western Railroad and the Soo Line Railroad Company are excluded. Beginning in 1999, the Illinois Central data are excluded. Beginning in 2002, the Wisconsin Central data are excluded.
[b] Data are not available.

The National Railroad Passenger Corporation, known as Amtrak, began operation in 1971. The travel effects of the pandemic are evident in the 2020 revenue passenger-miles. But overall, revenue passenger miles have grown at an average annual rate of 2.2% from 1971 to 2023.

Table 9.10
Summary Statistics for the National Railroad Passenger Corporation (Amtrak), 1971–2023

Year	Number of locomotives in service	Number of passenger cars	Train-miles (thousands)	Car-miles (thousands)	Revenue passenger-miles (millions)	Average trip length (miles)	Energy intensity (Btu per revenue passenger-mile)	Energy use (trillion Btu) [a]
1971	[b]	1,165	16,537	140,147	1,993	188	[b]	[b]
1975	355	1,913	30,166	253,898	3,753	224	3,311	12.4
1980	448	2,128	29,487	235,235	4,503	217	2,859	12.9
1985	382	1,818	30,038	250,642	4,785	238	2,237	10.7
1990	318	1,863	33,000	300,996	6,057	273	2,052	12.4
1995	422	1,907	31,579	282,579	5,401	266	2,071	11.2
2000	385	1,891	35,404	371,215	5,574	243	2,651	14.8
2005	258	1,186	36,199	264,796	5,381	215	2,025	10.9
2006	319	1,191	36,083	263,908	5,410	220	1,948	10.5
2007	270	1,164	37,484	266,545	5,784	218	1,824	10.5
2008	278	1,177	37,736	271,762	6,179	215	1,745	10.8
2009	274	1,214	38,300	282,764	5,914	217	1,773	10.5
2010	282	1,274	37,453	294,820	6,420	220	1,668	10.7
2011	287	1,301	37,090	296,315	6,670	213	1,628	10.7
2012	485	2,090	37,640	319,088	6,804	218	1,561	10.6
2013	418	1,447	38,410	324,949	6,810	218	1,608	11.0
2014	428	1,419	38,013	324,683	6,675	218	1,629	10.9
2015	423	1,428	37,798	319,464	6,536	218	1,589	10.4
2016	434	1,402	37,808	316,384	6,520	208	1,551	10.1
2017	419	1,405	37,859	316,148	6,563	205	1,524	10.0
2018	431	1,403	37,825	272,540	6,363	200	1,579	10.0
2019	403	1,415	38,205	278,889	6,479	198	1,506	9.8
2020	384	1,313	26,867	184,680	2,232	220	3,074	6.9
2021	395	1,443	28,228	157,481	3,624	228	1,989	7.2
2022	391	1,344	32,800	174,777	5,106	209	1,641	8.4
2023	413	1,353	36,900	199,333	6,056	203	1,556	9.4
			Average annual percentage change					
1971-2023	[b]	0.3%	1.6%	0.7%	2.2%	0.1%	[b]	[b]
2013-2023	-0.1%	-0.7%	-0.4%	-4.8%	-1.2%	-0.7%	-0.3%	-1.5%

Sources:
1971–83 – Association of American Railroads, Economics and Finance Department, *Statistics of Class I Railroads*, Washington, DC, and previous editions.
1984–88 – Association of American Railroads, *Railroad Facts*, 1988 Edition, Washington, DC, December 1989, p. 61, and previous editions.
1989–93 – Personal communication with the Corporate Accounting Office of Amtrak, Washington, DC, annually.
1994–2023 - Association of American Railroads, *Railroad Facts*, *2024 Edition*, Washington, DC, 2025 and previous editions.
Energy use - 1973-2019 - Personal communication with Amtrak, Washington, DC. 2020-2023 - Estimated by ORNL.

[a] Only end-use energy was counted for electricity. Previous editions included primary energy use for electricity which included generation and distribution losses.
[b] Data are not available.

TRANSPORTATION & THE ECONOMY

Chapter 10



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Adjusting Dollar Amounts for Inflation

A dollar spent in 1970 does not have the purchasing power of a dollar spent in 2024 due to the inflation of prices for all goods and services. Thus, prices in a historical series must be adjusted to provide proper comparison. The term "current dollars" is used in this report for dollar amounts that were current as of the year listed – this can also be referred to as "nominal dollars." The term "constant 2024 dollars" is used in this report for dollar amounts that have been adjusted to a constant purchasing power (2024, in this example) and thus the data are comparable historically – this can also be referred to as "real dollars."

Appendix B, Table B.15 contains the Consumer Price Inflation Index and Table B.16 contains the Gross National Product Implicit Price Deflator since 1970. Tables in the report with constant dollars have a footnote indicating which of these inflation adjustment indices were used.

The Transportation Services Index (TSI) was created by the U.S. Department of Transportation Bureau of Transportation Statistics (BTS). It is an index that measures the movement of freight and passengers.

The Freight TSI consists of:

- *for-hire trucking (parcel services are not included);*
- *freight railroad services (including rail-based intermodal shipments such as containers on flat cars);*
- *inland waterway traffic;*
- *pipeline movements (including principally petroleum and petroleum products and natural gas); and*
- *air freight.*

The index does not include international or coastal steamship movements, private trucking, courier services, or the United States Postal Services.

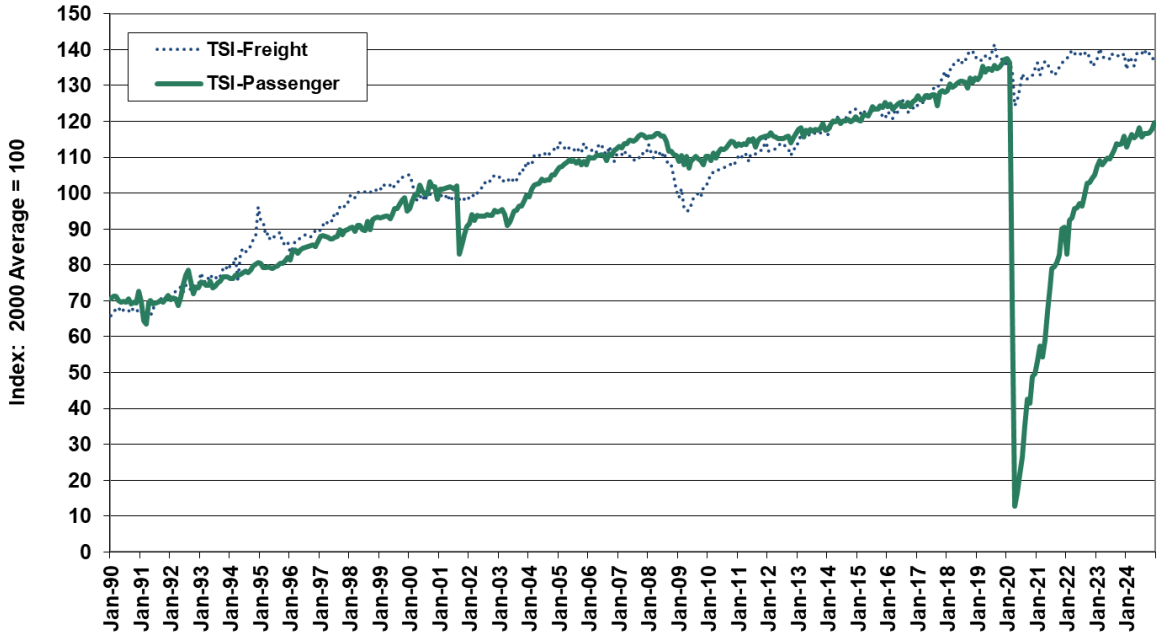
The Passenger TSI consists of:

- *local mass transit;*
- *intercity passenger rail; and*
- *passenger air transportation.*

The index does not include intercity bus, sightseeing services, taxi service, private car usage, or bicycling and other nonmotorized means of transportation.

The sharp travel declines in March and April 2020 were due to the COVID-19 pandemic.

Figure 10.1 Transportation Services Index, January 1990–December 2024



Source:
U.S. Department of Transportation, Bureau of Transportation Statistics, Transportation Services Index website, 2025, www.transtats.bts.gov/OSEA/TSI. (Additional resources: www.bts.gov)

Table 10.1
Average Annual Expenditures of Households by Income, 2023[a]

	All households	Income before taxes: Less than $15,000	$15,000–$29,999	$30,000–$39,999	$40,000–$49,999
Total expenditures	$77,280	$32,081	$35,587	$47,027	$50,204
	Percentage of total expenditures[b]				
Food[c]	13.7%	18.4%	15.2%	14.9%	15.2%
Housing	32.9%	40.3%	41.6%	39.0%	37.7%
Apparel and services	2.6%	3.2%	2.6%	2.6%	2.4%
Transportation	17.0%	15.3%	14.1%	16.5%	16.5%
Vehicle purchases (net outlay)	**7.2%**	**6.0%**	**3.8%**	**5.6%**	**5.4%**
Gasoline and motor oil	**3.5%**	**3.6%**	**4.2%**	**4.2%**	**4.5%**
Other vehicle expenditures	**5.0%**	**4.4%**	**5.3%**	**5.6%**	**5.5%**
Public transportation	**1.4%**	**2.4%**	**2.8%**	**2.9%**	**2.8%**
Health care	8.0%	8.4%	11.9%	9.5%	10.2%
Entertainment	4.7%	4.1%	4.3%	5.3%	4.2%
Personal Insurance & pensions	12.4%	1.4%	2.7%	4.3%	5.8%
Others[d]	8.6%	5.5%	7.7%	7.0%	6.5%
Households[e] (thousands)	134,556	11,492	17,114	11,137	9,814
Percentage of households	100.0%	8.5%	12.7%	8.3%	7.3%
Average number of vehicles in HH	1.9	0.8	1.2	1.5	1.6

	Income before taxes: $50,000–$69,999	$70,000–$99,999	$100,000–$149,999	$150,000–$199,999	$200,000 and over
Total expenditures	$51,285	$63,592	$83,050	$100,484	$145,402
	Percentage of total expenditures[b]				
Food[c]	14.7%	14.2%	14.1%	14.1%	11.5%
Housing	35.6%	34.0%	31.3%	29.3%	29.2%
Apparel and services	2.3%	2.9%	2.7%	2.6%	2.7%
Transportation	17.6%	17.6%	18.4%	17.9%	16.2%
Vehicle purchases (net outlay)	**6.3%**	**6.9%**	**8.0%**	**8.1%**	**8.1%**
Gasoline and motor oil	**4.3%**	**4.1%**	**3.7%**	**3.2%**	**2.3%**
Other vehicle expenditures	**5.7%**	**5.4%**	**5.5%**	**4.9%**	**3.8%**
Public transportation	**1.2%**	**1.2%**	**1.1%**	**1.8%**	**1.9%**
Health care	9.2%	8.4%	8.0%	6.8%	6.1%
Entertainment	3.9%	4.4%	4.4%	5.0%	5.4%
Personal Insurance & pensions	7.6%	10.6%	13.8%	15.9%	18.6%
Others[d]	9.2%	7.8%	7.3%	4.9%	10.3%
Households[e] (thousands)	17,068	18,939	22,396	11,237	15,359
Percentage of households	12.7%	14.1%	16.6%	8.4%	11.4%
Average number of vehicles in HH	1.8	2.0	2.3	2.6	2.7

Source:
U.S. Department of Labor, Bureau of Labor Statistics, Consumer Expenditure Survey, www.bls.gov/cex, May 2025.
(Additional resources: www.bls.gov)

[a] Public assistance monies are included in reported income. Data for those reporting incomes.
[b] Percentages may not sum to totals due to rounding.
[c] Includes alcoholic beverages.
[d] Includes personal care, reading, education, tobacco and smoking supplies, cash contributions, and miscellaneous items.
[e] The term household refers to a "consumer unit," which is defined differently than households on Table 8.1.

The South had the lowest dollar amount for average annual expenditures ($68,364) in 2023, but the highest share of transportation expenditures (17.9%). The West had an average of 2.1 vehicles per household, the highest of all U.S. regions. Overall, 17% of U.S. household expenditures were for transportation in 2023.

Table 10.2
Average Annual Expenditures of Households by Region, 2023[a]

	Northeast	Midwest	South	West	Total U.S.
Total expenditures	$87,445	$72,575	$68,364	$89,510	$77,280
	Percentage of total expenditures[b]				
Food[c]	13.7%	14.1%	13.7%	13.5%	13.7%
Housing	32.9%	34.2%	30.5%	32.7%	32.9%
Apparel and services	2.5%	2.6%	2.6%	2.8%	2.6%
Transportation	15.9%	17.2%	17.9%	16.6%	17.0%
Vehicle purchases (net outlay)	6.6%	7.4%	7.7%	6.8%	7.2%
Gasoline and motor oil	2.6%	3.6%	3.9%	3.6%	3.5%
Other vehicle expenditures	4.6%	5.1%	5.2%	4.8%	5.0%
Public transportation	2.1%	1.1%	1.1%	1.5%	1.4%
Health care	7.4%	9.1%	8.2%	7.2%	8.0%
Entertainment	4.5%	5.4%	4.5%	4.7%	4.7%
Personal Insurance & pensions	12.7%	12.8%	12.0%	12.2%	12.4%
Others[d]	9.2%	8.3%	8.4%	8.8%	8.6%
Households[e] (thousands)	23,217	28,204	53,043	30,091	134,556
Percentage of households	17.3%	21.0%	39.4%	22.4%	100.0%
Average number of vehicles in HH	1.7	2.0	1.8	2.1	1.9

Source:
U.S. Department of Labor, Bureau of Labor Statistics, Consumer Expenditure Survey, www.bls.gov/cex, May 2025.
(Additional resources: www.bls.gov)

[a] Public assistance monies are included in reported income. Data for those reporting incomes.
[b] Percentages may not sum to totals due to rounding.
[c] Includes alcoholic beverages.
[d] Includes personal care, reading, education, tobacco and smoking supplies, cash contributions, and miscellaneous items.
[e] The term household refers to a "consumer unit," which is defined differently than households on Table 8.1.

The average amount of money that a household spends in a year has grown about 14% between 1985 and 2023 in constant dollar terms. Expenditures on transportation were 17% and vehicle purchases were 42% of transportation expenditures in 2023.

Table 10.3
Annual Household Expenditures for Transportation, 1985-2023
(constant 2023 dollars[a])

	Transportation expenditures					Average annual household expenditures	Transportation share of annual expenditures
Year	Vehicle purchases	Gas & Oil	Other vehicle expenses[b]	Public transportation	Total transportation		
1985	5,842	2,962	3,613	750	13,165	67,895	19.4%
1990	5,061	2,457	3,889	706	12,113	67,752	17.9%
1991	4,819	2,233	3,973	689	11,712	68,204	17.2%
1992	4,706	2,113	3,922	623	11,363	66,298	17.1%
1993	4,879	2,060	3,981	671	11,589	66,288	17.5%
1994	5,557	2,035	4,089	808	12,492	67,314	18.6%
1995	5,350	2,027	4,125	734	12,238	67,172	18.2%
1996	5,675	2,148	4,170	831	12,821	69,118	18.5%
1997	5,422	2,107	4,389	740	12,661	68,622	18.5%
1998	5,688	1,925	4,271	798	12,683	69,652	18.2%
1999	6,231	1,959	4,271	746	13,209	71,590	18.5%
2000	6,133	2,329	4,149	780	13,391	71,200	18.8%
2001	6,500	2,219	4,210	697	13,625	71,220	19.1%
2002	6,399	2,121	4,319	684	13,523	72,080	18.8%
2003	6,410	2,241	4,001	662	13,316	70,780	18.8%
2004	5,479	2,578	3,815	711	12,583	69,998	18.0%
2005	5,529	3,141	3,649	699	13,018	72,406	18.0%
2006	5,171	3,366	3,559	763	12,859	73,150	17.6%
2007	4,767	3,503	3,809	791	12,870	72,946	17.6%
2008	3,899	3,842	3,709	726	12,177	71,449	17.0%
2009	3,774	2,821	3,602	680	10,876	69,689	15.6%
2010	3,616	2,979	3,443	689	10,728	67,225	16.0%
2011	3,615	3,596	3,324	699	11,234	67,330	16.7%
2012	4,260	3,658	3,305	719	11,942	68,270	17.5%
2013	4,278	3,415	3,380	702	11,777	66,838	17.6%
2014	4,249	3,177	3,505	748	11,678	68,853	17.0%
2015	5,138	2,687	3,543	850	12,217	71,964	17.0%
2016	4,614	2,424	3,661	791	11,488	72,759	15.8%
2017	5,039	2,446	3,533	885	11,904	74,659	15.9%
2018	4,823	2,559	3,469	993	11,844	74,291	15.9%
2019	5,237	2,496	4,140	931	12,803	75,129	17.0%
2020	5,325	1,846	4,086	310	11,568	72,209	16.0%
2021	5,429	2,415	3,974	508	12,325	75,260	16.4%
2022	4,681	3,248	3,992	880	12,801	75,971	16.9%
2023	5,539	2,694	3,845	1,096	13,174	77,280	17.0%
				Average annual percentage change			
1985-2023	-0.1%	-0.2%	0.2%	1.0%	0.0%	0.3%	
2013-2023	2.6%	-2.3%	1.3%	4.5%	1.1%	1.5%	

Source:
U.S. Department of Labor, Bureau of Labor Statistics, Consumer Expenditure Survey, www.bls.gov/cex, May 2025.
(Additional resources: www.bls.gov)

[a] Adjusted using the U.S. Consumer Price Inflation Index.
[b] Other vehicle expenses include vehicle finance charges, maintenance and repairs, insurance, licenses, and other vehicle charges.

The cost of crude oil influences the price of gasoline, but it is not the only factor which determines the price at the pump. Refining cost, transportation cost, marketing cost, and taxes also play a part of the cost of a gallon of gasoline. The average price of a barrel of crude oil declined to 46.9 dollars per barrel in 2020 from a high of 138 in 2011 (constant 2023 dollars). The average price of crude oil increased by 112% from 2020 to 2022 but declined in 2023. For gasoline, the average price rose 65% from 2020 to 2022.

Table 10.4
Prices for a Barrel of Crude Oil and a Gallon of Gasoline, 1978–2023

	Crude oil[a] (dollars per barrel)		Gasoline[b] (dollars per gallon)		Ratio of gasoline price to crude oil price
Year	Current	Constant 2023[c]	Current	Constant 2023[c]	
1978	12.5	58.2	0.65	3.05	2.2
1980	28.1	103.8	1.22	4.52	1.8
1985	26.8	75.8	1.20	3.39	1.9
1990	22.2	51.8	1.22	2.84	2.3
1995	17.2	34.4	1.21	2.41	2.9
2000	28.3	50.0	1.56	2.77	2.3
2001	23.0	39.5	1.53	2.63	2.8
2002	24.1	40.8	1.44	2.44	2.5
2003	28.5	47.2	1.64	2.71	2.4
2004	37.0	59.6	1.92	3.10	2.2
2005	50.2	78.4	2.34	3.65	2.0
2006	60.2	91.0	2.64	3.98	1.8
2007	67.9	99.8	2.85	4.19	1.8
2008	94.7	134.1	3.32	4.69	1.5
2009	59.3	84.2	2.40	3.41	1.7
2010	76.7	107.2	2.84	3.96	1.6
2011	101.9	138.0	3.58	4.85	1.5
2012	100.9	133.9	3.70	4.90	1.5
2013	100.5	131.4	3.58	4.69	1.5
2014	92.0	118.4	3.43	4.41	1.6
2015	48.4	62.2	2.51	3.23	2.2
2016	40.7	51.6	2.20	2.80	2.3
2017	50.7	63.0	2.47	3.07	2.0
2018	64.4	78.1	2.79	3.39	1.8
2019	59.4	70.8	2.70	3.22	1.9
2020	39.8	46.9	2.24	2.64	2.4
2021	67.8	76.3	3.13	3.52	1.9
2022	95.3	99.2	4.19	4.36	1.8
2023	77.7	77.7	3.77	3.77	2.0
		Average annual percentage change			
1978-2023	4.2%	0.6%	4.0%	0.5%	
2013-2023	-2.5%	-5.1%	0.5%	-2.2%	

Sources:

Crude oil – U.S. Department of Energy, Energy Information Administration, *Monthly Energy Review*, June 2025, Washington, DC, Table 9.1.

Gasoline – U.S. Department of Energy, Energy Information Administration, *Monthly Energy Review*, June 2025, Washington, DC, Table 9.4. (Additional resources: www.eia.gov)

[a] Refiner acquisition cost of composite (domestic and imported) crude oil.

[b] Average for all types. These prices were collected from a sample of service stations in 85 urban areas selected to represent all urban consumers. Urban consumers make up about 80% of the total U.S. population.

[c] Adjusted by the Consumer Price Inflation Index.

The price of a gallon of gasoline changes depending on different price components, including taxes, distribution and marketing, refining, and crude oil. The largest component of gasoline price is crude oil. The cost of refining and the cost of crude oil are the most variable over the series history.

Table 10.5
Gasoline Price Components, 2000–2024

Year	Refining	Distribution & marketing	Taxes	Crude Oil	Total
2000	$0.39	$0.32	$0.76	$1.23	$2.71
2001	$0.44	$0.36	$0.75	$0.97	$2.53
2002	$0.31	$0.29	$0.73	$1.00	$2.34
2003	$0.39	$0.38	$0.72	$1.18	$2.66
2004	$0.54	$0.36	$0.70	$1.47	$3.07
2005	$0.67	$0.33	$0.71	$1.93	$3.64
2006	$0.69	$0.36	$0.72	$2.23	$4.00
2007	$0.72	$0.44	$0.62	$2.46	$4.23
2008	$0.34	$0.51	$0.58	$3.30	$4.74
2009	$0.36	$0.36	$0.59	$2.12	$3.42
2010	$0.30	$0.40	$0.58	$2.72	$3.99
2011	$0.55	$0.44	$0.56	$3.34	$4.90
2012	$0.64	$0.45	$0.56	$3.29	$4.94
2013	$0.51	$0.43	$0.56	$3.22	$4.72
2014	$0.48	$0.51	$0.56	$2.90	$4.45
2015	$0.63	$0.45	$0.59	$1.52	$3.21
2016	$0.50	$0.45	$0.59	$1.27	$2.81
2017	$0.53	$0.43	$0.59	$1.54	$3.09
2018	$0.46	$0.45	$0.59	$1.90	$3.40
2019	$0.41	$0.47	$0.58	$1.72	$3.19
2020	$0.26	$0.65	$0.58	$1.13	$2.63
2021	$0.54	$0.53	$0.56	$1.85	$3.47
2022	$0.77	$0.52	$0.53	$2.42	$4.24
2023	$0.68	$0.51	$0.52	$1.90	$3.62
2024	$0.43	$0.54	$0.51	$1.83	$3.31

Note: Based on regular motor gasoline in all areas. Annual averages were created from monthly component price data.

Source:
Energy Information Administration, Gasoline and Diesel Fuel Update, Gasoline Pump Components History, 2025, www.eia.gov/petroleum/gasdiesel/gaspump_hist.php.
(Additional resources: www.eia.gov/petroleum/gasdiesel)

The average price of diesel fuel has been higher than regular gasoline since 2005. Premium gasoline in 2023 averaged 81 cents higher than regular gasoline. When adjusted for inflation (constant dollars), gasoline (premium and regular) is less expensive in 2023 than it was in 1980.

Table 10.6
Retail Prices for Motor Fuel, 1978–2023
(dollars per gallon, including tax)

	Diesel fuel[a]		Unleaded regular gasoline		Unleaded premium gasoline	
Year	Current	Constant 2023[b]	Current	Constant 2023[b]	Current	Constant 2023[b]
1978	[c]	[c]	0.67	3.13	[c]	[c]
1980	1.01	3.73	1.25	4.60	[c]	[c]
1985	1.22	3.45	1.20	3.40	1.34	3.79
1990	1.07	2.49	1.16	2.71	1.35	3.14
1995	1.11	2.22	1.15	2.29	1.34	2.67
2000	1.49	2.64	1.51	2.67	1.69	3.00
2001	1.40	2.41	1.46	2.51	1.66	2.85
2002	1.32	2.23	1.36	2.30	1.56	2.64
2003	1.51	2.50	1.59	2.63	1.78	2.94
2004	1.81	2.92	1.88	3.03	2.07	3.34
2005	2.40	3.75	2.30	3.58	2.49	3.89
2006	2.71	4.09	2.59	3.91	2.81	4.24
2007	2.89	4.24	2.80	4.12	3.03	4.46
2008	3.80	5.38	3.27	4.62	3.52	4.98
2009	2.47	3.50	2.35	3.34	2.61	3.70
2010	2.99	4.18	2.79	3.90	3.05	4.26
2011	3.84	5.20	3.53	4.78	3.79	5.14
2012	3.97	5.27	3.64	4.84	3.92	5.21
2013	3.92	5.13	3.53	4.61	3.84	5.03
2014	3.83	4.92	3.37	4.33	3.71	4.78
2015	2.71	3.48	2.45	3.15	2.87	3.68
2016	2.30	2.93	2.14	2.72	2.61	3.31
2017	2.65	3.29	2.41	2.99	2.91	3.62
2018	3.18	3.86	2.74	3.32	3.27	3.97
2019	3.06	3.64	2.64	3.14	3.21	3.83
2020	2.55	3.00	2.17	2.56	2.79	3.29
2021	3.29	3.70	3.05	3.43	3.69	4.15
2022	4.99	5.19	4.09	4.26	4.86	5.06
2023	4.21	4.21	3.66	3.66	4.47	4.47
			Average annual percentage change			
1980-2023	3.4%	0.3%	2.5%	-0.5%	[c]	-0.2%
2013-2023	0.7%	-1.9%	0.4%	-2.3%	1.5%	-1.2%

Sources:

Gasoline – U.S. Department of Energy, Energy Information Administration, *Monthly Energy Review*, June 2025, Washington, DC, Table 9.4.

Diesel – 1980-1994 U.S. Department of Energy, Energy Information Administration, *International Energy Annual 2004*, Washington, DC, June 2004, Table 7.2. 1995–2023 from *Monthly Energy Review*, June 2025, Table 9.4. (Additional resources: www.eia.gov)

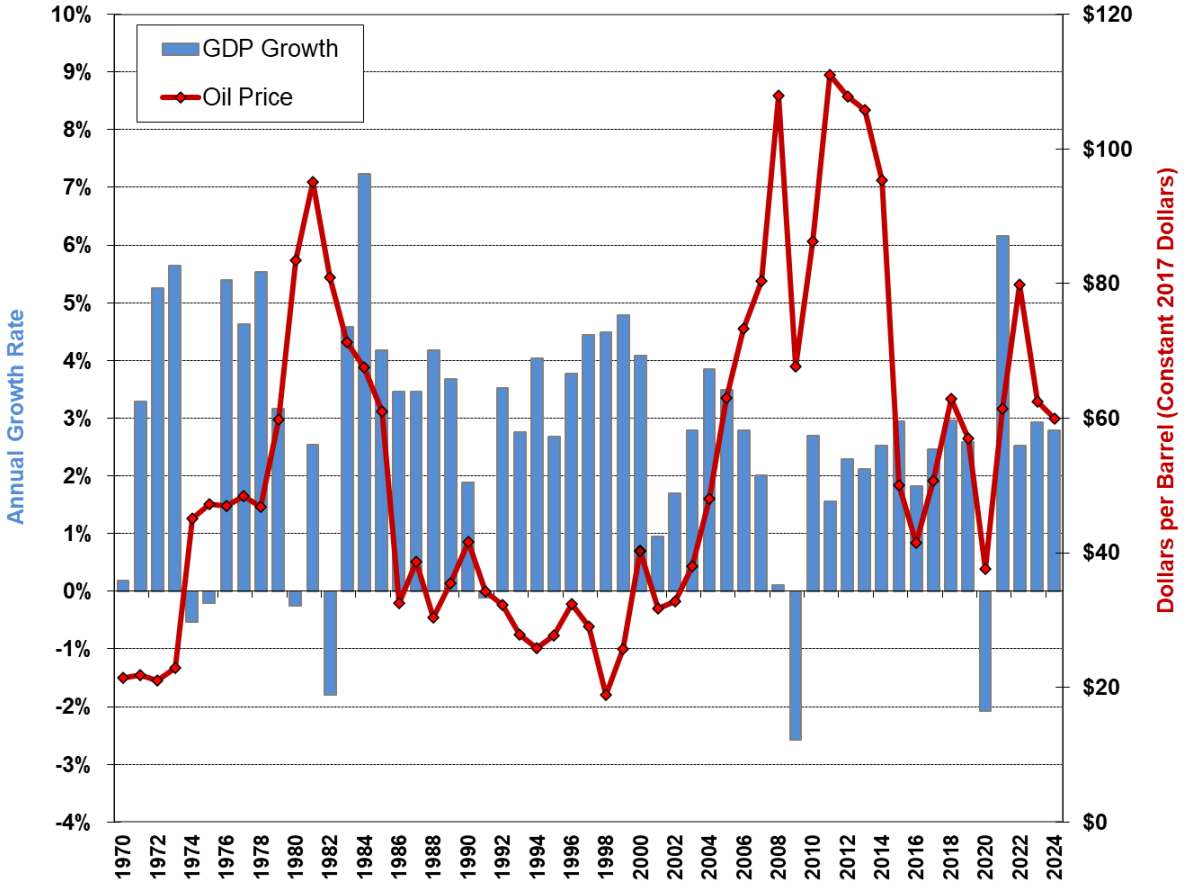
[a] 1980-1993: Collected from a survey of prices on January 1 of the current year. 1994-on: Annual average.

[b] Adjusted by the Consumer Price Inflation Index.

[c] Data are not available.

Major oil price shocks have disrupted world energy markets five times in the past 50 years (1973-74, 1979-80, 1990-91, 1999-2000, 2008). Most of the oil price shocks were followed by an economic recession in the United States. In 2019-2020, the oil price fell with the global pandemic economic downturn and recovered the following year.

Figure 10.2 Oil Price and Economic Growth, 1970–2024

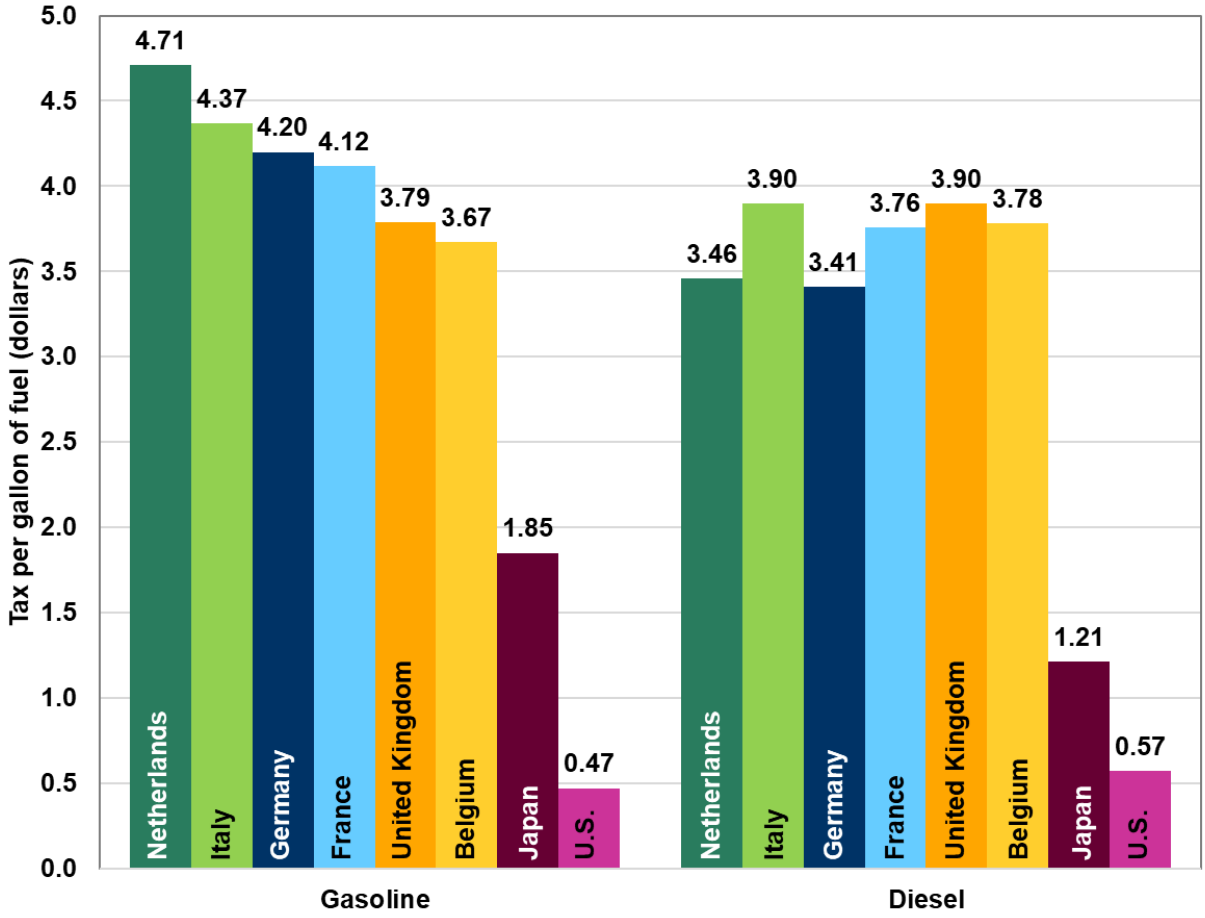


Source:

Greene, D.L. and N. I. Tishchishyna, *Costs of Oil Dependence: A 2000 Update*, Oak Ridge National Laboratory, ORNL/TM-2000/152, Oak Ridge, TN, 2000, and data updates, 2025.

The United States taxes on gasoline and diesel in 2023 were less than half of any other listed country. The Netherlands had the highest gasoline tax while Italy and the United Kingdom had the highest diesel tax.

Figure 10.3 Fuel Tax Rate in Selected Countries, 2023



Note: Tax for the United States includes a weighted average of State taxes plus the Federal tax.

Source:
U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics 2023*, Washington, DC, 2024, Table FE-21B. (Additional resources: www.fhwa.dot.gov)

The federal government taxes highway motor fuel and other highway transportation items and uses the money to pay for roadway upkeep and improvement through the Highway Trust Fund, as well as other related expenditures such as mass transit and leaking underground storage tanks. Compressed natural gas (CNG) and liquefied petroleum gas (LPG) taxes are calculated per energy equivalent of a gallon of gasoline, while liquified natural gas tax is calculated per energy equivalent of diesel.

Table 10.7
Federal Excise Taxes on Motor Fuels, 2023

Fuel	Cents per gallon	Effective date
Gasoline and gasohol	18.4	October 1, 1997
Diesel and kerosene	24.4	October 1, 1997
CNG	18.3[b]	January 1, 2016
LNG	24.3[c]	January 1, 2016
LPG	18.3[b]	January 1, 2016
Other alternative fuels[a]	18.4	October 1, 1997

Source:
U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics 2023*, Washington, DC, 2024, Table FE-21B. (Additional resources: www.fhwa.dot.gov)

Table 10.8
Federal Taxes on Highway Transportation, 2023

Item taxed	Details	Tax amount
Tires	Tax on tires sold by manufacturers, producers, or importers	$0.0945 per 10 lb of the maximum rated load capacity over 3,500 lb
Tires	Tax on *bias ply or super single tires* sold by manufacturers, producers, or importers	$0.04725 per 10 lb of the maximum rated load capacity over 3,500 lb
Truck and trailer sales	• For tractors and trucks >33,000 lb gvw • For trailers >26,000 lb gvw • Applies to parts and accessories sold in connection with the vehicle sale	12% of retailer's sales price
Heavy vehicle use	Annual tax for trucks 55,000–75,000 lb gvw	$100 plus $22 for each 1,000 lb (or fraction thereof) in excess of 55,000 lb
Heavy vehicle use	Annual tax for trucks >75,000 lb gvw	$550

Source:
U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics 2023*, Washington, DC, 2024, Table FE-21B. (Additional resources: www.fhwa.dot.gov)

[a] Includes benzol, benzene, naphtha, and other liquids used as a motor fuel.
[b] Compressed natural gas and liquefied petroleum gas are 18.3 cents per energy equivalent of a gallon of gasoline.
[c] Liquefied natural gas is 24.3 cents per energy equivalent of a gallon of diesel.

In addition to the 18.4 cents per gallon federal gasoline tax, the states also tax gasoline at varying rates. Some states have sales and/or use taxes added to gasoline excise taxes while others have inspection fees, environmental fees, leaking underground storage tank taxes, etc. The Energy Information Administration has compiled gasoline excise taxes, along with other state taxes and fees, to arrive at an estimate of the amount of state taxes consumers are paying per gallon.

Table 10.9
State Gasoline Tax Rates, January 2025
(cents per gallon)

State	Tax Rate	State	Tax Rate
Alabama	30.2	Montana	33.8
Alaska	9.0	Nebraska	31.3
Arizona	19.0	Nevada	23.8
Arkansas	25.0	New Hampshire	23.8
California	69.8	New Jersey	45.0
Colorado	28.2	New Mexico	18.9
Connecticut	25.0	New York	24.9
Delaware	23.0	North Carolina	40.6
District of Columbia	35.3	North Dakota	23.0
Florida	39.4	Ohio	38.5
Georgia	33.9	Oklahoma	20.0
Hawaii	18.5	Oregon	40.0
Idaho	33.0	Pennsylvania	58.7
Illinois	66.1	Rhode Island	38.1
Indiana	52.5	South Carolina	28.8
Iowa	30.0	South Dakota	30.0
Kansas	25.0	Tennessee	27.4
Kentucky	27.8	Texas	20.0
Louisiana	20.9	Utah	39.2
Maine	31.4	Vermont	31.7
Maryland	46.3	Virginia	40.4
Massachusetts	27.5	Washington	52.8
Michigan	47.8	West Virginia	35.7
Minnesota	31.9	Wisconsin	32.9
Mississippi	18.4	Wyoming	24.0
Missouri	27.5		

Note: Includes gasoline tax plus other per gallon fees, such as leaking underground storage tank fees. See source for additional specifics on individual state rates.

Source:
Energy Information Administration, Petroleum Supply Monthly, Federal and state motor fuels taxes, accessed June 4, 2025. (Additional resources: https://www.eia.gov/petroleum/marketing/monthly/xls/fueltaxes.xls)

In current dollars, import cars, on average, were less expensive than domestic cars until 1982. Since then, import prices have quadrupled, while domestic prices have more than doubled (current dollars). Taking inflation into account (constant dollars) the price of a domestic car was lower in 2024 than in 2014.

Table 10.10
Average Price of a New Car (Domestic and Import), 1970–2024

	Domestic[a]		Import		Total	
Year	Current dollars	Constant 2024 dollars[b]	Current dollars	Constant 2024 dollars[b]	Current dollars	Constant 2024 dollars[b]
1970	3,706	29,959	2,649	21,419	3,543	28,643
1975	5,096	29,712	4,367	25,461	4,961	28,928
1980	7,591	28,900	7,468	28,430	7,557	28,770
1985	11,576	33,749	12,843	37,440	11,835	34,502
1990	14,483	34,761	16,615	39,878	15,033	36,080
1995	16,797	34,573	23,069	47,483	17,892	36,828
1996	17,180	34,347	26,049	52,080	18,504	36,994
1997	17,532	34,266	27,682	54,104	19,182	37,490
1998	18,488	35,579	28,708	55,247	20,238	38,947
1999	19,006	35,785	27,485	51,752	20,701	38,977
2000	19,559	35,629	26,008	47,377	21,030	38,309
2001	19,995	35,416	25,854	45,794	21,464	38,018
2002	20,436	35,635	25,616	44,666	21,866	38,127
2003	19,956	34,021	26,150	44,582	21,663	36,932
2004	20,500	34,042	25,954	43,100	22,068	36,647
2005	21,568	34,642	26,635	42,781	23,012	36,962
2006	22,126	34,428	27,019	42,042	23,611	36,738
2007	22,255	33,670	27,466	41,553	23,883	36,133
2008	22,191	32,332	25,854	37,669	23,431	34,138
2009	22,039	32,225	25,166	36,797	23,108	33,788
2010	23,769	34,194	27,250	39,201	24,907	35,830
2011	24,158	33,689	28,269	39,422	25,471	35,521
2012	24,116	32,949	28,974	39,587	25,536	34,889
2013	23,916	32,205	29,285	39,433	25,441	34,258
2014	23,761	31,485	28,171	37,328	24,964	33,079
2015	24,119	31,921	28,326	37,490	25,196	33,346
2016	24,475	31,989	28,326	37,022	25,444	33,255
2017	23,870	30,547	30,804	39,421	25,563	32,713
2018	23,517	29,378	32,171	40,189	25,513	31,871
2019	24,691	30,295	31,192	38,273	26,325	32,300
2020	25,754	31,214	33,195	40,233	27,600	33,452
2021	27,983	32,395	34,743	40,220	29,941	34,661
2022	29,775	31,915	39,959	42,831	32,688	35,037
2023	30,170	31,059	42,500	43,754	33,592	34,583
2024	30,018	30,018	40,483	40,483	33,342	33,342
			Average annual percentage change			
1970-2024	4.0%	0.0%	5.2%	1.2%	4.2%	0.3%
2014-2024	2.4%	-0.5%	3.7%	0.8%	2.9%	0.1%

Note: These data are based on an average car and do not include prices for pickups, vans, or sport utility vehicles.

Source:
U.S. Department of Commerce, Bureau of Economic Analysis, *Average Transaction Price per New Car*, Washington, DC, 2025. (Additional resources: www.bea.gov)

[a] Includes all vehicles produced in the United States regardless of manufacturer headquarter location.
[b] Adjusted by the Consumer Price Inflation Index.

The average price of a new light-duty truck grew 54% from 1990-2024 in constant dollars terms, and by 269% when not adjusted for inflation. From the earliest available estimates in 2002, average prices for import light-duty trucks were slightly higher than domestic prices until 2009. By 2020, domestic light-duty truck prices averaged more than $3,500 higher than import prices.

Table 10.11
Average Price of a New Light-Duty Truck[a] (Domestic and Import), 1990-2024

	Domestic[b]		Import		Total	
Year	Current dollars	Constant 2024 dollars[c]	Current dollars	Constant 2024 dollars[c]	Current dollars	Constant 2024 dollars[c]
1990	[d]	[d]	[d]	[d]	13,592	32,623
1991	[d]	[d]	[d]	[d]	14,124	32,530
1992	[d]	[d]	[d]	[d]	15,032	33,609
1993	[d]	[d]	[d]	[d]	15,611	33,890
1994	[d]	[d]	[d]	[d]	16,821	35,604
1995	[d]	[d]	[d]	[d]	17,725	36,484
1996	[d]	[d]	[d]	[d]	19,574	39,135
1997	[d]	[d]	[d]	[d]	21,777	42,563
1998	[d]	[d]	[d]	[d]	22,787	43,852
1999	[d]	[d]	[d]	[d]	23,626	44,486
2000	[d]	[d]	[d]	[d]	23,363	42,559
2001	[d]	[d]	[d]	[d]	24,391	43,203
2002	26,066	45,451	26,753	46,649	26,149	45,596
2003	26,420	45,041	28,604	48,765	26,715	45,544
2004	26,950	44,753	28,760	47,760	27,190	45,153
2005	27,296	43,843	29,543	47,452	27,590	44,315
2006	27,999	43,567	29,611	46,075	28,248	43,953
2007	29,158	44,113	29,817	45,111	29,265	44,275
2008	28,267	41,184	29,958	43,648	28,555	41,604
2009	29,447	43,056	29,072	42,509	29,381	42,959
2010	32,327	46,505	32,305	46,474	32,324	46,500
2011	33,373	46,540	33,317	46,462	33,365	46,529
2012	34,040	46,508	34,136	46,640	34,054	46,528
2013	34,773	46,824	33,766	45,468	34,616	46,612
2014	35,793	47,428	34,204	45,322	35,546	47,101
2015	36,822	48,734	33,681	44,576	36,256	47,984
2016	37,352	48,820	33,567	43,872	36,581	47,812
2017	37,960	48,579	33,868	43,342	37,069	47,438
2018	38,537	48,142	35,299	44,096	37,787	47,204
2019	39,827	48,868	35,553	43,624	38,913	47,746
2020	41,798	50,660	36,802	44,606	40,690	49,318
2021	46,270	53,564	40,247	46,591	44,915	51,996
2022	50,456	54,082	44,196	47,372	49,244	52,783
2023	51,603	53,125	46,064	47,423	50,481	51,970
2024	50,924	50,924	47,325	47,325	50,170	50,170
			Average Annual Percentage Change			
1990-2024	[d]	[d]	[d]	[d]	3.9%	1.3%
2014-2024	3.6%	0.7%	3.3%	0.4%	3.5%	0.6%

Source:
U.S. Department of Commerce, Bureau of Economic Analysis, *Underlying Detail, Motor Vehicle Output*, 2025 and Ward's Communications, www.wardsauto.com.

[a] Light-duty trucks in this table are 14,000 lb and less.
[b] Includes all vehicles produced in the United States regardless of manufacturer.
[c] Adjusted by the Consumer Price Inflation Index.
[d] Data are not available.

The total cost of operating a car is the sum of the fixed cost (insurance, license, registration, taxes, depreciation, and finance charge) and the variable cost (fuel, maintenance, and tires), which is related to the amount of travel. When adjusted for inflation, the total annual finance charge of a light vehicle was $1,332 in 2024 which is lower than the cost in 2000. The fuel share of total cost was at an all-time high of 25% in 2022.

Table 10.12
Light-Duty Vehicle Operating Cost, 2000–2024
(constant 2024 dollars) [a]

Year	Variable (cents per mile)		Fixed (dollars per year, based on 15,000 miles/year)				Total annual cost[b]	Percentage fuel cost of total cost
	Fuel	Maintenance and tires	Insurance	License, registration and taxes	Depreciation	Annual finance charge		
2000	12.57	9.65	1,297	896	6,361	1,547	13,435	14.0%
2001	13.99	10.10	1,364	848	6,284	1,534	13,644	15.4%
2002	10.29	9.42	1,280	844	6,488	1,444	13,011	11.9%
2003	12.27	10.06	1,268	844	6,373	1,268	13,103	14.1%
2004	10.79	10.13	2,662	689	6,280	1,231	14,001	11.6%
2005	13.17	9.48	2,069	625	6,230	1,187	13,508	14.6%
2006	14.78	8.71	1,441	832	5,278	1,114	12,190	18.2%
2007	13.46	8.47	1,490	814	5,132	1,109	11,835	17.1%
2008	17.00	7.71	1,374	807	4,839	1,104	11,831	21.6%
2009	14.75	7.79	1,427	829	5,061	1,139	11,838	18.7%
2010	16.34	7.73	1,483	842	5,113	1,159	12,207	20.1%
2011	17.21	7.53	1,350	830	5,199	1,148	12,237	21.1%
2012	19.36	7.47	1,368	833	4,842	1,156	12,224	23.8%
2013	19.46	8.04	1,386	823	4,809	1,142	12,283	23.8%
2014	17.23	7.99	1,356	849	4,651	1,122	11,761	22.0%
2015	14.84	8.06	1,476	880	4,836	885	11,512	19.3%
2016	11.04	8.21	1,597	898	4,913	893	11,189	14.8%
2017	13.13	10.12	1,508	919	4,059	863	10,836	18.2%
2018	13.80	10.26	1,485	922	4,109	929	11,054	18.7%
2019	14.23	10.97	1,465	924	4,091	1,129	11,389	18.7%
2020	12.92	11.05	1,457	1,031	4,510	993	11,587	16.7%
2021	12.41	11.06	1,554	774	4,515	824	11,187	16.6%
2022	19.28	10.38	1,702	724	3,919	705	11,499	25.2%
2023	16.40	10.12	1,817	784	4,672	1,290	12,541	19.6%
2024	14.90	10.13	1,715	815	4,680	1,332	12,297	18.2%
			Average annual percentage change					
2000-2024	0.7%	0.2%	1.2%	-0.4%	-1.3%	-0.6%	-0.4%	1.1%
2014-2024	-1.4%	2.4%	2.4%	-0.4%	0.1%	1.7%	0.4%	1.9%

Source:
AAA, *Your Driving Costs 2024*, 2025, and previous editions. (Additional resources: newsroom.aaa.com)

[a] Adjusted by the U.S. Consumer Price Inflation Index. Can be converted to constant dollars using Table B.15.

[b] Based on 15,000 miles per year.

Used car transactions (including pickups, vans, and SUVs) in 2024 were 5.7 times higher than in 1970 while new car transactions were 3.4 times higher. The transportation consumer price index (CPI) outpaced the national CPI in the late 1970's and early 1980's but has grown at a slower rate since 1986.

Table 10.13
Consumer Price Indices, 1970–2024
(1970 = 1.000)

Year	Consumer price index	Transportation consumer price index[a]	New car[b] consumer price index	Used car[b] consumer price index	Gross national product index
1970	1.000	1.000	1.000	1.000	1.000
1975	1.387	1.336	1.186	1.404	1.573
1980	2.124	2.216	1.667	1.997	2.678
1985	2.773	2.837	1.998	3.644	4.042
1990	3.369	3.213	2.286	3.769	5.555
1995	3.928	3.709	2.655	5.016	7.102
1996	4.044	3.813	2.706	5.032	7.506
1997	4.137	3.848	2.718	4.843	7.966
1998	4.201	3.776	2.701	4.827	8.410
1999	4.294	3.851	2.691	4.872	8.949
2000	4.438	4.088	2.689	4.994	9.530
2001	4.564	4.115	2.676	5.087	9.847
2002	4.637	4.077	2.637	4.872	10.165
2003	4.742	4.203	2.597	4.580	10.665
2004	4.869	4.349	2.582	4.272	11.386
2005	5.034	4.637	2.597	4.468	12.146
2006	5.196	4.824	2.591	4.487	12.839
2007	5.344	4.925	2.566	4.351	13.494
2008	5.549	5.215	2.527	4.293	13.814
2009	5.529	4.780	2.554	4.070	13.548
2010	5.620	5.157	2.599	4.587	14.129
2011	5.797	5.663	2.672	4.776	14.669
2012	5.917	5.796	2.716	4.818	15.270
2013	6.004	5.798	2.745	4.804	15.848
2014	6.101	5.758	2.755	4.779	16.526
2015	6.109	5.308	2.771	4.715	17.148
2016	6.186	5.197	2.775	4.599	17.631
2017	6.318	5.375	2.768	4.431	18.436
2018	6.472	5.618	2.755	4.435	19.401
2019	6.589	5.602	2.765	4.480	20.211
2020	6.670	5.369	2.780	5.853	22.114
2021	6.984	6.151	2.942	5.853	22.114
2022	7.543	7.102	3.248	6.600	24.272
2023	7.853	7.119	3.369	6.129	25.838
2024	8.085	7.218	3.350	5.764	27.128

Sources:

Bureau of Labor Statistics, Consumer Price Index, All Urban Consumers, Multi-screen data search, 2025, www.bls.gov/data. (Additional resources: www.bls.gov)

GNP – U.S. Department of Commerce, Bureau of Economic Analysis, National Income and Product Accounts, Table 1.7.5, 2025. (Additional resources: www.bea.gov)

[a] Transportation Consumer Price Index includes new and used cars, gasoline, car insurance rates, intracity mass transit, intracity bus fare, and airline fares.

[b] Includes cars, pickups, vans, and sport utility vehicles.

The data below were summarized from the Bureau of Labor Statistics (BLS) Current Employment Statistics Survey data using the North American Industry Classification System (NAICS). Transportation-related employment was 7.6% of total employment in both 2020 and 2024.

Table 10.14
Transportation-Related Employment, 1990, 2000, 2020, and 2024[a]
(thousands)

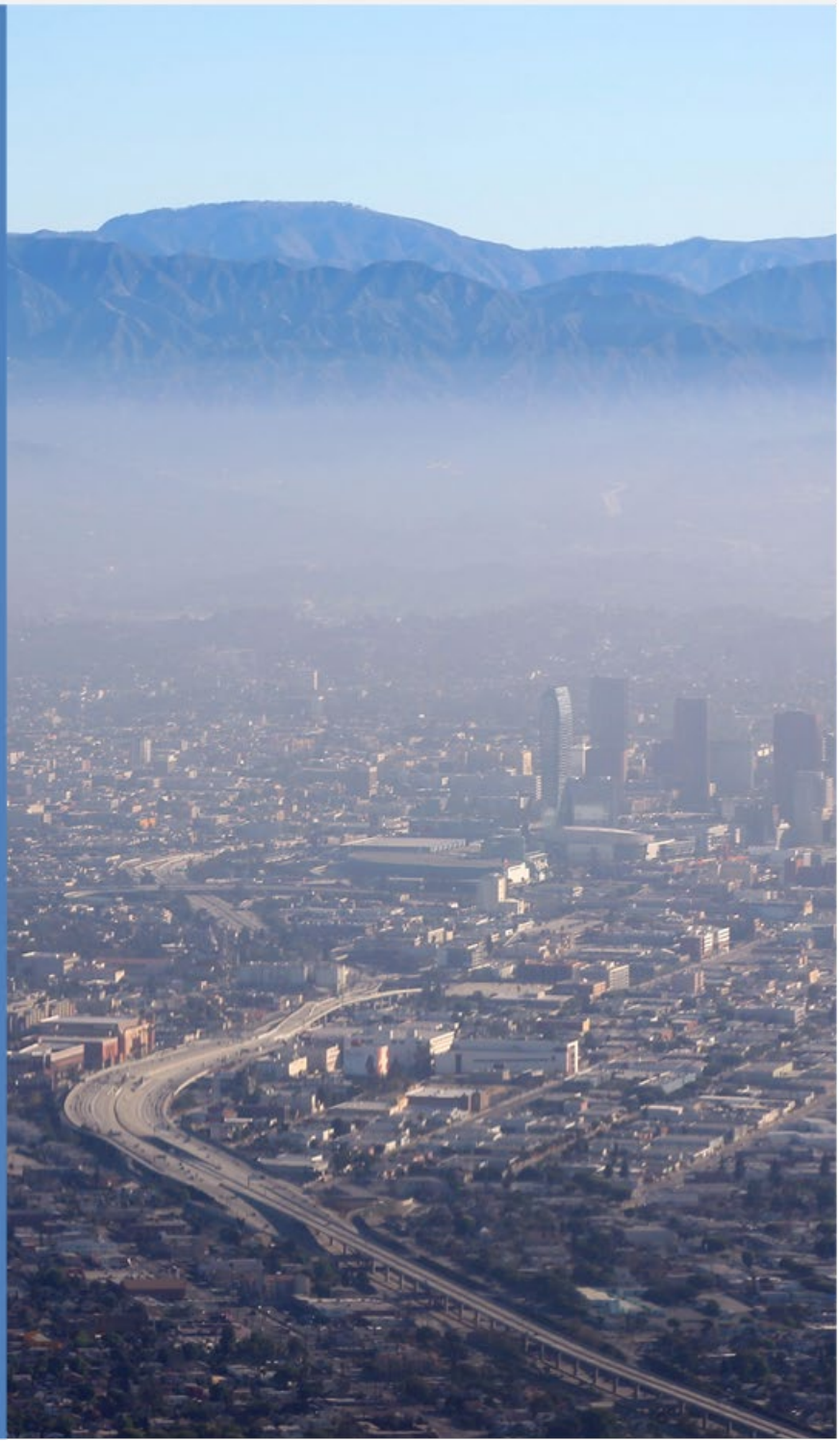
	1990	2000	2020	2024	Percent change 1990-2024
Truck transportation (includes drivers)	1,122.6	1,406.1	1,471.3	1522.1	35.6%
Transit and ground transportation	274.2	372.1	370.3	472.6	72.4%
Air transportation	529.2	614.4	441.2	564.4	6.7%
Rail transportation	271.8	231.7	150.4	156.4	-42.5%
Water transportation	56.8	56.0	60.0	70.0	23.2%
Pipeline transportation	59.8	46.0	51.1	55.4	-7.4%
Motor vehicle and parts - retail	1,494.4	1,846.9	1,905.1	2050.4	37.2%
Motor vehicles and parts - wholesale	313.8	360.8	344.5	381.1	21.4%
Gasoline stations - retail	910.2	935.7	927.4	983.4	8.0%
Automotive repair and maintenance	659.4	888.1	898.3	1036	57.1%
Automotive equipment rental and leasing	163.2	208.3	188.6	215.1	31.8%
Manufacturing (subtotal)	2,224.9	2,143.9	1,647.1	1,849.8	-16.9%
Motor vehicles	*271.5*	*291.4*	206.3	302.0	11.2%
Motor vehicle bodies and trailers	*129.8*	*182.7*	150.9	163.5	26.0%
Motor vehicle parts	*653.0*	*839.5*	530.3	553.3	-15.3%
Aerospace products and parts	*840.7*	*516.7*	507.0	559.1	-33.5%
Railroad rolling stock	*65.9*	*72.7*	56.6	64.8	-1.7%
Ship & boat building	*173.7*	*154.1*	139.8	150.5	-13.4%
Tires	*90.3*	*86.8*	56.2	56.6	-37.3%
Oil and gas pipeline construction	86.0	72.2	141.0	149.3	73.6%
Highway street and bridge construction	288.5	340.1	346.0	377.9	31.0%
Scenic & sightseeing	15.7	27.5	21.3	31.1	98.1%
Support activities for transportation	364.1	537.4	701.3	837.0	129.9%
Couriers and messengers	375.0	605.0	967.3	1096.4	192.4%
Travel arrangement and reservation services	250.0	298.6	165.1	189.3	-24.3%
Total transportation-related employment	**9,459.6**	**10,990.8**	**10,797.3**	**12,037.7**	**27.3%**
Total nonfarm employment	109,976	133,555	142,186	157,959	43.6%
Transportation-related to total employment	8.6%	8.2%	7.6%	7.6%	

Source:
Tabulated from the U.S. Department of Labor, Bureau of Labor Statistics, Current Employment Statistics, www.bls.gov/ces/data.htm, March 2025. (Additional resources: www.bls.gov)

[a] Not seasonally adjusted.

EMISSIONS

Chapter 11



Credit: Stefan_Redel/iStock/Getty Images

The U.S. accounted for 23% of the World's carbon dioxide emissions in 1990, 21% in 2005, and only 13% in 2023. About 47% of the U.S. carbon emissions are from oil use.

Table 11.1
World Carbon Dioxide Emissions, 1990, 2005 and 2023

	1990		2005		2023	
Country/Region	Million metric tons	Percent of emissions from oil use	Million metric tons	Percent of emissions from oil use	Million metric tons	Percent of emissions from oil use
North America						
United States	5,038	44%	6,007	44%	4,795	47%
Canada	439	48%	575	50%	586	50%
Mexico	280	73%	431	64%	441	52%
Total	5,758	45%	7,015	46%	5,823	48%
Europe						
UK	606	39%	585	41%	341	58%
France	385	63%	421	62%	304	69%
Germany	[a]	[a]	844	41%	600	46%
Other	3,905	40%	2,874	48%	2,328	54%
Total	4,895	41%	4,725	47%	3,573	54%
Eurasia						
Russia	[a]	[a]	1,571	21%	1,844	25%
Ukraine	[a]	[a]	341	14%	107	23%
Other	[a]	[a]	517	24%	618	21%
Total	4,024	30%	2,429	21%	2,569	24%
Asia and Oceania						
Japan	1,109	63%	1,279	52%	960	42%
Australia	268	36%	370	34%	395	39%
China	2,417	14%	6,120	15%	12,196	15%
India	541	30%	1,119	29%	2,821	23%
Other	1,060	59%	2,202	52%	3,707	39%
Total	5,395	35%	11,090	28%	20,079	22%
Middle East	694	71%	1,422	59%	2,439	50%
Africa	685	44%	988	43%	1,371	45%
Central & South America	699	74%	1,032	69%	1,225	67%
Total World	22,150	41%	28,701	39%	37,079	34%

Source:
U.S. Department of Energy, Energy Information Administration, *International Energy Outlook 2023*, Washington, DC, 2025. (Additional resources: www.eia.gov)

[a] Data are not available.

The transportation sector accounts for 37.7% of carbon dioxide emissions. The commercial sector accounts for the lowest share of carbon dioxide emissions.

Table 11.2
U.S. Carbon Emissions from Fossil Fuel Consumption
by End-Use Sector, 1990–2022[a]
(Million metric tonnes of carbon dioxide)

	End use sector				Transportation	CO_2 from
	Residential	Commercial	Industrial	Transportation	percentage	all sectors
1990	931.3	766.0	1,562.9	1,472.0	31.1%	4,732.2
1995	994.7	814.4	1,623.4	1,583.7	31.6%	5,016.2
1996	1,055.6	846.1	1,663.3	1,630.4	31.4%	5,195.4
1997	1,045.2	886.9	1,677.0	1,646.6	31.3%	5,255.7
1998	1,049.8	905.1	1,675.9	1,682.1	31.7%	5,312.9
1999	1,070.5	914.5	1,636.7	1,749.6	32.6%	5,371.3
2000	1,133.9	977.6	1,676.7	1,795.6	32.2%	5,583.8
2001	1,125.5	983.9	1,602.2	1,766.1	32.2%	5,477.7
2002	1,152.7	982.7	1,581.5	1,806.5	32.7%	5,523.4
2003	1,182.7	994.2	1,595.2	1,816.3	32.5%	5,588.4
2004	1,180.9	1,011.2	1,622.9	1,849.8	32.7%	5,664.8
2005	1,214.9	1,030.1	1,584.0	1,863.3	32.7%	5,692.3
2006	1,151.9	1,010.1	1,579.8	1,863.7	33.2%	5,605.5
2007	1,204.1	1,051.3	1,573.5	1,865.8	32.8%	5,694.7
2008	1,190.4	1,042.9	1,521.7	1,764.4	32.0%	5,519.4
2009	1,122.2	980.6	1,353.6	1,693.0	32.9%	5,149.4
2010	1,174.6	997.3	1,432.1	1,701.1	32.1%	5,305.1
2011	1,117.1	962.8	1,418.1	1,674.7	32.4%	5,172.7
2012	1,008.1	901.1	1,387.0	1,663.4	33.5%	4,959.6
2013	1,064.0	928.8	1,420.6	1,673.3	32.9%	5,086.7
2014	1,080.8	938.2	1,413.8	1,711.8	33.3%	5,144.6
2015	1,001.4	907.9	1,342.5	1,722.6	34.6%	4,974.4
2016	946.7	865.5	1,305.9	1,762.1	36.1%	4,880.2
2017	911.1	838.7	1,284.8	1,784.6	37.0%	4,819.2
2018	981.2	851.3	1,311.8	1,817.9	36.6%	4,962.2
2019	926.7	804.4	1,275.3	1,821.4	37.7%	4,827.8
2020	860.1	709.6	1,171.8	1,576.9	36.5%	4,318.4
2021	890.3	756.1	1,225.6	1,758.6	38.0%	4,630.6
2022	899.4	782.0	1,238.0	1,757.4	37.6%	4,676.8
			Average annual percentage change			
1990-2022	-0.1%	0.1%	-0.7%	0.6%		0.0%
2012-2022	-1.1%	-1.4%	-1.1%	0.6%		-0.6%

Note: CO_2 from all sectors does not match Table 11.3 since it is only from fossil fuel consumption and does not include the use of fluorinated gases and other transportation categories. U.S. territories are not included.

Source:
U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2022*, April 2024, EPA 430-R-24-004. (Additional resources: https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2022)

[a] Includes petroleum, coal, and natural gas. Electric utility emissions are distributed across consumption sectors.

This report has typically displayed carbon and carbon dioxide data from the Environmental Protection Agency (EPA). However, the Energy Information Administration's (EIA's) Monthly Energy Review *also includes carbon dioxide emission data. The differences between the two series ranged from 2.3% to 7.4% over 1990-2022 and have been under 4% since 2020. Reasons for the differences include the treatment of international bunker fuel, nonfuel use of fossil fuels, and the agencies' use of different fuel consumption controls.*

Table 11.3
Transportation Sector Carbon Dioxide Emissions from Energy Consumption, 1973-2024
(Million metric tonnes of carbon dioxide)

Year	Energy Information Administration's *Monthly Energy Review*	Environmental Protection Agency's Emissions Inventory Report	Percentage difference
1973	1,314.4	[a]	[a]
1980	1,397.4	[a]	[a]
1985	1,423.0	[a]	[a]
1990	1,586.7	1,483.9	6.5%
1995	1,678.6	1,595.1	5.0%
2000	1,887.7	1,807.8	4.2%
2001	1,859.4	1,777.2	4.4%
2002	1,898.7	1,817.4	4.3%
2003	1,916.6	1,826.4	4.7%
2004	1,971.6	1,860.1	5.7%
2005	1,992.4	1,873.5	6.0%
2006	2,023.3	1,873.6	7.4%
2007	2,026.3	1,876.1	7.4%
2008	1,895.5	1,773.9	6.4%
2009	1,831.6	1,701.5	7.1%
2010	1,847.0	1,711.5	7.3%
2011	1,812.7	1,684.8	7.1%
2012	1,775.6	1,672.5	5.8%
2013	1,795.4	1,683.0	6.3%
2014	1,813.7	1,721.9	5.1%
2015	1,837.2	1,733.6	5.6%
2016	1,869.0	1,772.5	5.2%
2017	1,886.8	1,794.3	4.9%
2018	1,918.1	1,827.1	4.7%
2019	1,924.2	1,830.4	4.9%
2020	1,632.8	1,584.7	2.9%
2021	1,809.1	1,766.7	2.3%
2022	1,836.5	1,765.9	3.8%
2023	1,853.1	[a]	[a]
2024	1,850.8	[a]	[a]

Sources:
U.S. Department of Energy, Energy Information Administration, *Monthly Energy Review, March 2025*.
U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2022*, April 2024, EPA 430-R-24-004.
(Additional resources: www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2022)

[a] Data are not available.

Most U.S. transportation sector carbon dioxide emissions come from petroleum fuels. Motor gasoline has been responsible for 58%-65% of U.S. transportation sector CO_2 emissions from fossil combustion between 1190 and 2022.

Table 11.4
U.S. Carbon Emissions from Fossil Fuel Combustion in the Transportation End-Use Sector, 1990–2022
(Million metric tonnes of carbon dioxide equivalent)

Year	Motor gasoline	LPG[a]	Jet fuel	Distillate fuel	Residual fuel	Aviation gas	Natural gas	Electricity[b]	Total
1990	958.9	1.4	184.1	262.9	22.6	3.1	36.0	3.0	1,472.0
1995	1,013.1	1.1	172.1	324.2	29.1	2.7	38.4	3.1	1,583.8
1996	1,036.5	1.0	184.5	340.2	23.6	2.6	39.1	3.1	1,630.6
1997	1,048.8	0.9	184.3	355.1	10.3	2.7	41.4	3.1	1,646.6
1998	1,079.4	1.1	188.2	366.5	5.9	2.5	35.3	3.2	1,682.1
1999	1,113.0	0.9	192.3	388.4	13.2	2.7	35.8	3.2	1,749.5
2000	1,118.2	0.7	194.9	406.9	33.3	2.5	35.7	3.4	1,795.6
2001	1,118.4	0.9	189.6	404.4	12.0	2.4	34.9	3.6	1,766.2
2002	1,142.7	0.9	185.2	417.7	17.1	2.3	37.1	3.5	1,806.5
2003	1,162.3	1.1	179.2	426.5	7.4	2.1	33.3	4.3	1,816.2
2004	1,166.9	1.2	186.6	442.5	14.0	2.2	31.9	4.5	1,849.8
2005	1,150.1	1.8	189.3	462.6	19.3	2.4	33.1	4.7	1,863.3
2006	1,142.8	1.7	182.2	474.0	23.0	2.3	33.1	4.5	1,863.6
2007	1,135.5	1.4	179.4	478.1	29.0	2.2	35.2	5.1	1,865.9
2008	1,071.7	2.5	173.0	453.4	20.4	2.0	36.7	4.7	1,764.4
2009	1,071.4	1.8	154.0	407.6	13.9	1.8	37.9	4.5	1,692.9
2010	1,059.3	0.3	151.5	425.2	20.4	1.9	38.2	4.5	1,701.3
2011	1,035.7	0.3	146.5	427.6	19.4	1.9	38.9	4.3	1,674.6
2012	1,030.4	0.3	143.3	426.4	15.8	1.7	41.4	4.0	1,663.3
2013	1,028.0	0.4	147.1	429.9	15.1	1.5	47.0	4.3	1,673.3
2014	1,066.6	0.5	148.3	444.4	5.8	1.5	40.2	4.4	1,711.7
2015	1,058.8	0.6	157.5	456.4	4.2	1.5	39.4	4.3	1,722.7
2016	1,084.4	0.7	166.0	452.4	12.9	1.4	40.1	4.2	1,762.1
2017	1,081.8	0.8	171.6	465.9	16.5	1.4	42.3	4.3	1,784.6
2018	1,097.0	0.8	172.2	476.6	14.0	1.5	50.9	4.8	1,817.8
2019	1,086.5	0.8	180.2	474.0	14.5	1.6	58.9	4.8	1,821.3
2020	936.9	0.5	120.6	447.4	7.3	1.4	58.7	4.1	1,576.9
2021	1,028.7	0.6	152.7	480.7	24.2	1.5	65.2	5.0	1,758.6
2022	1,014.5	0.6	164.9	476.7	22.9	1.5	70.2	6.1	1,757.4
				Average annual percentage change					
1990-2022	0.2%	-2.6%	-0.3%	1.9%	0.0%	-2.2%	2.1%	2.2%	0.6%
2012-2022	-0.2%	7.2%	1.4%	1.1%	3.8%	-1.2%	5.4%	4.3%	0.6%

Note: Emissions from U.S. Territories are not included. Emissions from International Bunker Fuels are not included.

Source:
U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2022*, April 2024, EPA 430-R-24-004. (Additional resources: https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2022)

[a] Liquefied petroleum gas.
[b] Share of total electric utility carbon dioxide emissions weighted by sales to the transportation sector.

Highway vehicles are responsible for the majority of carbon dioxide emissions in the transportation sector.

Table 11.5
Transportation Carbon Dioxide Emissions by Mode, 1990–2022
(Million metric tonnes of carbon dioxide equivalent)

Year	Passenger Vehicles	Heavy Trucks	Highway Total	Water	Air	Rail	Pipeline	Total
1990	917.7	246.3	1,164.0	46.4	187.2	38.5	36.0	1,472.1
1995	977.0	292.6	1,269.6	58.0	174.8	42.7	38.4	1,583.5
2000	1,089.9	362.2	1,452.1	64.6	197.4	46.0	35.5	1,795.6
2005	1,139.9	403.7	1,543.6	44.3	191.7	50.8	32.8	1,863.2
2010	1,054.2	369.2	1,423.4	43.0	153.3	43.4	37.8	1,700.9
2011	1,035.9	363.0	1,398.9	44.2	148.4	44.5	38.6	1,674.6
2012	1,033.3	362.7	1,396.0	37.9	145.0	43.3	41.0	1,663.2
2013	1,028.2	368.9	1,397.1	36.9	148.5	43.8	46.7	1,673.0
2014	1,065.3	384.9	1,450.2	26.2	149.8	45.6	39.8	1,711.6
2015	1,058.7	392.0	1,450.7	30.4	159.0	43.4	38.9	1,722.4
2016	1,082.3	396.3	1,478.6	37.1	167.3	39.6	39.6	1,762.2
2017	1,078.7	410.4	1,489.1	39.9	173.1	40.8	41.7	1,784.6
2018	1,092.8	422.2	1,515.0	36.8	173.8	41.9	50.3	1,817.8
2019	1,081.5	424.9	1,506.4	35.6	181.9	39.1	58.3	1,821.3
2020	934.6	469.3	1,403.9	27.4	122.0	33.6	58.0	1,644.9
2021	1,026.3	433.2	1,459.5	45.4	154.1	35.0	64.4	1,758.4
2022	1,012.9	429.3	1,442.2	44.5	166.3	35.0	69.3	1,757.3
			Average annual percentage change					
1990-2022	0.3%	1.8%	0.7%	-0.1%	-0.4%	-0.3%	2.1%	0.6%
2012-2022	-0.2%	1.7%	0.3%	1.6%	1.4%	-2.1%	5.4%	0.6%

Note: Emissions from U.S. Territories are not included. Emissions from International Bunker Fuels are not included. Passenger vehicles include cars, light trucks and motorcycles. Heavy trucks include medium and heavy trucks and buses.

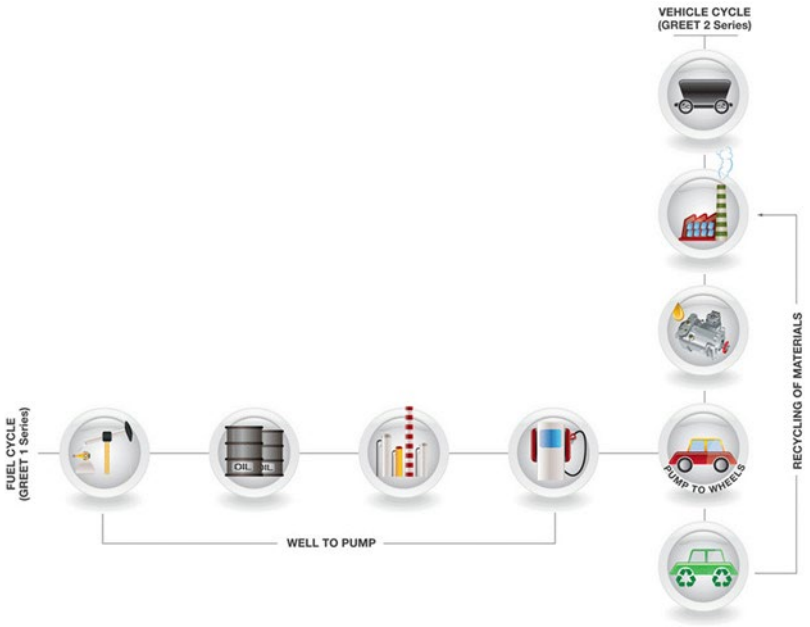
Source:
U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2022,* April 2024, EPA 430-R-24-004. (Additional resources: www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2022)

The GREET Model

greet.es.anl.gov

Sponsored primarily by the U.S. Department of Energy's Office of Critical Minerals and Energy Innovation, among other DOE Offices and Programs, Argonne National Laboratory has developed a full life-cycle model called the R&D GREET® (Wang et al., 2025). It allows researchers and analysts to evaluate the energy and environmental impacts of various vehicle and fuel combinations on a holistic and consistent life-cycle basis. The first version of R&D GREET was released in 1996. Since then, Argonne has continued to update and expand the model. The most recent R&D GREET versions are R&D GREET 1 2024 version for fuel-cycle analysis and R&D GREET 2 2024 version for vehicle-cycle analysis.

Figure 11.1 System Boundary of R&D GREET Model



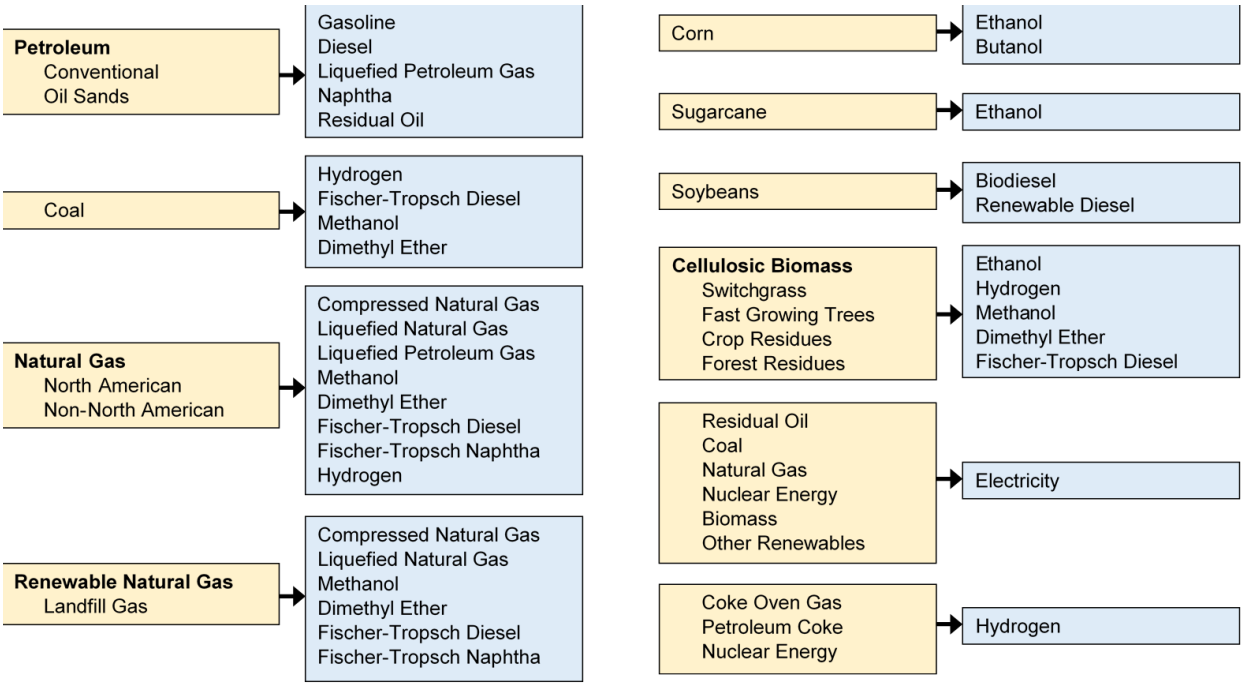
For a given vehicle and fuel system, R&D GREET separately calculates the following:

- Consumption of total resources (energy in non-renewable and renewable sources), fossil fuels (petroleum, natural gas, and coal together), petroleum, coal, natural gas, and water consumption.
- Emissions of CO_2-equivalent emissions

- Emissions of seven criteria pollutants: volatile organic compounds (VOCs), carbon monoxide (CO), nitrogen oxide (NO_x), particulate matter with size smaller than 10 micron (PM_{10}), particulate matter with size smaller than 2.5 micron ($PM_{2.5}$), black carbon (BC), and sulfur oxides (SO_x).

R&D GREET includes more than 100 fuel production pathways and more than 80 vehicle/fuel systems. These vehicle/fuel systems cover current and advanced vehicle technologies such as conventional spark-ignition engine vehicles, compression-ignition engine vehicles, hybrid electric vehicles, plug-in hybrid electric vehicles, battery-powered electric vehicles and fuel-cell electric vehicles. R&D GREET also evaluates transportation modes other than light-duty vehicles, such as heavy-duty vehicles, farming tractors, aviation, rail, and marine.

Figure 11.2 R&D GREET Model Feedstocks and Fuels

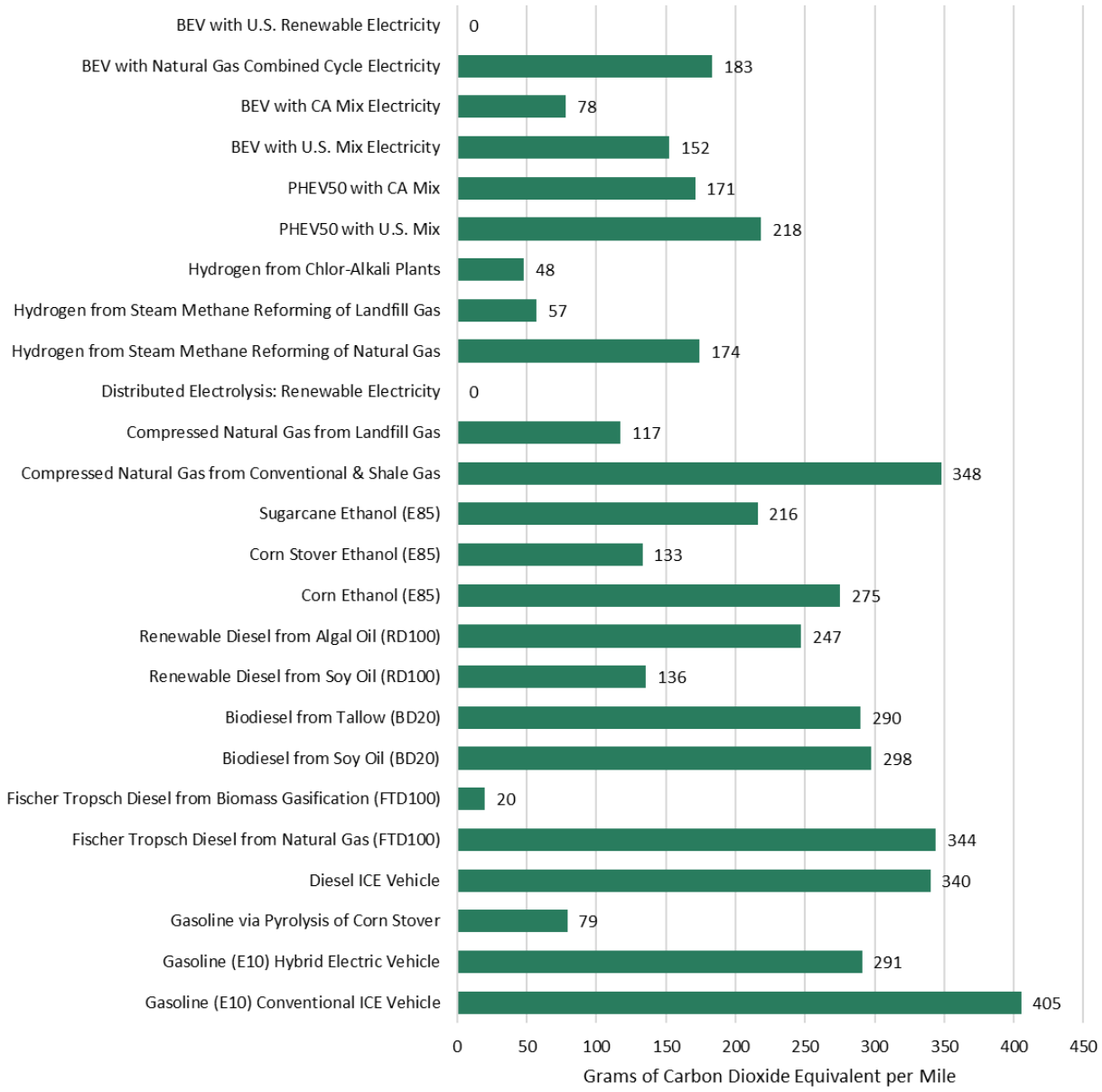


To address technology improvements over time, R&D GREET 2024 simulates current and future vehicle/fuel systems up to the year 2050.

For additional information about the R&D GREET model and associated documentation, please visit the R&D GREET website https://greet.anl.gov/ or contact greet@anl.gov.

Results from the R&D GREET 1 2024 model on emissions of carbon dioxide equivalents per mile are shown for various fuels and vehicle technologies. A full description of the model is on the preceding pages.

Figure 11.3 Well-to-Wheel Emissions for Various Fuels and Light-Duty Vehicle Technologies

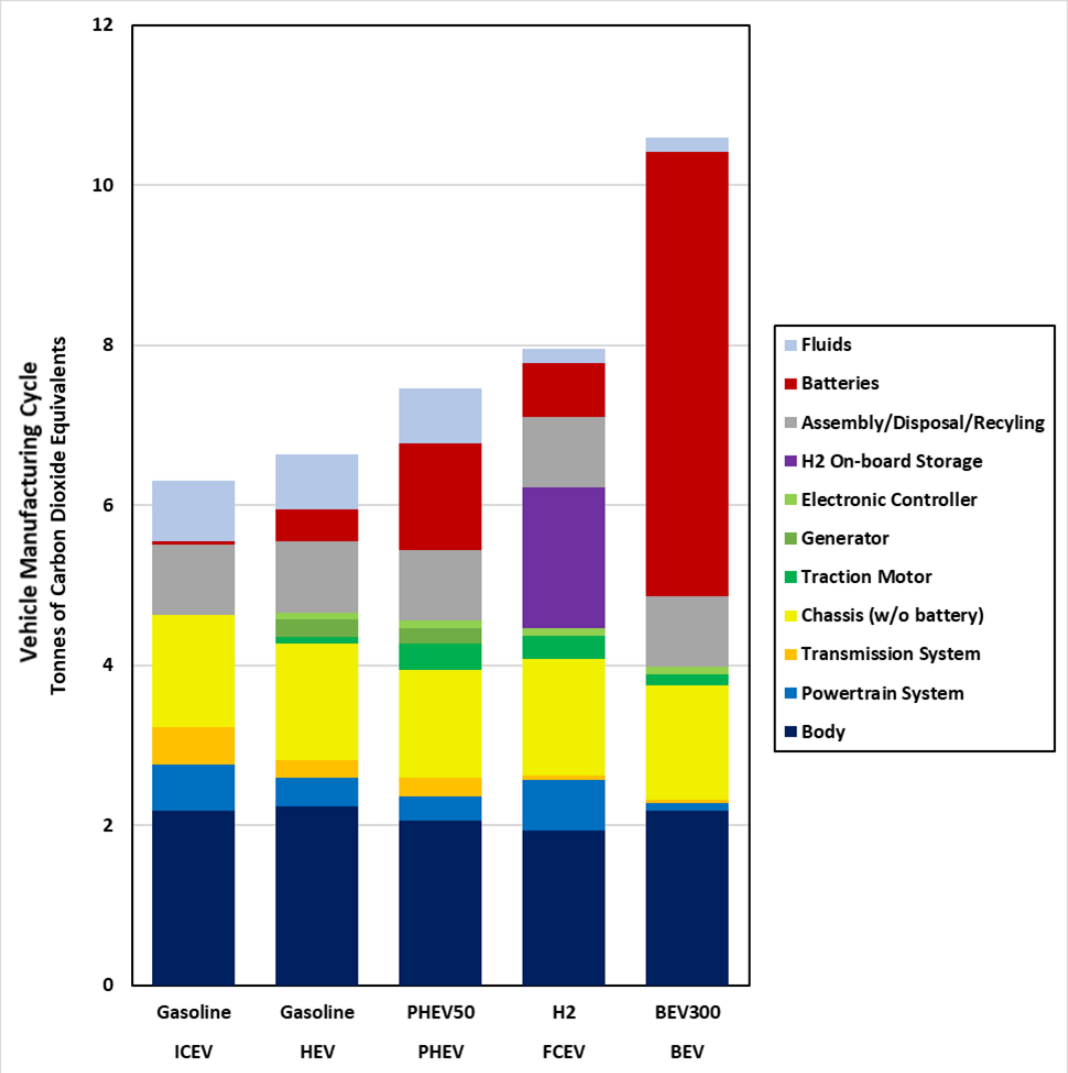


Note: BEV = Battery-electric vehicle. PHEV50 = Plug-in hybrid electric vehicle with 50-mile electric range.

Source:
Argonne National Laboratory, R&D GREET 1 2024, https://greet.anl.gov/.

Carbon dioxide emissions associated with vehicle manufacturing (current technology) were estimated using the R&D GREET model. Emissions from manufacturing the vehicle body are about two tonnes of carbon dioxide equivalent for each of the vehicle types. Emissions from the manufacture of hydrogen on-board storage cause the FCEV's manufacturing emissions to exceed those of the ICEV, HEV and PHEV50; battery manufacturing gives the BEV300 the highest total.

Figure 11.4 Vehicle Manufacturing Cycle – Total Carbon Dioxide Emissions by Vehicle Component for Selected Light-Duty Vehicles



Note: ICEV = internal combustion engine vehicle. CNG = compressed natural gas. HEV = hybrid-electric vehicle. PHEV50 = Plug-in hybrid electric vehicle with 50-mile electric range. H2FCEV = Hydrogen fuel cell electric vehicle. BEV100 = Battery-electric vehicle with a 100-mile range. BEV300 = Battery-electric vehicle with a 300-mile range.

Source:
Wang, M., et.al., *Summary of Expansions and Updates in R&D GREET® 2024*, Argonne National Laboratory, 2025, https://greet.anl.gov/**.**

Transportation accounts for the majority of the carbon monoxide and almost half of nitrogen oxide emissions. Highway vehicles account for the larger share of transportation CO, NOx and PM-10 emissions; off-highway sources account for more VOC, PM-2.5 and SO_2.

Table 11.6
Total National Emissions of Criteria Air Pollutants by Sector, 2023
(millions of short tons/percentage)

Sector	CO	NOx	VOC	PM-10	PM-2.5	SO_2
Highway vehicles	**13.01**	**1.67**	**0.82**	**0.19**	**0.06**	**0.01**
	26.6%	*24.1%*	*5.7%*	*1.1%*	*1.0%*	*0.7%*
Other off-highway	**11.63**	**1.56**	**1.00**	**0.10**	**0.09**	**0.02**
	23.8%	*22.5%*	*6.9%*	*0.6%*	*1.5%*	*1.1%*
Transportation total	**24.64**	**3.22**	**1.82**	**0.29**	**0.16**	**0.03**
	50.4%	*46.6%*	*12.6%*	*1.7%*	*2.6%*	*1.7%*
Stationary source fuel combustion	**4.76**	**2.23**	**0.63**	**0.93**	**0.86**	**1.01**
	9.8%	*32.3%*	*4.3%*	*5.3%*	*14.1%*	*59.6%*
Industrial processes	**1.66**	**1.12**	**6.96**	**0.87**	**0.43**	**0.45**
	3.4%	*16.2%*	*48.0%*	*5.0%*	*7.1%*	*26.3%*
Waste disposal and recycling total	**1.48**	**0.08**	**0.19**	**0.25**	**0.23**	**0.03**
	3.0%	*1.2%*	*1.3%*	*1.4%*	*3.7%*	*2.0%*
Miscellaneous	**16.30**	**0.25**	**4.89**	**15.17**	**4.42**	**0.18**
	33.4%	*3.7%*	*33.7%*	*86.6%*	*72.4%*	*10.4%*
Total of all sources	**48.84**	**6.92**	**14.50**	**17.51**	**6.10**	**1.70**
	100.0%	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*

Note: CO = Carbon monoxide. NO_x = Nitrogen oxides. VOC = Volatile organic compounds. PM-10 = Particulate matter less than 10 microns. PM-2.5 = Particulate matter less than 2.5 microns. SO_2 = Sulfur dioxide.

Source:
U.S. Environmental Protection Agency, National Emission Inventory Air Pollutant Emission Trends, 2025, www.epa.gov/air-emissions-inventories/air-pollutant-emissions-trends-data.
(Additional resources: www.epa.gov/air-emissions-inventories/national-emissions-inventory)

The transportation sector accounted for more than 50% of the nation's carbon monoxide (CO) emissions in 2023. Highway vehicles were nearly double the CO emissions of other transportation modes in 2009 but in 2023 were only 12% higher. For details on the highway emissions of CO, see Table 11.8.

Table 11.7
Total National Emissions of Carbon Monoxide, 1970–2023[a]
(million short tons)

Source category	1970	1980	1990	2000	2010	2020	2023	Percentage 2023
Highway vehicles	163.23	143.83	110.26	68.06	27.57	14.26	13.01	26.6%
Other off-highway	11.37	16.69	21.45	24.18	14.43	11.69	11.63	23.8%
Transportation total	174.60	160.51	131.70	92.24	41.99	25.95	24.64	50.4%
Stationary fuel combustion total	4.63	7.30	5.51	4.78	5.01	4.72	4.76	9.8%
Industrial processes total	9.84	6.95	4.77	2.63	2.17	1.60	1.66	3.4%
Waste disposal and recycling total	7.06	2.30	1.08	1.85	1.30	1.48	1.48	3.0%
Miscellaneous total	7.91	8.34	11.12	12.96	9.78	28.69	16.30	33.4%
Total of all sources	204.04	185.40	154.19	114.47	60.25	62.44	48.84	100.0%

Source:
U.S. Environmental Protection Agency, National Emission Inventory Air Pollutant Emission Trends, 2025, www.epa.gov/air-emissions-inventories/air-pollutant-emissions-trends-data
(Additional resources: www.epa.gov/air-emissions-inventories/national-emissions-inventory)

[a] The sums of subcategories may not equal total due to rounding.

Though gasoline-powered light-duty vehicles continue to be responsible for the majority of carbon monoxide emissions from highway vehicles, the total pollution from light-duty vehicles in 2008 is less than a fifth of what it was in 1970. This is despite the fact that there were many more light-duty vehicles on the road in 2008. Between 2008 and 2011 the Environmental Protection Agency updated their source from the MOBILE 6.2 emissions model to the MOVES emission model. MOVES results typically show higher emissions, especially for heavy-duty trucks. The 2020 data are the latest released.

Table 11.8
Emissions of Carbon Monoxide from Highway Vehicles, 1970–2020[a]
(million short tons)

	Gasoline			Diesel				
Year	Light-duty vehicles[b]	Heavy-duty vehicles	All	Light-duty vehicles[b]	Heavy-duty vehicles	All	Highway vehicle total	Percent diesel
1970	141.41	21.27	162.68	0.07	0.49	0.56	163.24	0.3%
1980	127.04	15.35	142.39	0.08	1.36	1.44	143.83	1.0%
1990	99.47	8.92	108.39	0.07	1.81	1.88	110.27	1.7%
1995	76.35	5.96	82.31	0.04	1.53	1.57	83.88	1.9%
2000	63.44	3.42	66.86	0.02	1.19	1.21	68.07	1.8%
2005	45.38	1.97	47.35	0.02	0.85	0.87	48.22	1.8%
2008	29.58	2.58	32.17	0.05	0.94	0.99	33.16	3.0%
2011[c]	25.34	0.86	26.20	0.38	0.77	1.15	27.35	4.2%
2014[c]	22.48	0.78	23.27	0.52	0.65	1.17	24.44	4.8%
2017[c]	18.08	0.62	18.70	0.36	0.45	0.81	19.51	4.2%
2020[c]	12.96	0.51	13.46	0.18	0.57	0.75	14.21	5.3%
Percent of total, 2020	91.2%	3.6%	94.7%	1.3%	4.0%	5.3%	100.0%	

Source:
U.S. Environmental Protection Agency, National Emission Inventory Air Pollutant Emission Trends, 2025, www.epa.gov/air-emissions-inventories/national-emissions-inventory-nei

[a] The sums of subcategories may not equal total due to rounding.
[b] Less than 8,500 pounds.
[c] These data are not directly comparable to the older data due to the change in source from the MOBILE emissions model to the MOVES emissions model.

The transportation sector accounted for more than 45% of the nation's nitrogen oxide (NOx) emissions in 2023, with the majority coming from highway vehicles. For details on the highway emissions of NOx, see Table 11.10.

Table 11.9
Total National Emissions of Nitrogen Oxides, 1970–2023[a]
(million short tons)

Source category	1970	1980	1990	2000	2010	2020	2023	Percentage, 2023
Highway vehicles	12.62	11.49	9.59	8.39	7.23	2.34	1.67	24.1%
Off-highway	2.65	3.35	3.78	4.17	2.73	1.64	1.56	22.5%
Transportation total	15.28	14.85	13.37	12.56	9.96	3.99	3.22	46.6%
Stationary fuel combustion total	10.06	11.32	10.89	8.82	3.96	2.33	2.23	32.3%
Industrial processes total	0.78	0.56	0.80	0.81	1.17	0.98	1.12	16.2%
Waste disposal and recycling total	0.44	0.11	0.09	0.13	0.06	0.08	0.08	1.2%
Miscellaneous total	0.33	0.25	0.37	0.28	0.20	0.43	0.25	3.7%
Total of all sources	26.88	27.08	25.53	22.60	15.34	7.82	6.92	100.0%

Source:
U.S. Environmental Protection Agency, National Emission Inventory Air Pollutant Emission Trends, 2025, www.epa.gov/air-emissions-inventories/air-pollutant-emissions-trends-data (Additional resources: www.epa.gov/air-emissions-inventories/national-emissions-inventory)

[a] The sums of subcategories may not equal total due to rounding.

Diesel-powered vehicles were responsible for nearly two-thirds (62.6%) of highway vehicle nitrogen oxide emissions in 2020, while light-duty gasoline vehicles were responsible for the rest. Between 2008 and 2011 the Environmental Protection Agency updated their source from the MOBILE 6.2 emissions model to the MOVES emission model. MOVES results typically show higher emissions, especially for heavy-duty trucks. The 2020 data are the latest released.

Table 11.10
Emissions of Nitrogen Oxides from Highway Vehicles, 1970–2020[a]
(million short tons)

	Gasoline			Diesel				
Year	Light-duty vehicles[b]	Heavy-duty vehicles	All	Light-duty vehicles[b]	Heavy-duty vehicles	All	Highway vehicle total	Percent diesel
1970	10.08	0.72	10.80	0.07	1.76	1.83	12.63	14.5%
1980	8.21	0.62	8.83	0.08	2.59	2.67	11.50	23.2%
1990	5.76	0.57	6.33	0.06	3.19	3.25	9.58	33.9%
1995	4.51	0.52	5.03	0.03	3.82	3.85	8.88	43.4%
2000	3.75	0.45	4.20	0.02	4.18	4.20	8.40	50.0%
2005	3.19	0.38	3.57	0.01	2.81	2.82	6.39	44.1%
2008	3.39	0.27	3.67	0.08	3.20	3.27	6.94	47.2%
2011[c]	3.09	0.09	3.18	0.13	2.56	2.69	5.87	45.8%
2014[c]	2.29	0.09	2.38	0.11	2.17	2.28	4.66	48.9%
2017[c]	2.51	0.08	2.59	0.17	2.12	2.29	4.88	46.9%
2020[c]	0.85	0.03	0.88	0.14	1.32	1.47	2.34	62.6%
Percent of total, 2020	36.1%	1.3%	37.4%	6.1%	56.5%	0.63	1.00	

Source:
U.S. Environmental Protection Agency, National Emission Inventory Air Pollutant Emission Trends, 2025, www.epa.gov/air-emissions-inventories/national-emissions-inventory-nei
(Additional resources: www.epa.gov/air-emissions-inventories/national-emissions-inventory)

[a] The sums of subcategories may not equal total due to rounding.
[b] Less than 8,500 pounds.
[c] These data are not directly comparable to the older data due to the change in source from the MOBILE emissions model to the MOVES emissions model.

The transportation sector accounted for about 13% of the nation's volatile organic compound (VOC) emissions in 2023, with the majority coming from off-highway vehicles. For details on the highway emissions of VOC, see Table 11.12.

Table 11.11
Total National Emissions of Volatile Organic Compounds, 1970–2023[a] (million short tons)

Source category	1970	1980	1990	2000	2010	2020	2023	Percentage, 2023
Highway vehicles	16.91	13.87	9.39	5.33	2.29	1.04	0.82	5.7%
Off-highway	1.62	2.19	2.66	2.64	1.90	1.08	1.00	6.9%
Transportation total	18.53	16.06	12.05	7.97	4.18	2.12	1.82	12.6%
Stationary fuel combustion total	0.72	1.05	1.01	1.18	0.60	0.63	0.63	4.3%
Industrial processes total	12.33	12.10	9.01	7.21	6.11	6.50	6.96	48.0%
Waste disposal and recycling total	1.98	0.76	0.99	0.42	0.17	0.20	0.19	1.3%
Miscellaneous total	1.10	1.13	1.06	0.73	2.53	7.18	4.89	33.7%
Total of all sources	34.66	31.11	24.11	17.51	13.60	16.63	14.50	100.0%

Source:
U.S. Environmental Protection Agency, National Emission Inventory Air Pollutant Emission Trends, 2025, www.epa.gov/air-emissions-inventories/air-pollutant-emissions-trends-data
(Additional resources: www.epa.gov/air-emissions-inventories/national-emissions-inventory)

[a] The sum of subcategories may not equal total due to rounding. The EPA's definition of volatile organic compounds excludes methane, ethane, and certain other nonphotochemically reactive organic compounds.

Gasoline-powered vehicles were responsible for 90% of highway vehicle emissions of volatile organic compounds in 2020. Between 2008 and 2011 the Environmental Protection Agency updated their source from the MOBILE 6.2 emissions model to the MOVES emission model. MOVES results typically show higher emissions, especially for heavy-duty trucks. The 2020 data are the latest available.

Table 11.12
Emissions of Volatile Organic Compounds from Highway Vehicles, 1970–2020[a]
(thousand short tons)

	Gasoline			Diesel				
Year	Light-duty vehicles[b]	Heavy-duty vehicles	All	Light-duty vehicles[b]	Heavy-duty vehicles	All	Highway vehicle total	Percent diesel
1970	14,772	1,679	16,451	49	411	460	16,911	2.7%
1980	12,168	1,198	13,366	44	459	503	13,869	3.6%
1990	8,307	633	8,940	33	415	448	9,388	4.8%
1995	5,993	421	6,414	19	315	334	6,748	4.9%
2000	4,832	256	5,088	7	230	237	5,325	4.5%
2005	3,740	171	3,911	8	159	167	4,078	4.1%
2008	2,660	169	2,829	10	213	223	3,052	7.3%
2011[c]	2,345	40	2,385	43	213	256	2,641	9.7%
2014[c]	1,811	41	1,852	26	174	200	2,052	9.7%
2017[c]	1,966	36	2,002	52	162	214	2,216	9.7%
2020[c]	835	27	861	24	69	93	954	9.7%
Percent of total, 2020	87.5%	2.8%	90.3%	2.5%	7.2%	9.7%	100.0%	

Source:
U.S. Environmental Protection Agency, National Emission Inventory Air Pollutant Emission Trends website:
www.epa.gov/air-emissions-inventories/national-emissions-inventory-nei
(Additional resources: www.epa.gov/air-emissions-inventories/national-emissions-inventory)

[a] The sums of subcategories may not equal total due to rounding.
[b] Less than 8,500 pounds.
[c] These data are not directly comparable to the older data due to the change in source from the MOBILE emissions model to the MOVES emissions model.

The transportation sector accounted for 2% of the nation's particulate matter (PM-10) emissions in 2023. For details on the highway emissions of PM-10, see Table 11.14.

Table 11.13
Total National Emissions of Particulate Matter (PM-10), 1970–2023[a]
(million short tons)

Source category	1970	1980	1990	2000	2010	2020	2023	Percentage, 2023
Highway vehicles	0.48	0.43	0.39	0.23	0.28	0.22	0.19	1.1%
Off-highway	0.16	0.26	0.33	0.32	0.23	0.12	0.10	0.6%
Transportation total	0.64	0.69	0.72	0.55	0.51	0.34	0.29	1.7%
Stationary fuel combustion total	2.87	2.45	1.20	1.47	0.98	0.75	0.93	5.3%
Industrial processes total	7.67	2.75	1.04	0.71	1.05	0.90	0.87	5.0%
Waste disposal and recycling total	1.00	0.27	0.27	0.36	0.21	0.23	0.25	1.4%
Miscellaneous total	0.84[b]	0.85[b]	24.54	20.65	18.08	14.78	15.17	86.6%
Total of all sources	13.02	7.01	27.75	23.75	20.82	16.99	17.51	100.0%

Note: Because PM-10 is fine particulate matter less than 10 microns, it also includes PM-2.5. Specific data for PM-2.5 are shown on Tables 11.15 and 11.16.

Source:
U.S. Environmental Protection Agency, National Emission Inventory Air Pollutant Emission Trends, 2025, www.epa.gov/air-emissions-inventories/air-pollutant-emissions-trends-data
(Additional resources: www.epa.gov/air-emissions-inventories/national-emissions-inventory)

[a] Fine particulate matter less than 10 microns. The sums of subcategories may not equal total due to rounding.
[b] Estimates for 1970 and 1980 exclude fugitive dust and other miscellaneous sources and are not comparable with 1990 and later years.

In 2020, diesel-powered vehicles were responsible for 40% of highway vehicle emissions of particulate matter (PM-10); in 1990, diesels were responsible for 73%. Between 2008 and 2011, the Environmental Protection Agency updated their source from the MOBILE 6.2 emissions model to the MOVES emission model. MOVES results typically show higher emissions, especially for heavy-duty trucks. The latest data are from 2020.

Table 11.14
Emissions of Particulate Matter (PM-10) from Highway Vehicles, 1970–2020[a]
(thousand short tons)

	Gasoline			Diesel				
Year	Light-duty vehicles[b]	Heavy-duty vehicles	All	Light-duty vehicles[b]	Heavy-duty vehicles	All	Highway vehicle total	Percent diesel
1970	323	44	367	21	92	113	480	23.5%
1980	190	30	220	21	191	212	432	49.1%
1990	87	17	104	16	268	284	388	73.2%
1995	85	13	98	7	199	206	304	67.8%
2000	82	10	92	2	135	137	229	59.8%
2005	81	8	89	2	92	94	183	51.4%
2008	140	7	147	5	179	185	332	55.6%
2011[c]	199	3	202	10	159	169	371	45.6%
2014[c]	163	4	168	10	127	137	304	44.9%
2017[c]	138	4	141	8	90	98	240	41.0%
2020[c]	110	4	113	9	67	76	190	40.2%
Percent of total, 2020	57.9%	1.9%	59.8%	4.8%	35.4%	40.2%	100%	

Note: Because PM-10 is fine particulate matter less than 10 microns, it also includes PM-2.5. Specific data for PM-2.5 are shown on Tables 11.15 and 11.16.

Source:
U.S. Environmental Protection Agency, National Emission Inventory Air Pollutant Emission Trends, 2025, www.epa.gov/air-emissions-inventories/national-emissions-inventory-nei
(Additional resources: www.epa.gov/air-emissions-inventories/national-emissions-inventory)

[a] The sums of subcategories may not equal total due to rounding.
[b] Less than 8,500 pounds.
[c] These data are not directly comparable to the older data due to the change in source from the MOBILE emissions model to the MOVES emissions model.

The transportation sector accounted for about 3% of the nation's particulate matter (PM-2.5) emissions in 2023. For details on the highway emissions of PM-2.5, see Table 11.16.

Table 11.15
Total National Emissions of Particulate Matter (PM-2.5), 1990–2023[a]
(million short tons)

Source category	1990	2000	2005	2010	2020	2023	Percentage, 2023
Highway vehicles	0.32	0.17	0.31	0.20	0.09	0.06	1.0%
Off-highway	0.30	0.30	0.29	0.21	0.11	0.09	1.5%
Transportation total	0.62	0.47	0.60	0.41	0.20	0.16	2.6%
Stationary fuel combustion total	0.91	1.29	1.13	0.84	0.66	0.86	14.1%
Industrial processes total	0.56	0.50	0.53	0.40	0.39	0.43	7.0%
Waste disposal and recycling total	0.23	0.33	0.27	0.18	0.20	0.23	3.8%
Miscellaneous total	5.23	4.69	3.07	4.11	4.19	4.42	72.5%
Total of all sources	7.56	7.29	5.59	5.96	5.64	6.10	100.0%

Source:
U.S. Environmental Protection Agency, National Emission Inventory Air Pollutant Emission Trends
Website: www.epa.gov/air-emissions-inventories/air-pollutant-emissions-trends-data
(Additional resources: www.epa.gov/air-emissions-inventories/national-emissions-inventory)

[a] The sums of subcategories may not equal total due to rounding.

Diesel vehicles are responsible for the majority of highway vehicle PM-2.5 emissions. Half of all highway vehicles' PM-2.5 emissions are from heavy-duty diesel trucks. Between 2008 and 2011 the Environmental Protection Agency updated their source from the MOBILE 6.2 emissions model to the MOVES emission model. MOVES results typically show higher emissions, especially for heavy-duty trucks. The 2020 data are the latest released.

Table 11.16
Emissions of Particulate Matter (PM-2.5) from Highway Vehicles, 1990–2020[a]
(thousand short tons)

	Gasoline			Diesel				
Year	Light-duty vehicles[b]	Heavy-duty vehicles	All	Light-duty vehicles[b]	Heavy-duty vehicles	All	Highway vehicle total	Percent diesel
1990	56	11	67	13	243	256	323	79.3%
1995	50	9	59	6	179	185	244	75.8%
2000	45	7	52	2	119	121	173	69.9%
2005	41	6	47	2	79	81	128	63.3%
2008	83	4	88	5	160	165	253	65.4%
2011[c]	68	2	70	6	120	126	196	64.3%
2014[c]	62	2	64	7	92	99	163	60.8%
2017[c]	50	1	51	6	57	63	114	55.2%
2020[c]	32	1	33	7	40	46	79	58.5%
Percent of total, 2020	39.9%	1.6%	41.5%	8.3%	50.2%	58.5%	100.0%	

Source:
U.S. Environmental Protection Agency, National Emission Inventory Air Pollutant Emission Trends, 2025,
www.epa.gov/air-emissions-inventories/national-emissions-inventory-nei
(Additional resources: www.epa.gov/air-emissions-inventories/national-emissions-inventory)

[a] The sums of subcategories may not equal total due to rounding.
[b] Less than 8,500 pounds.
[c] These data are not directly comparable to the older data due to the change in source from the MOBILE emissions model to the MOVES emissions model.

The transportation sector accounted for less than 2% of the nation's sulfur dioxide (SO2) emissions in 2023, with off-highway vehicles responsible for most of the emissions. Stationary fuel combustion (e.g. electricity generation) was responsible for about 60% of all SO2 emissions in 2023.

Table 11.17
Total National Emissions of Sulfur Dioxide, 1970–2023[a]
(million short tons)

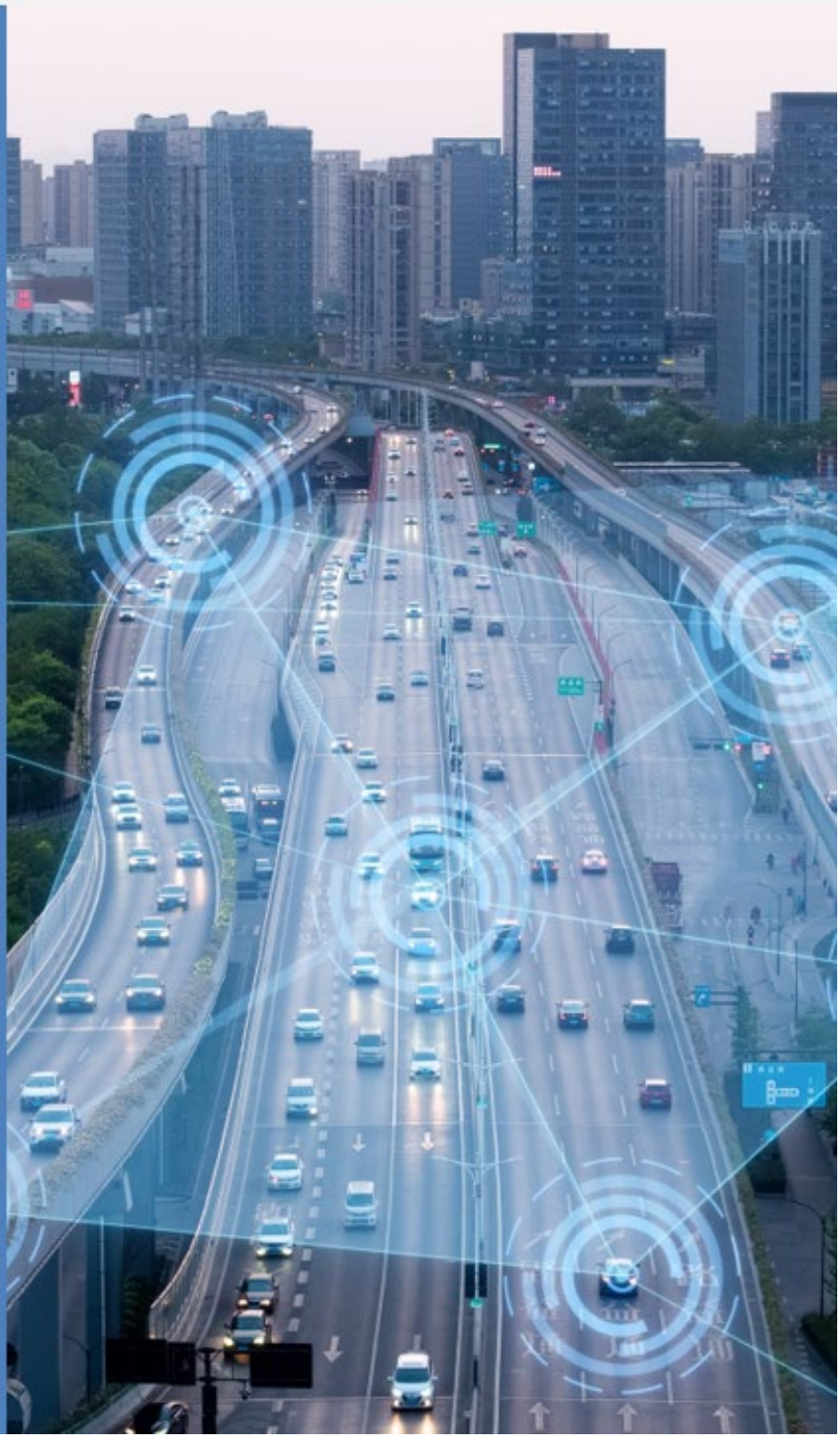
Source category	1970	1980	1990	2000	2010	2020	2023	Percentage, 2023
Highway vehicles	0.27	0.39	0.50	0.26	0.04	0.01	0.01	0.7%
Other off-highway	0.28	0.32	0.37	0.44	0.13	0.02	0.02	1.1%
Transportation total	0.55	0.72	0.87	0.70	0.17	0.03	0.03	1.7%
Stationary fuel combustion total	23.46	21.39	20.29	14.16	6.07	1.11	1.01	59.6%
Industrial processes total	7.09	3.77	1.86	1.38	0.59	0.45	0.45	26.3%
Waste disposal and recycling total	0.01	0.03	0.04	0.03	0.02	0.04	0.03	2.0%
Miscellaneous total	0.11	0.01	0.01	0.07	0.09	0.22	0.18	10.4%
Total of all sources	31.22	25.93	23.08	16.35	6.94	1.84	1.70	100.0%

Source:
U.S. Environmental Protection Agency, National Emission Inventory Air Pollutant Emission Trends, 2025, www.epa.gov/air-emissions-inventories/air-pollutant-emissions-trends-data
(Additional resources: www.epa.gov/air-emissions-inventories/national-emissions-inventory)

[a] The sums of subcategories may not equal total due to rounding.

Appendix A

SOURCES & METHODOLOGIES



Credit: Getty Images

SOURCES & METHODOLOGIES

This TEDB appendix contains documentation of the estimation procedures used by ORNL. The reader can examine the methodology behind the estimates and form an opinion as to their utility. The appendix is arranged by subject heading. Only tables which contain ORNL estimations are documented in Appendix A; all other tables have sources listed at the bottom of the table. Since abbreviations are used throughout the appendix, a list of abbreviations is also included.

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1. LIST OF ABBREVIATIONS USED IN APPENDIX A

AAR	Association of American Railroads
APTA	American Public Transportation Association
Amtrak	National Railroad Passenger Corporation
BTS	Bureau of Transportation Statistics
Btu	British thermal unit
CNG	Compressed Natural Gas
CO_2	Carbon Dioxide
CPI	Consumer Price Index
CY	Calendar Year
DOE	Department of Energy
DOT	Department of Transportation
EIA	Energy Information Administration
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
IRS	Internal Revenue Service
GGE	gasoline gallon equivalent
gal	Gallons
kWh	Kilowatt hour
L	Liter
lb	Pound
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
mpg	Miles per Gallon
NHTS	National Household Travel Survey
NPTS	Nationwide Personal Transportation Survey
NVPP	National Vehicle Population Profile
ORNL	Oak Ridge National Laboratory
psi	Pounds per square inch
RTECS	Residential Transportation Energy Consumption Survey
SCF	Standard Cubic Feet
TEDB	Transportation Energy Data Book
TIUS	Truck Inventory and Use Survey
VIUS	Vehicle Inventory and Use Survey
VMT	Vehicle-miles traveled

2. ENERGY USE SOURCES

2.1 HIGHWAY ENERGY USE

2.1.1 Cars

Fuel use in gallons (1970-2008) – DOT, FHWA, *Highway Statistics 2008*, Table VM-1 and previous editions back to 1996; DOT, FHWA, *Highway Statistics Summary* to 1995.

Fuel use in gallons (2009–2023) – See Section 7. Appendix A Car and Light Truck Shares.

Fuel type distribution for gallons – Fuel use was distributed among fuel types using the percentages shown in Table A.1. The FHWA discontinued gasohol data in 2005. Therefore, data from EIA, *Alternatives to Traditional Transportation Fuels*, 2006-2011, Table C1 were used through 2013. From 2014 on, author estimates were used, with knowledge of how the Renewable Fuels Standard affects the gasoline/gasohol mix.

Electricity use (2010-2021) – Estimates derived using cumulative electric vehicle (EV) and plug-in hybrid vehicle (PHEV) sales as a proxy for vehicle population; sales-weighted vehicle efficiencies from the U.S. Department of Energy and U.S. Environmental Protection Agency's vehicle database on www.fueleconomy.gov; and annual miles traveled from varying PHEV utility factors and EV usage assumptions. Methodology documented in an Argonne National Laboratory report, *Assessment of Light-Duty Plug-in Electric Vehicles in the United States, 2010 – 2021*, November 2022.

Electricity use (2022-2023) – Estimates using the same methodology as the 2010-2021 data obtained via personal communication with Argonne National Laboratory.

For tables in the main body of the TEDB, electricity was converted from kWh to Btu using 3,412 Btu/kWh.

Table A.1
Car Fuel Use and Fuel Type Shares for Calculation of Energy Use

Year	Fuel use (million gallons)	Source for gasohol shares	Source for gasoline/diesel shares	Shares by fuel type[b]		
				Gasoline	Gasohol	Diesel
1970	67,820		1984 NVPP	99.8%	0.0%	0.2%
1971	71,346		interpolated	99.2%	0.0%	0.8%
1972	75,937		interpolated	98.7%	0.0%	1.3%
1973	78,233		interpolated	98.1%	0.0%	1.9%
1974	74,229		interpolated	97.5%	0.0%	2.5%
1975	74,140		interpolated	97.0%	0.0%	3.0%
1976	78,297		interpolated	96.4%	0.0%	3.6%
1977	79,060		interpolated	95.8%	0.0%	4.2%
1978	80,652		interpolated	95.3%	0.0%	4.7%
1979	76,588		1979 RTECS	94.7%	0.0%	5.3%
1980	69,981	FHWA, MF-33e	interpolated	93.9%	0.5%	5.6%
1981	69,112	FHWA, MF-33e	1981 RTECS	93.4%	0.7%	5.9%
1982	69,116	FHWA, MF-33e	interpolated	93.5%	2.3%	4.2%
1983	70,322	FHWA, MF-33e	1983 RTECS	93.2%	4.3%	2.5%
1984	70,663	FHWA, MF-33e	interpolated	92.7%	5.3%	2.0%
1985	71,518	FHWA, MF-33e	1985 RTECS	90.8%	7.7%	1.5%
1986	73,174	FHWA, MF-33e	interpolated	91.0%	7.6%	1.4%
1987	73,308	FHWA, MF-33e	interpolated	92.4%	6.3%	1.3%
1988	73,345	FHWA, MF-33e	1988 RTECS	91.4%	7.4%	1.2%
1989	73,913	FHWA, MF-33e	interpolated	92.6%	6.2%	1.2%
1990	69,568	FHWA, MF-33e	interpolated	92.0%	6.8%	1.2%
1991	64,318	FHWA, MF-33e	1991 RTECS	90.8%	8.0%	1.2%
1992	65,436	FHWA, MF-33e	interpolated	90.8%	7.9%	1.2%
1993	67,047	FHWA, MF-33e	interpolated	89.7%	9.1%	1.3%
1994	67,874	FHWA, MF-33e	1994 RTECS	89.1%	9.6%	1.3%
1995	68,072	FHWA, MF-33e	interpolated	87.6%	11.2%	1.2%
1996	69,221	FHWA, MF-33e	interpolated	88.8%	10.1%	1.0%
1997	69,892	FHWA, MF-33e	interpolated	86.9%	12.2%	0.9%
1998	71,695	FHWA, MF-33e	interpolated	88.0%	11.2%	0.8%
1999	73,283	FHWA, MF-33e	interpolated	88.3%	11.0%	0.6%
2000	73,065	FHWA, MF-33e	2000 NVPP	86.9%	12.6%	0.5%
2001	73,559	FHWA, MF-33e	2001 NVPP	86.5%	13.0%	0.5%
2002	75,471	FHWA, MF-33e	2001 NVPP	83.9%	15.6%	0.5%
2003	74,590	FHWA, MF-33e	2001 NVPP	75.3%	24.2%	0.5%
2004	75,402	FHWA, MF-33e	2001 NVPP	67.2%	32.3%	0.5%
2005	77,418	FHWA, MF-33e	2001 NVPP	66.9%	32.6%	0.5%
2006	75,009	EIA, C1	2001 NVPP	78.2%	21.3%	0.5%
2007	74,377	EIA, C1	2001 NVPP	72.9%	26.6%	0.5%
2008	71,497 [a]	EIA, C1	2001 NVPP	61.8%	37.7%	0.5%
2009	66,587	EIA, C1	2001 NVPP	55.8%	43.7%	0.5%
2010	62,245	EIA, C1	2001 NVPP	49.5%	50.0%	0.5%
2011	59,646	EIA, C1	2001 NVPP	48.7%	50.8%	0.5%
2012	57,899	EIA, C1	2001 NVPP	48.7%	50.8%	0.5%
2013	57,290	EIA, C1	2001 NVPP	49.0%	50.5%	0.5%
2014	56,420	Author estimates	2001 NVPP	24.5%	75.0%	0.5%
2015	55,212	Author estimates	2001 NVPP	14.5%	85.0%	0.5%
2016	54,248	Author estimates	2001 NVPP	4.5%	95.0%	0.5%
2017	52,268	Author estimates	2001 NVPP	4.5%	95.0%	0.5%
2018	51,174	Author estimates	2001 NVPP	4.5%	95.0%	0.5%
2019	48,579	Author estimates	2001 NVPP	4.5%	95.0%	0.5%
2020	41,427	Author estimates	2001 NVPP	4.5%	95.0%	0.5%
2021	42,431	Author estimates	2001 NVPP	4.5%	95.0%	0.5%
2022	41,047	Author estimates	2001 NVPP	4.5%	95.0%	0.5%
2023	39,230	Author estimates	2001 NVPP	4.5%	95.0%	0.5%
Heat content used for conversion to Btu:				125,000 Btu/gallon	120,900 Btu/gallon	138,700 Btu/gallon

[a] Data are not continuous between 2008 and 2009 due to changes in source.
[b] Percentages may not sum to totals due to rounding.

2.1.2 Motorcycles

DOT, FHWA, *Highway Statistics 2023*, Table VM-1, and previous editions. The FHWA made methodology changes for *Highway Statistics 2009-10*. At that time, they published historical data back to 2007 which do not match the previous data.

Table A.2
Motorcycle Fuel Use

Year	Fuel use (thousand gallons)	Year	Fuel use (thousand gallons)	
1970	59,580	1997	201,620	
1971	72,140	1998	205,660	
1972	86,620	1999	211,680	
1973	103,880	2000	209,380	
1974	108,900	2001	192,780	
1975	112,580	2002	191,040	
1976	120,060	2003	190,780	
1977	126,980	2004	202,447	
1978	143,160	2005	189,495	
1979	172,740	2006	221,030	[a]
1980	204,280	2007	474,923	
1981	213,800	2008	489,417	
1982	198,200	2009	482,290	
1983	175,200	2010	426,732	
1984	175,680	2011	426,378	
1985	181,720	2012	491,130	
1986	187,940	2013	467,716	
1987	190,120	2014	458,628	
1988	200,480	2015	447,879	
1989	207,420	2016	465,802	
1990	191,140	2017	458,429	
1991	183,560	2018	456,657	
1992	191,140	2019	447,864	
1993	198,120	2020	408,170	
1994	204,800	2021	446,708	
1995	198,262	2022	540,572	
1996	195,940	2023	459,065	
Heat content used for conversion to Btu:			125,000 Btu/gallon	

[a] Data are not continuous between 2006 and 2007 due to changes in estimation methodology. See source document for details.

2.1.3 Buses

Transit

APTA, *2025 Public Transportation Fact Book*, Washington, DC, 2025. Includes motorbus and trolley bus data.

Table A.3
Transit Bus Fuel Use

Year	LNG (million gallons)	LPG (million gallons)	CNG (million gallons)	Gasoline (million gallons)	Diesel fuel (million gallons)	Electricity (million kilowatt hours)	Biodiesel (million gallons)	Methanol (million gallons)
1994	1.1	0.2	3.1	2.1	565.1	102.9	[a]	12.5
1995	1.7	0.3	10.0	2.3	563.8	100.0	[a]	12.0
1996	2.3	0.6	11.5	1.8	577.7	69.0	[a]	11.6
1997	3.3	1.0	20.0	2.7	597.6	78.0	[a]	8.7
1998	3.1	0.9	32.6	2.0	606.6	74.0	[a]	5.0
1999	5.3	0.8	39.9	1.4	618.0	75.0	[a]	2.7
2000	10.5	0.7	50.4	1.3	635.2	77.0	[a]	0.8
2001	11.7	1.2	60.9	1.5	587.2	74.0	[a]	0.8
2002	16.8	1.8	77.8	1.3	559.0	73.0	[a]	1.8
2003	14.2	1.8	94.9	1.1	536.0	69.0	[a]	1.9
2004	16.5	1.7	106.7	1.8	550.5	68.0	[a]	4.7
2005	18.3	2.0	117.2	1.0	533.8	67.0	[a]	8.1
2006	19.6	1.6	138.8	2.3	536.7	62.0	20.5	0.9
2007	18.3	[a]	129.1	2.5	494.1	61.0	25.8	1.3
2008	17.9	[a]	135.5	3.8	493.3	62.2	41.8	0.9
2009	25.5	[a]	141.6	6.7	455.5	69.5	40.6	0.0
2010	23.0	[a]	126.2	8.1	435.4	66.0	43.5	0.0
2011	21.6	[a]	131.1	8.9	455.1	61.0	51.1	0.0
2012	19.6	[a]	127.3	12.5	439.0	61.0	56.6	0.0
2013	17.6	6.3	134.9	12.9	427.5	63.0	66.2	0.0
2014	15.4	6.2	146.0	11.7	413.6	64.0	38.1	1.2
2015	11.3	8.2	158.9	11.1	415.0	62.0	43.9	0.9
2016	10.7	6.9	170.3	11.6	428.9	64.3	43.2	0.0
2017	4.9	6.7	173.8	12.9	432.0	62.4	37.2	0.6
2018	3.0	2.8	181.0	13.3	399.5	62.8	49.4	0.2
2019	2.7	2.2	190.7	13.9	399.9	57.0	41.0	0.2
2020	1.5	1.6	176.5	13.7	338.9	50.4	32.5	0.2
2021	0.0	1.8	170.3	11.6	315.1	48.4	28.7	0.8
2022	0.0	2.0	178.6	11.6	323.3	52.0	28.4	0.1
2023	0.0	1.8	188.3	11.2	325.4	45.5	25.6	5.1
Heat content used for conversion to Btu:	84,800 Btu/gallon	91,300 Btu/gallon	138,700 Btu/gallon	125,000 Btu/gallon	138,700 Btu/gallon	3,412 Btu/kWh	126,200 Btu/gallon	64,600 Btu/gallon

Note: CNG is reported in diesel-gallon equivalents.

[a] Data are not available.

Intercity and School

Fuel use (1970-2000) – Eno Transportation Foundation, *Transportation in America, 2001, Nineteenth Edition*, 2003, Washington, DC, pp. 20–23. School bus fuel was assumed to be 90% diesel fuel and 10% gasoline based on estimates from the National Association of State Directors of Pupil Transportation Services. Intercity bus fuel was assumed to be 100% diesel.

Fuel use (2001-2023) – Estimated from 2000 data using the rate of change of bus vehicle-miles traveled from DOT, FHWA, *Highway Statistics 2023*, Table VM-1, and previous editions.

Table A.4
Intercity and School Bus Fuel Use

Year	Intercity (million gallons)	School (million gallons)
1970	305.34	299.88
1971	296.73	309.75
1972	288.12	319.62
1973	252.42	327.04
1974	216.72	334.46
1975	181.02	341.88
1976	182.28	389.76
1977	181.86	401.52
1978	180.18	406.98
1979	205.38	404.88
1980	213.78	379.68
1981	205.38	386.82
1982	227.22	398.58
1983	237.30	400.68
1984	169.26	375.06
1985	165.48	425.04
1986	148.68	462.42
1987	155.82	487.20
1988	160.44	511.14
1989	166.74	498.12
1990	159.60	472.08
1991	160.44	533.40
1992	157.08	546.00
1993	171.36	533.40
1994	195.30	546.00
1995	195.30	545.16
1996	199.92	545.16
1997	212.52	544.74
1998	220.08	550.20
1999	241.08	555.66
2000	233.10	577.08
2001	217.35	538.08
2002	210.22	520.44
2003	208.32	515.72
2004	208.87	517.09
2005	214.37	530.70
2006	208.32	515.72
2007	214.37	530.70
2008	218.48	540.89
2009	224.58	556.00
2010	214.95	532.15

Table A.4 (Continued)
Intercity and School Bus Fuel Use

2011	215.53	533.58
2012	230.42	570.45
2013	236.76	586.14
2014	249.75	618.29
2015	253.35	627.22
2016	255.22	631.84
2017	268.92	665.76
2018	285.72	707.35
2019	280.67	694.85
2020	234.73	581.12
2021	261.38	647.08
2022	288.63	714.56
2023	276.32	684.07
Fuel type shares	100% diesel	90% diesel 10% gasoline
Heat content used for conversion to Btu:	138,700 Btu/gallon	138,700 Btu/gallon 125,000 Btu/gallon

2.1.4 Trucks

Light Duty Trucks

Fuel use in gallons (1970-2007) – DOT, FHWA, *Highway Statistics 2008*, Table VM-1 and annual editions back to 1996 and DOT, FHWA, *Highway Statistics Summary to 1995.*

Fuel use in gallons (2008–2023) – See Section 7. Appendix A Car and Light Truck Shares.

Fuel type distribution for gallons – Fuel use was distributed among fuel types using the percentages shown in Table A.1. The FHWA discontinued gasohol data in 2005. Therefore, data from EIA, *Alternatives to Traditional Transportation Fuels*, 2006-2011, Table C1 were used through 2013. From 2014 on, author estimates were used, with knowledge of how the Renewable Fuels Standard affects the gasoline/gasohol mix.

Electricity use (2010-2021) – Estimates derived using cumulative electric vehicle (EV) and plug-in hybrid vehicle (PHEV) sales as a proxy for vehicle population; sales-weighted vehicle efficiencies from the U.S. Department of Energy and U.S. Environmental Protection Agency's vehicle database on www.fueleconomy.gov; and annual miles traveled from varying PHEV utility factors and EV usage assumptions. Methodology documented in an Argonne National Laboratory report, *Assessment of Light-Duty Plug-in Electric Vehicles in the United States, 2010 – 2021*, November 2022.

Electricity use (2022-2023) – Estimates using the same methodology as the 2010-2021 data obtained via personal communication with Argonne National Laboratory.

For tables in the main body of the TEDB, electricity was converted from kWh to Btu using 3,412 Btu/kWh.

Table A.5
Light Duty Truck Fuel Use and Fuel Type Shares for Calculation of Energy Use

Year	Fuel use (million gallons)	Source for gasohol shares	Source for gasoline/diesel /LPG shares	Shares by fuel type			
				Gasoline	Gasohol	Diesel	LPG
1970	12,313		1977 TIUS	97.6%	0.0%	1.6%	0.8%
1975	19,081		1977 TIUS	97.6%	0.0%	1.6%	0.8%
1976	20,828		1977 TIUS	97.6%	0.0%	1.6%	0.8%
1977	22,383		1977 TIUS	97.6%	0.0%	1.6%	0.8%
1978	24,162		Interpolated	97.1%	0.0%	2.0%	0.9%
1979	24,445		Interpolated	96.7%	0.0%	2.4%	1.0%
1980	23,796	FHWA, MF-33e	Interpolated	95.7%	0.5%	2.7%	1.0%
1981	23,697	FHWA, MF-33e	Interpolated	95.1%	0.7%	3.1%	1.1%
1982	22,702	FHWA, MF-33e	1982 TIUS	93.0%	2.3%	3.5%	1.2%
1983	23,945	FHWA, MF-33e	Interpolated	91.0%	4.3%	3.5%	1.2%
1984	25,604	FHWA, MF-33e	Interpolated	90.0%	5.3%	3.5%	1.2%
1985	27,363	FHWA, MF-33e	Interpolated	87.6%	7.7%	3.5%	1.2%
1986	29,074	FHWA, MF-33e	Interpolated	87.7%	7.6%	3.5%	1.2%
1987	30,598	FHWA, MF-33e	1987 TIUS	89.0%	6.3%	3.5%	1.2%
1988	32,653	FHWA, MF-33e	Interpolated	88.2%	7.4%	3.5%	1.0%
1989	33,271	FHWA, MF-33e	Interpolated	89.5%	6.2%	3.4%	0.8%
1990	35,611	FHWA, MF-33e	Interpolated	89.2%	6.8%	3.4%	0.7%
1991	38,217	FHWA, MF-33e	Interpolated	88.1%	8.0%	3.3%	0.5%
1992	40,929	FHWA, MF-33e	1992 TIUS	88.5%	7.9%	3.3%	0.3%
1993	42,851	FHWA, MF-33e	Interpolated	87.3%	9.1%	3.3%	0.3%
1994	44,112	FHWA, MF-33e	Interpolated	86.8%	9.6%	3.3%	0.3%
1995	45,605	FHWA, MF-33e	Interpolated	85.1%	11.2%	3.4%	0.3%
1996	47,354	FHWA, MF-33e	Interpolated	86.2%	10.1%	3.4%	0.3%
1997	49,388	FHWA, MF-33e	1997 VIUS	84.2%	12.2%	3.4%	0.2%
1998	50,462	FHWA, MF-33e	Interpolated	85.0%	11.2%	3.5%	0.3%
1999	52,859	FHWA, MF-33e	Interpolated	84.9%	11.0%	3.6%	0.4%
2000	52,939	FHWA, MF-33e	Interpolated	83.1%	12.6%	3.8%	0.6%
2001	53,522	FHWA, MF-33e	Interpolated	82.4%	13.0%	3.9%	0.7%
2002	55,220	FHWA, MF-33e	2002 VIUS	79.6%	15.6%	4.0%	0.8%
2003	60,758	FHWA, MF-33e	2002 VIUS	71.0%	24.2%	4.0%	0.8%
2004	63,417	FHWA, MF-33e	2002 VIUS	62.9%	32.3%	4.0%	0.8%
2005	58,869	FHWA, MF-33e	2002 VIUS	62.6%	32.6%	4.0%	0.8%
2006	60,685	EIA, C1	2002 VIUS	73.9%	21.3%	4.0%	0.8%
2007	61,836	EIA, C1	2002 VIUS	68.6%	26.6%	4.0%	0.8%
2008	61,199 [a]	EIA, C1	2002 VIUS	57.5%	37.7%	4.0%	0.8%
2009	61,824	EIA, C1	2002 VIUS	51.5%	43.7%	4.0%	0.8%
2010	64,687	EIA, C1	2002 VIUS	45.2%	50.0%	4.0%	0.8%
2011	65,786	EIA, C1	2002 VIUS	44.4%	50.8%	4.0%	0.8%
2012	66,395	EIA, C1	2002 VIUS	44.4%	50.8%	4.0%	0.8%
2013	65,555	EIA, C1	2002 VIUS	44.7%	50.5%	4.0%	0.8%
2014	69,012	Author estimates	2002 VIUS	25.2%	70.0%	4.0%	0.8%
2015	70,933	Author estimates	2002 VIUS	15.2%	80.0%	4.0%	0.8%
2016	73,107	Author estimates	2002 VIUS	5.2%	90.0%	4.0%	0.8%
2017	73,835	Author estimates	2002 VIUS	5.2%	90.0%	4.0%	0.8%
2018	73,802	Author estimates	2002 VIUS	5.2%	90.0%	4.0%	0.8%
2019	75,856	Author estimates	2002 VIUS	5.2%	90.0%	4.0%	0.8%
2020	66,927	Author estimates	2002 VIUS	5.0%	92.0%	3.0%	0.0%
2021	73,425	Author estimates	2021 VIUS	5.0%	92.0%	3.0%	0.0%
2022	75,043	Author estimates	2021 VIUS	5.0%	92.0%	3.0%	0.0%
2023	77,352	Author estimates	2021 VIUS	5.2%	90.0%	4.0%	0.8%
Heat content used for conversion to btu:				125,000 Btu/gallon	120,900 Btu/gallon	138,700 Btu/gallon	90,800 Btu/gallon

[a] Data are not continuous between 2008 and 2009 due to changes in source.

Medium/Heavy-Duty Trucks

DOT, FHWA, *Highway Statistics 2023*, Table VM-1 and previous editions back to 1996 and DOT, FHWA, *Highway Statistics Summary to 1995*. The FHWA made methodology changes for *Highway Statistics 2009*. At that time, they published historical data back to 2007 which do not match the previous data.

Table A.6
Medium/Heavy Truck Fuel Use and Fuel Type Shares for Calculation of Energy Use

	Fuel use (million gallons)			Shares by fuel type			
Year	Single-unit, 6-axle truck	Combination truck	Source	Gasoline	Diesel	LPG	CNG/LNG[b]
1970	3,968	7,348	1977 TIUS	10.4%	89.5%	0.1%	0.0%
1971	4,217	7,595	1977 TIUS	10.4%	89.5%	0.1%	0.0%
1972	4,844	8,120	1977 TIUS	10.4%	89.5%	0.1%	0.0%
1973	5,294	9,026	1977 TIUS	10.4%	89.5%	0.1%	0.0%
1974	5,261	9,080	1977 TIUS	10.4%	89.5%	0.1%	0.0%
1975	5,420	9,177	1977 TIUS	10.4%	89.5%	0.1%	0.0%
1976	5,706	9,703	1977 TIUS	10.4%	89.5%	0.1%	0.0%
1977	6,268	10,814	1977 TIUS	10.4%	89.5%	0.1%	0.0%
1978	6,955	12,165	Interpolated	16.2%	83.5%	0.3%	0.0%
1979	7,050	12,864	Interpolated	22.1%	77.5%	0.5%	0.0%
1980	6,923	13,037	Interpolated	27.9%	71.4%	0.6%	0.0%
1981	6,867	13,509	Interpolated	33.8%	65.4%	0.8%	0.0%
1982	6,803	13,583	1982 TIUS	39.6%	59.4%	1.0%	0.0%
1983	6,965	13,796	Interpolated	35.6%	63.6%	0.8%	0.0%
1984	7,240	14,188	Interpolated	31.5%	67.8%	0.7%	0.0%
1985	7,399	14,005	Interpolated	27.5%	72.0%	0.5%	0.0%
1986	7,386	14,475	Interpolated	23.4%	76.2%	0.4%	0.0%
1987	7,523	14,990	1987 TIUS	19.4%	80.4%	0.2%	0.0%
1988	7,701	15,224	Interpolated	18.8%	81.0%	0.3%	0.0%
1989	7,779	15,733	Interpolated	18.1%	81.6%	0.3%	0.0%
1990	8,357	16,133	Interpolated	17.5%	82.1%	0.4%	0.0%
1991	8,172	16,809	Interpolated	16.8%	82.7%	0.4%	0.0%
1992	8,237	17,216	1992 TIUS	16.2%	83.3%	0.5%	0.0%
1993	8,488	17,748	Interpolated	15.4%	84.1%	0.5%	0.0%
1994	9,032	18,653	Interpolated	14.7%	84.8%	0.5%	0.0%
1995	9,216	19,777	Interpolated	13.9%	85.6%	0.5%	0.0%
1996	9,409	20,193	Interpolated	13.2%	86.3%	0.5%	0.0%
1997	9,576	20,302	1997 VIUS	12.4%	87.1%	0.5%	0.0%
1998	9,741	21,100	Interpolated	12.1%	87.4%	0.5%	0.0%
1999	9,372	24,537	Interpolated	11.8%	87.6%	0.5%	0.0%
2000	9,563	25,666	Interpolated	11.6%	87.9%	0.5%	0.0%
2001	9,667	25,512	Interpolated	11.3%	88.1%	0.5%	0.0%
2002	10,321	26,480	2002 VIUS	11.0%	88.4%	0.5%	0.0%
2003	8,880	26,895	Interpolated	10.8%	88.7%	0.5%	0.0%
2004	8,959	24,191	Interpolated	10.5%	88.9%	0.5%	0.0%
2005	9,501	27,689	Interpolated	10.3%	89.2%	0.4%	0.1%
2006	9,852 [a]	28,107	Interpolated	10.0%	89.5%	0.4%	0.1%
2007	16,314	30,904	Interpolated	9.8%	89.8%	0.4%	0.1%
2008	17,144	30,561	Interpolated	9.5%	90.0%	0.4%	0.1%
2009	16,253	28,050	Interpolated	9.3%	90.3%	0.3%	0.2%
2010	15,097	29,927	Interpolated	9.0%	90.6%	0.3%	0.2%

[a] Data are not continuous between 2006 and 2007 due to changes in methodology. See source for details.
[b] VIUS respondents were given a conversion of 1 GGE = 123 cubic feet CNG. 1 lb = 126.67 cubic feet.

Table A.6 (Continued)
Medium/Heavy-Duty Truck Fuel Use and Fuel Type Shares for Calculation of Energy Use

	Fuel use (million gallons)			Shares by fuel type			
Year	Single-unit, 6-axle truck	Combination truck	Source	Gasoline	Diesel	LPG	CNG/LNG[a]
2011	14,215	28,181	Interpolated	8.8%	90.9%	0.3%	0.2%
2012	14,376	27,975	Interpolated	8.6%	91.1%	0.3%	0.2%
2013	14,502	28,795	Interpolated	8.3%	91.4%	0.3%	0.2%
2014	14,894	29,118	Interpolated	8.1%	91.7%	0.2%	0.3%
2015	14,850	28,884	Interpolated	7.8%	91.9%	0.2%	0.3%
2016	15,338	29,555	Interpolated	7.6%	92.2%	0.2%	0.3%
2017	15,600	30,364	Interpolated	7.3%	92.5%	0.2%	0.3%
2018	16,080	30,325	Interpolated	7.1%	92.8%	0.1%	0.4%
2019	16,657	28,987	Interpolated	6.8%	93.0%	0.1%	0.4%
2020	15,180	27,159	Interpolated	6.6%	93.3%	0.1%	0.4%
2021	17,169	30,439	2021 VIUS	6.6%	93.3%	0.1%	0.4%
2022	17,181	28,218	2021 VIUS	6.6%	93.3%	0.1%	0.4%
2023	17,163	29,297	2021 VIUS	6.6%	93.3%	0.1%	0.4%
Heat content used for conversion to Btu:				125,000 Btu/gallon	138,700 Btu/gallon	90,800 Btu/gallon	22,500 Btu/lb

Shares of Class 3-6 and 7-8 energy use were calculated from the 2002 and 2021 Vehicle Inventory and Use Surveys (VIUS) and applied to the total gallons of fuel from the DOT, FHWA *Highway Statistics*.

Table A.7
Class 3-6 and Class 7-8 Fuel Use Shares for Calculation of Energy Use

Year	Class 3-6	Class 7-8
1970-2020	19%	81%
2021-2023	20%	80%

Shares of Class 3-6 and 7-8 energy use by fuel type were calculated from the 2002 Vehicle Inventory and Use Survey (VIUS) and applied to all years 1970-2020.

Table A.8
Share of Medium and Heavy-Duty Truck Energy Use, VIUS 2002

	Share of energy use		
Fuel type	Class 3-6	Class 7-8	Total
Gasoline	92%	8%	100%
Diesel	14%	86%	100%
LPG	99%	1%	100%
CNG/LNG	0%	100%	100%

Shares of Class 3-6 and 7-8 energy use by fuel type were calculated from the 2021Vehicle Inventory and Use Survey (VIUS) and applied to all years 2021-2023.

Table A.9
Share of Medium and Heavy-Duty Truck Energy Use, VIUS 2021

	Share of energy use		
Fuel type	Class 3-6	Class 7-8	Total
Gasoline	96%	4%	100%
Diesel	15%	85%	100%
LPG	36%	64%	100%
CNG/LNG	7%	93%	100%

2.2 OFF-HIGHWAY ENERGY USE

U.S. Environmental Protection Agency, MOVES4.0.1 model, results generated September 2025. Data by fuel type were produced for agricultural equipment, airport equipment, construction and mining equipment, industrial equipment, lawn and garden equipment, logging equipment, railroad maintenance equipment, and recreational equipment. Some non-transportation-related equipment, such as generators, chain saws, compressors, and pumps, were excluded from the data. Model output was converted from grams to gallons using EPA's methodology documented in the technical report *Greenhouse Gas and Energy Consumption Rates for On-road Vehicles: Updates for MOVES2014,* www.epa.gov/moves/can-moves-report-output-terms-fuel-consumption.

2.3 NONHIGHWAY ENERGY USE

2.3.1 Air

General Aviation

DOT, FAA, *General Aviation and Part 135 Activity Surveys - CY 2023*, Table 5.1, and previous editions. 2011 Data: *Aviation Forecasts*, Tables 28 and 29, May 2013.

Table A.10
General Aviation Fuel Use

Year	Jet fuel (million gallons)	Aviation gasoline (million gallons)	Year	Jet fuel (million gallons)	Aviation gasoline (million gallons)
1970	208.0	551.0	1997	639.4	289.7
1971	226.0	508.0	1998	814.6	311.4
1972	245.0	584.0	1999	967.2	345.4
1973	304.0	411.0	2000	998.1	336.3
1974	357.0	443.0	2001	938.7	319.3
1975	453.0	412.0	2002	815.5	261.4
1976	495.0	432.0	2003	820.0	255.5
1977	536.0	456.0	2004	1,075.2	256.1
1978	763.0	518.0	2005	1,507.4	323.6
1979	736.0	570.0	2006	1,636.3	294.7
1980	766.0	520.0	2007	1,516.3	314.8
1981	759.0	489.0	2008	1,688.6	306.3
1982	887.0	448.0	2009	1,350.6	226.6
1983	613.0	428.0	2010	1,451.5	210.3
1984	738.9	462.4	2011	1,490.7	215.5
1985	691.0	421.0	2012	1,492.1	227.7
1986	732.1	408.6	2013	1,353.6	173.3
1987	672.7	401.8	2014	1,454.1	205.8
1988	746.0	398.0	2015	1,384.4	183.2
1989	688.0	342.8	2016	1,445.7	187.8
1990	662.0	353.0	2017	1,548.7	192.4
1991	579.0	348.0	2018	1,822.7	222.3
1992	496.0	306.0	2019	1,515.4	187.8
1993	454.1	268.4	2020	1,346.0	192.8
1994	470.8	264.1	2021	1,911.8	217.5
1995	544.0	276.0	2022	2,050.0	220.7
1996	567.5	286.5	2023	1,779.8	242.6
Heat content used for conversion to Btu:	135,000 Btu/gallon	120,200 Btu/gallon		135,000 Btu/gallon	120,200 Btu/gallon

Domestic and International Air Carrier

DOT, Bureau of Transportation Statistics, "Fuel Cost and Consumption Tables," www.transtats.bts.gov/fuel. The table below shows all international fuel use. Because the data for internationals includes fuel purchased abroad, for the tables in TEDB Chapter 2, the international total was divided in half to estimate domestic fuel use for international flights.

Table A.11
Air Carrier Fuel Use

Year	Domestic (thousand gallons)	International (thousand gallons)	Total (thousand gallons)
1970	Separate estimates for domestic and international are not available from 1970-1976.		10,085,000
1971			10,140,000
1972			10,302,000
1973			10,671,000
1974			10,417,260
1975			10,412,640
1976			10,400,040
1977	8,202,051	1,708,376	9,910,427
1978	8,446,117	1,741,918	10,188,035
1979	8,865,885	1,828,435	10,694,320
1980	8,519,233	1,747,306	10,266,539
1981	8,555,249	2,032,520	10,587,769
1982	8,432,465	1,967,733	10,400,198
1983	8,672,574	1,998,289	10,670,863
1984	9,625,958	2,286,407	11,912,365
1985	10,115,007	2,487,929	12,602,936
1986	11,137,331	2,544,996	13,682,327
1987	11,586,838	2,893,617	14,480,455
1988	11,917,904	3,262,824	15,180,728
1989	11,905,144	3,557,294	15,462,438
1990	12,429,305	3,963,081	16,392,386
1991	11,506,477	3,939,666	15,446,144
1992	11,762,852	4,120,132	15,882,983
1993	11,958,663	4,113,321	16,071,984
1994	12,475,549	4,310,879	16,786,428
1995	12,811,717	4,511,418	17,323,135
1996	13,187,305	4,658,093	17,845,398
1997	13,659,581	4,964,181	18,623,762
1998	13,876,971	5,185,562	19,062,533
1999	14,402,127	5,250,492	19,652,619
2000	14,844,592	5,474,685	20,319,277
2001	14,017,461	5,237,487	19,254,948
2002	12,848,329	4,990,798	17,839,127
2003	12,958,581	4,836,356	17,794,936
2004	13,622,603	4,931,546	18,554,149
2005	13,778,869	5,520,889	19,309,758
2006	13,694,437	6,017,638	19,712,075
2007	13,681,664	6,204,502	19,886,165
2008	12,666,911	6,186,747	18,853,658
2009	11,339,220	5,721,298	17,060,517
2010	11,256,900	6,041,500	17,288,400
2011	11,035,400	6,522,600	17,558,000
2012	10,439,700	6,506,300	16,946,000
2013	10,337,000	6,487,300	16,824,300
2014	10,458,600	6,321,400	16,780,000

Table A.11 (Continued)
Air Carrier Fuel Use

2015	10,928,600	6,420,600	17,349,200
2016	11,373,600	6,294,800	17,668,400
2017	11,587,600	6,441,300	18,028,900
2018	12,151,000	6,598,800	18,749,800
2019	12,541,400	6,663,400	19,204,800
2020	7,643,300	3,837,700	11,481,000
2021	10,382,800	4,746,900	15,129,700
2022	11,869,700	6,065,100	17,934,800
2023	12,811,100	6,910,200	19,721,300
Heat content used for conversion to Btu:	135,000 Btu/gallon	135,000 Btu/gallon	135,000 Btu/gallon

2.3.2 Water

Freight

Total – **1970-2020**: DOE, EIA, *Petroleum and Other Liquids Database*, September 2021. Adjusted sales of distillate and residual fuel oil for vessel bunkering. (This may include some amounts of bunker fuels used for recreational purposes.)
2021-2023: Using 2020 as a base, adjusted both distillate and residual fuel use by the change in domestic ton-miles from the U.S. Department of the Army, Army Corps of Engineers, Waterborne Commerce Statistics Center. Includes only ton-miles on taxable waterways.

Table A.12
Diesel and Residual Fuel Oil for Vessel Bunkering

Year	Distillate fuel oil (thousand gallons)	Residual fuel oil (thousand gallons)	Year	Distillate fuel oil (thousand gallons)	Residual fuel oil (thousand gallons)
1970	819,000	3,774,120	1997	2,107,561	4,789,861
1971	880,000	3,307,000	1998	2,125,568	4,640,153
1972	1,013,000	3,273,000	1999	2,064,590	5,598,630
1973	1,125,000	3,859,000	2000	2,041,433	6,192,294
1974	1,018,920	3,827,040	2001	2,099,011	4,345,284
1975	1,097,880	4,060,140	2002	2,056,465	4,783,956
1976	1,220,100	4,977,000	2003	1,863,150	3,801,425
1977	1,407,420	5,416,740	2004	2,313,448	4,886,978
1978	1,578,822	6,614,790	2005	2,115,381	5,533,552
1979	1,630,858	8,002,672	2006	2,206,690	6,000,434
1980	717,376	7,454,242	2007	2,158,930	6,773,950
1981	1,723,143	7,922,512	2008	1,980,729	6,274,047
1982	1,423,216	6,408,818	2009	2,138,690	5,331,657
1983	1,418,890	5,724,115	2010	2,427,051	6,032,367
1984	1,692,045	5,688,931	2011	2,651,859	5,207,886
1985	1,894,265	5,269,733	2012	1,842,107	4,560,546
1986	2,034,215	5,690,250	2013	1,655,258	3,876,795
1987	2,223,258	5,869,154	2014	1,626,527	2,987,363
1988	2,310,367	6,025,511	2015	2,415,253	3,103,402
1989	2,356,444	6,621,100	2016	2,020,587	4,192,719
1990	2,197,004	6,248,095	2017	1,807,230	4,472,233
1991	2,167,640	6,786,055	2018	2,101,132	4,117,841
1992	2,240,170	7,199,078	2019	1,933,207	3,543,789
1993	2,043,745	6,269,882	2020	1,523,504	2,625,945
1994	2,026,899	5,944,383	2021	1,555,795	2,681,603
1995	1,978,105	6,431,238	2022	1,591,219	2,742,660
1996	2,177,608	5,804,977	2023	1,489,672	2,567,632
Heat content used for conversion to Btu:	138,700 Btu/gallon	149,700 Btu/gallon		138,700 Btu/gallon	149,700 Btu/gallon
Domestic share of total fuel use	77.5%	9.3%		77.5%	9.3%

Recreational Boating

1970-1998: U.S. Environmental Protection Agency, MOVES2014a model.
1999-2017: Environmental Protection Agency MOVES2014b model.
2018-2023: Environmental Protection Agency MOVES4.0.1 model.
Model output was converted from grams to gallons using EPA's methodology documented in the technical report Greenhouse Gas and Energy Consumption Rates for On-road Vehicles: Updates for MOVES2014, www.epa.gov/moves/can-moves-report-output-terms-fuel-consumption.

Table A.13
Recreational Boating Fuel Use

Year	Diesel use (gallons)	Gasoline use (gallons)	Year	Diesel use (gallons)	Gasoline use (gallons)
1970	39,589,953	1,213,397,311	1997	243,195,481	1,657,737,628
1971	47,130,906	1,220,995,448	1998	250,736,414	1,659,056,085
1972	54,671,856	1,228,593,572	1999	273,614,890	1,660,897,656
1973	62,212,803	1,236,191,635	2000	273,885,726	1,658,797,382
1974	69,753,735	1,243,789,752	2001	274,699,518	1,656,581,817
1975	77,294,680	1,251,387,972	2002	275,242,097	1,648,949,353
1976	84,835,632	1,258,986,070	2003	276,055,034	1,639,089,564
1977	92,376,573	1,266,584,111	2004	275,783,985	1,621,105,112
1978	99,917,523	1,274,182,341	2005	279,309,693	1,621,729,779
1979	107,458,470	1,281,780,460	2006	277,411,274	1,593,043,638
1980	114,999,421	1,289,378,532	2007	279,037,889	1,580,468,954
1981	122,540,357	1,296,976,672	2008	274,156,923	1,535,255,008
1982	130,081,302	1,304,574,832	2009	274,970,396	1,519,694,458
1983	137,622,248	1,312,172,890	2010	268,462,593	1,466,964,903
1984	145,163,202	1,319,771,007	2011	263,581,279	1,421,359,003
1985	152,704,140	1,327,369,146	2012	261,140,658	1,391,588,940
1986	160,245,074	1,334,967,322	2013	259,784,908	1,367,836,644
1987	167,786,030	1,342,565,455	2014	257,886,775	1,341,947,672
1988	175,326,970	1,362,856,034	2015	270,902,771	1,344,235,659
1989	182,867,916	1,383,146,636	2016	281,478,856	1,354,416,848
1990	190,408,869	1,403,437,194	2017	287,444,461	1,363,320,915
1991	197,949,808	1,429,688,292	2018	293,681,413	1,371,130,522
1992	205,490,749	1,455,939,504	2019	298,562,437	1,374,801,040
1993	213,031,707	1,482,190,597	2020	303,715,223	1,378,689,113
1994	220,572,649	1,539,794,180	2021	308,324,819	1,382,187,334
1995	228,113,596	1,597,269,921	2022	313,205,763	1,385,398,260
1996	235,654,521	1,654,446,069	2023	318,629,903	1,389,291,009
Heat content used for conversion to Btu:	138,700 Btu/gallon	125,000 Btu/gallon			

2.3.3 Pipeline

The sum of natural gas, crude petroleum, other petroleum products, coal slurry and water.

Natural Gas

The amount of natural gas fuel used to move natural gas through the pipeline was reported in DOE, EIA, Natural Gas Annual 2023, Table 1. Cubic feet were converted to Btu using 1,031 Btu/ft^3. Electricity use was estimated using the following procedure as reported on p. 5-110 of J. N. Hooker et al., End Use Energy Consumption DataBase: Transportation Sector. The energy consumption of a natural gas pipeline was taken to be the energy content of the fuel used to drive the pumps. Some 94% of the installed pumping horsepower was supplied by natural gas. The remaining 6% of the horsepower was generated more efficiently, mostly by electric motors. The energy consumed by natural gas pipeline pumps that were electrically powered was not known. In order to estimate the electricity consumed, the Btu of natural gas pipeline fuel consumed was multiplied by a factor of 0.015.

Crude Petroleum and Petroleum Product

J. N. Hooker, *Oil Pipeline Energy Consumption and Efficiency*, ORNL-5697, ORNL, Oak Ridge, TN, 1981. (Data held constant; Latest available data.)

Coal Slurry and Water

W. F. Banks, Systems, Science and Software, *Energy Consumption in the Pipeline Industry*, LaJolla, CA, October 1977. (Data held constant; Latest available data.)

Table A.14
Pipeline Fuel Use

Year	Natural gas (million cubic feet)	Estimated natural gas pipeline electricity use (million kWh)	Electricity constant (trillion Btu)
1970	722,166	3,272.9	70.0
1971	742,592	3,365.4	70.0
1972	766,156	3,472.2	70.0
1973	728,177	3,300.1	70.0
1974	668,792	3,031.0	70.0
1975	582,963	2,642.0	70.0
1976	548,323	2,485.0	70.0
1977	532,669	2,414.1	70.0
1978	530,451	2,404.0	70.0
1979	600,964	2,723.6	70.0
1980	634,622	2,876.1	70.0
1981	642,325	2,911.0	70.0
1982	596,411	2,703.0	70.0
1983	490,042	2,220.9	70.0
1984	528,754	2,396.3	70.0
1985	503,766	2,283.1	70.0
1986	485,041	2,198.2	70.0
1987	519,170	2,352.9	70.0
1988	613,912	2,782.3	70.0
1989	629,308	2,852.0	70.0
1990	659,816	2,990.3	70.0
1991	601,305	2,725.1	70.0
1992	587,710	2,663.5	70.0
1993	624,308	2,829.4	70.0
1994	685,362	3,106.1	70.0
1995	700,335	3,173.9	70.0
1996	711,446	3,224.3	70.0
1997	751,470	3,405.7	70.0
1998	635,477	2,880.0	70.0
1999	645,319	2,924.6	70.0
2000	642,210	2,910.5	70.0
2001	624,964	2,832.3	70.0
2002	666,920	3,022.5	70.0
2003	591,492	2,680.7	70.0
2004	566,187	2,566.0	70.0
2005	584,026	2,646.8	70.0
2006	584,213	2,647.7	70.0
2007	621,364	2,816.0	70.0
2008	647,956	2,936.6	70.0
2009	670,174	3,037.2	70.0
2010	674,124	3,055.1	70.0
2011	687,784	3,117.0	70.0
2012	730,790	3,312.0	70.0
2013	833,061	3,775.4	70.0
2014	700,150	3,173.1	70.0
2015	678,183	3,073.5	70.0
2016	686,732	3,112.3	70.0
2017	722,049	3,272.3	70.0
2018	876,535	3,972.5	70.0
2019	1,018,095	4,614.0	70.0
2020	1,020,360	4,624.3	70.0
2021	1,131,472	5,127.9	70.0
2022	1,252,302	5,675.5	70.0
2023	1,243,855	5,637.2	70.0
Heat content used for conversion to Btu:	1,031 Btu/ cubic foot	3,412 Btu/ kWh[a]	

[a] For tables in the main body of the TEDB, electricity was converted from kWh to Btu using 3,412 Btu/kWh.

Note: Formula for estimating electricity use for natural gas pipelines is:
Natural gas use (in million cubic ft) × 1,031 Btu/cubic ft × 0.015 × 29.305 ×10-5 kWh/Btu.

2.3.4 Rail

Freight

AAR, *Railroad Fact Book*, 2024 Edition, Washington, DC, December 2024.

Table A.15
Class I Freight Railroad Fuel Use

Year	Diesel fuel (thousand gallons)	Year	Diesel fuel (thousand gallons)
1970	3,807,663	1997	3,602,793
1971	3,822,907	1998	3,619,341
1972	3,996,985	1999	3,749,428
1973	4,160,730	2000	3,720,107
1974	4,175,375	2001	3,729,985
1975	3,736,484	2002	3,751,413
1976	3,895,542	2003	3,849,229
1977	3,985,069	2004	4,082,236
1978	3,968,007	2005	4,119,879
1979	4,072,187	2006	4,214,459
1980	3,955,996	2007	4,087,405
1981	3,756,439	2008	3,911,178
1982	3,178,116	2009	3,220,059
1983	3,137,295	2010	3,519,021
1984	3,388,173	2011	3,710,485
1985	3,144,190	2012	3,634,025
1986	3,039,069	2013	3,712,582
1987	3,102,227	2014	3,897,113
1988	3,182,267	2015	3,723,491
1989	3,190,815	2016	3,418,577
1990	3,134,446	2017	3,536,618
1991	2,925,970	2018	3,697,139
1992	3,022,108	2019	3,463,894
1993	3,111,981	2020	3,001,000
1994	3,355,802	2021	3,118,000
1995	3,503,096	2022	3,144,000
1996	3,600,649	2023	3,084,000
Heat content used for conversion to Btu:	138,700 Btu/gallon		138,700 Btu/gallon

Passenger

Commuter - APTA, *2025 Public Transportation Fact Book*, Washington, DC, 2025.

Table A.16
Commuter Rail Fuel Use

Year	Diesel (thousand gallons)	Electricity (million kWh)
1984	58,320	901
1985	55,372	1,043
1986	54,608	1,170
1987	51,594	1,155
1988	53,054	1,195
1989	52,516	1,293
1990	52,681	1,226
1991	54,315	1,239
1992	54,951	1,124
1993	59,766	1,196
1994	61,900	1,244
1995	63,064	1,253
1996	61,888	1,255
1997	63,195	1,270
1998	69,200	1,299
1999	73,005	1,322
2000	70,818	1,370
2001	72,204	1,354
2002	72,847	1,334
2003	72,264	1,383
2004	71,999	1,449
2005	76,714	1,484
2006	78,600	1,478
2007	80,700	1,763
2008	83,500	1,718
2009	95,000	1,780
2010	93,200	1,797
2011	93,900	1,813
2012	92,800	1,808
2013	98,700	1,816
2014	93,900	1,809
2015	97,400	1,792
2016	102,878	1,764
2017	104,245	1,776
2018	102,650	1,764
2019	103,718	1,780
2020	107,222	1,554
2021	104,567	1,421
2022	95,020	1,529
2023	93,624	1,678
Heat content used for conversion to Btu:	138,700 Btu/gallon	3,412 Btu/kWh[a]

[a] For tables in the main body of the TEDB, electricity was converted from kWh to Btu using 3,412 Btu/kWh.

Transit – APTA, *2025 Public Transportation Fact Book*, Washington, DC, 2025. Includes light rail and heavy rail.

Table A.17
Transit Rail Fuel Use

	Electricity (million kWh)		
Year	Light rail	Heavy rail	Total
1970			2,561
1975			2,646
1976	Light rail and heavy rail data are		2,576
1977	not available separately from		2,303
1978	1970 to 1985.		2,223
1979			2,473
1980			2,446
1981			2,655
1982			2,722
1983			2,930
1984			3,092
1985			2,928
1986	173	3,066	3,239
1987	191	3,219	3,410
1988	243	3,256	3,499
1989	242	3,286	3,528
1990	239	3,284	3,523
1991	274	3,248	3,522
1992	297	3,193	3,490
1993	281	3,287	3,568
1994	282	3,431	3,713
1995	288	3,401	3,689
1996	321	3,322	3,643
1997	363	3,253	3,616
1998	382	3,280	3,662
1999	416	3,385	3,801
2000	563	3,549	4,112
2001	587	3,646	4,233
2002	510	3,683	4,193
2003	507	3,632	4,138
2004	553	3,684	4,237
2005	571	3,769	4,339
2006	634	3,709	4,343
2007	687	3,817	4,505
2008	721	3,898	4,619
2009	738	3,886	4,624
2010	749	3,780	4,529
2011	789	3,854	4,643
2012	806	3,795	4,601
2013	882	3,856	4,738
2014	985	3,812	4,797
2015	898	3,816	4,713
2016	907	3,760	4,667
2017	930	3,728	4,658
2018	939	3,874	4,812
2019	955	3,996	4,951
2020	880	3,597	4,477
2021	813	3,395	4,208
2022	857	3,381	4,238
2023	878	3,387	4,265
Heat content used for conversion to Btu:	3,412 Btu/kWh[a]	3,412 Btu/kWh[a]	3,412 Btu/kWh[a]

[a] For tables in the main body of the TEDB, electricity was converted from kWh to Btu using 3,412 Btu/kWh.

Intercity – 1994–2019: Personal communication with Amtrak, Washington, DC, 2020. 2020–2023: Estimated using rate of change in Amtrak train miles from the AAR, *Railroad Fact Book*, 2024 Edition, Washington, DC, December 2024.

Table A.18
Intercity Rail Fuel Use

Year	Diesel fuel (thousand gallons)	Electricity (thousand kWh)
1994	73,516	308,948
1995	72,371	335,818
1996	71,226	362,689
1997	75,656	389,559
1998	75,999	416,429
1999	79,173	443,300
2000	94,968	470,170
2001	96,846	455,703
2002	84,432	518,306
2003	74,621	536,950
2004	68,605	550,695
2005	65,477	531,377
2006	62,463	548,856
2007	61,824	577,864
2008	63,428	582,022
2009	61,704	564,968
2010	63,474	558,662
2011	63,450	555,425
2012	63,058	549,201
2013	66,036	525,127
2014	65,711	515,332
2015	62,468	504,017
2016	60,212	515,711
2017	60,076	489,949
2018	60,459	487,607
2019	58,378	486,650
2020	41,053	342,228
2021	43,133	359,565
2022	50,119	417,802
2023	56,384	470,027
Heat content used for conversion to Btu	138,700 Btu/gallon	3,412 Btu/kWh[a]

2.4 CALCULATION OF MILLION BARRELS PER DAY CRUDE OIL EQUIVALENT

One gallon of gasoline, diesel fuel, or LPG is estimated to be the equivalent of one gallon of crude oil. Petroleum used for electricity was calculated using the following formula:

$$(\{[(BTU \times S)/G\ ]/P\ \}/365)/1000$$

BTU = Btus of electricity
S = Share of petroleum used in making primary electricity (Calculated from Table 2.6 from the EIA, Monthly Energy Review)
G = Electricity generation and distribution (assumed 29%)
P = Btus per barrel of petroleum product (Table A3 from the EIA, Monthly Energy Review).

3. PASSENGER TRAVEL AND ENERGY USE

3.1 CARS

Number of vehicles – DOT, FHWA, *Highway Statistics 2023*, Table MV-1 and previous editions back to 2009. From 1970-2008, Table VM-1 was used.

Vehicle-miles – See Appendix A, Section 7. Car and Light Truck Shares.

Passenger-miles – Vehicle-miles multiplied by an average load factor.

Load factor – 2022 NHTS shows carload factor as 1.39 persons per vehicle.

Energy intensities –

***Btu per vehicle-mile* –** Car energy use divided by vehicle-miles.

***Btu per passenger-mile* –** Car energy use divided by passenger-miles.

Energy use – See Section 2. Energy Use Sources. Data series shown in TEDB Table 2.9.

3.2 LIGHT TRUCKS

Number of vehicles – DOT, FHWA, *Highway Statistics 2023*, Table MV-9 and previous editions back to 2009. From 1970-2008, Table VM-1 was used. Columns for pickups, vans, sport utility vehicles, and other light trucks. Data were multiplied by the shares of light trucks which are for personal use (TEDB Table A.19) which were derived by ORNL from the 2021 VIUS Micro Data File on CD.

Vehicle-miles – See Appendix A, Section 7. Car and Light Truck Shares. Data were multiplied by the shares of vehicle miles which are for personal use (TEDB Table A.19) which were derived by ORNL from the 2021 VIUS Micro Data File on CD.

Passenger-miles – Vehicle-miles multiplied by an average load factor.

Load factor – 2022 NHTS shows personal light truck load factor as 1.67 persons per vehicle.

Energy intensities -

***Btu per vehicle-mile* –** Personal light truck energy use divided by personal light truck vehicle-miles.

***Btu per passenger-mile* –** Personal light truck energy use divided by personal light truck passenger-miles.

Energy use – See Section 2. Energy Use Sources (light trucks, medium/heavy trucks). Data by truck type were multiplied by the shares of truck fuel use which are for personal use (TEDB Table A.19) which were derived by ORNL from the 2021 VIUS Micro Data File on CD.

Table A.19
Share of Trucks, Truck Travel,
and Fuel Use for Personal Travel

Personal trucks	
85.1%	2-axle, 4-tire trucks
30.5%	Other single-unit and combination trucks
Personal truck travel	
78.9%	2-axle, 4-tire trucks
12.0%	Other single-unit and combination trucks
Personal truck fuel use	
76.6%	2-axle, 4-tire trucks
7.3%	Other single-unit and combination trucks

Note: Since these shares come from the 2021 VIUS, they may underestimate the number of personal trucks, truck travel, and energy use for 2021.

3.3 MOTORCYCLES

Number of vehicles, vehicle-miles – DOT, FHWA, *Highway Statistics 2023*, Table VM-1.

Passenger-miles – Vehicle-miles multiplied by an average load factor.

Load factor – 2022 NHTS shows motorcycle load factor as 1.03 persons per vehicle.

Energy intensities –
Btu per vehicle-mile – Motorcycle energy use divided by vehicle-miles.
Btu per passenger-mile – Motorcycle energy use divided by passenger-miles.

Energy use – See Section 2. Energy Use Sources. Data series shown in TEDB Table 2.9.

3.4 DEMAND RESPONSE

Number of vehicles, vehicle-miles, passenger-miles – APTA, *2025 Public Transportation Fact Book*, Washington, DC, 2025.

Load factor – Passenger-miles divided by vehicle-miles.

Energy intensities –
Btu per vehicle-mile – Energy use divided by vehicle-miles.
Btu per passenger-mile – Energy use divided by passenger-miles.

Energy use – APTA, *2025 Public Transportation Fact Book*, Washington, DC, 2025.

3.5 BUSES

3.5.1 Transit

Number of vehicles, vehicle-miles, passenger-miles – APTA, *2025 Public Transportation Fact Book*, Washington, DC, 2025. Data series shown on TEDB Table 7.1.

Load factor – Passenger-miles divided by vehicle-miles.

Energy intensities –

***Btu per vehicle-mile* –** Transit bus energy use divided by transit bus vehicle-miles.

***Btu per passenger-mile* –** Transit bus energy use divided by transit bus passenger-miles.

Energy use – See Section 2. Energy Use Sources. Data series shown in TEDB Table 7.1.

3.5.2 Intercity

Energy use – See Section 2. Energy Use Sources. Because the data past 2000 are not available, the rate of change in bus VMT from FHWA, *Highway Statistics 2023*, was used to estimate the change in energy use.

3.5.3 School

Number of vehicles – DOT, FHWA, *Highway Statistics 2023*, Table MV-10.

Energy use – See Section 2. Energy Use Sources. Because the data past 2000 are not available, the rate of change in bus VMT from FHWA, *Highway Statistics 2023*, was used to estimate the change in energy use.

3.6 AIR

3.6.1 Certificated Air Carriers

Aircraft-miles, passenger-miles – DOT, BTS, U.S. Air Traffic Statistics Through December 2023, www.transtats.bts.gov, Washington, DC.

Load factor – Passenger-miles divided by aircraft-miles.

Energy intensities –

***Btu per passenger-mile* –** Certificated air carrier energy use divided by passenger-miles.

Energy use – See Section 2. Energy Use Sources. All domestic fuel use and half of international fuel use was considered to be domestic use.

Note: These data differ from the data in TEDB Table 10.2 because that table contains data on ALL domestic AND international air carrier energy use and passenger-miles.

3.6.2 General Aviation

Number of vehicles – DOT, FAA, *General Aviation and Air Taxi Activity Surveys - CY 2023.* 2011 Data: *Aviation Forecasts*, Tables 28 and 29, May 2013. Data series shown on TEDB Table 9.3.

Energy intensities –

Btu per passenger-mile – General aviation energy use divided by passenger-miles.

Energy use – See Section 2. Energy Use Sources. Data series shown in TEDB Table 9.3.

3.7 RECREATIONAL BOATING

Number of vehicles and energy use – U.S. EPA's MOVES4.1.0 model.

3.8 RAIL

3.8.1 Intercity

Number of vehicles, vehicle-miles, passenger-miles – AAR, *Railroad Fact Book, 2024 Edition*, Washington, DC, December 2024.

Load factor – Passenger-miles divided by vehicle-miles.

Energy Intensities –

Btu per vehicle-mile – Intercity rail energy use divided by vehicle-miles.
Btu per passenger-mile – Intercity rail energy use divided by passenger-miles.

Energy use – See Section 2. Energy Use Sources. Data series shown in TEDB Table 9.10.

3.8.2 Transit

Number of vehicles, vehicle-miles, passenger-miles – APTA, *2025 Public Transportation Fact Book*, Washington, DC, 2025. Sum of light and heavy rail transit. Data series shown on TEDB Table 7.4.

Load factor – Passenger-miles divided by vehicle-miles.

Energy intensities –

Btu per vehicle-mile – Light and heavy transit rail energy use divided by vehicle-miles.
Btu per passenger-mile – Light and heavy transit rail energy use divided by passenger-miles.

Energy use – See Section 2. Energy Use Sources. Data series shown in TEDB Table 7.4.

3.8.3 Commuter

Number of vehicles, vehicle-miles, passenger-miles – APTA, *2025 Public Transportation Fact Book*, Washington, DC, 2025.

Load factor – Passenger-miles divided by vehicle-miles.

Energy intensities –

***Btu per vehicle-mile* –** Commuter rail energy use divided by vehicle-miles.

***Btu per passenger-mile* –** Commuter rail energy use divided by passenger-miles.

Energy use – See Section 2. Energy Use Sources. Data series shown in TEDB Table 7.3.

4. HIGHWAY PASSENGER MODE ENERGY INTENSITIES

4.1 CARS

Btu per vehicle-mile – Car energy use divided by car vehicle miles of travel.

***Energy use* –** See Section 2. Energy Use Sources. Data series shown in TEDB Table 2.9.

***Vehicle-miles* –** 1970-2008: DOT, FHWA, *Highway Statistics 2009*, Table VM-1 and previous editions back to 1996 and DOT, FHWA, *Highway Statistics Summary to 1995*. Data series shown in TEDB Table 4.1.
2009-2023: See Appendix A, Section 7. Car and Light Truck Shares.

Btu per passenger-mile – Car energy use divided by car passenger-miles.

***Energy use* –** See Section 2. Energy Use Sources. Data series shown in TEDB Table 2.9.

***Passenger miles* –** Vehicle miles multiplied by an average load factor.

***Vehicle-miles* –** 1970-2008: DOT, FHWA, *Highway Statistics 2009*, Table VM-1 and previous editions back to 1996 and DOT, FHWA, *Highway Statistics Summary to 1995*. Data series shown in TEDB Table 4.1.
2009-2023: See Appendix A, Section 7. Car and Light Truck Shares.

***Load factor* –** NPTS 1969, 1977, 1983/84, 1990, 1995; NHTS 2001, 2009, 2017, 2022. Data series shown in TEDB Table A.20.

Table A.20
Car Load Factor used to Calculate Passenger-Miles

Year	Source	Load Factor
1970	1969 NPTS	1.90
1971	Interpolated	1.90
1972	Interpolated	1.90
1973	Interpolated	1.90
1974	Interpolated	1.90
1975	Interpolated	1.90
1976	Interpolated	1.90
1977	1977 NPTS	1.90
1978	Interpolated	1.88
1979	Interpolated	1.87
1980	Interpolated	1.85
1981	Interpolated	1.83
1982	Interpolated	1.82
1983	1983/84 NPTS	1.80
1984	Interpolated	1.77
1985	Interpolated	1.74
1986	Interpolated	1.71
1987	Interpolated	1.69
1988	Interpolated	1.66
1989	Interpolated	1.63
1990	1990 NPTS	1.60
1991	Interpolated	1.60
1992	Interpolated	1.60
1993	Interpolated	1.60
1994	Interpolated	1.60
1995	1995 NPTS	1.60
1996	Interpolated	1.60
1997	Interpolated	1.59
1998	Interpolated	1.59
1999	Interpolated	1.58
2000	Interpolated	1.58
2001	2001 NHTS	1.57
2002	Interpolated	1.57
2003	Interpolated	1.57
2004	Interpolated	1.56
2005	Interpolated	1.56
2006	Interpolated	1.56
2007	Interpolated	1.56
2008	Interpolated	1.55
2009	2009 NHTS	1.55
2010	Interpolated	1.55
2011	Interpolated	1.55
2012	Interpolated	1.55
2013	Interpolated	1.55
2014	Interpolated	1.54
2015	Interpolated	1.54
2016	Interpolated	1.54
2017	2017 NHTS	1.54
2018	Interpolated	1.51
2019	Interpolated	1.48
2020	Interpolated	1.45
2021	Interpolated	1.42
2022	2022 NHTS	1.39
2023	2022 NHTS	1.39

4.2 LIGHT DUTY TRUCKS

Btu per vehicle-mile – Light duty truck energy use divided by light duty truck vehicle miles of travel.

***Energy use* –** See Section 2. Energy Use Sources. Data series shown in TEDB Table 2.9.

***Vehicle-miles* –** 1970-2008: DOT, FHWA, *Highway Statistics 2008*, Table VM-1 and previous editions back to 1996 and DOT, FHWA, *Highway Statistics Summary to 1995*. Data series shown in TEDB Table 4.2. 2009-2023: See Appendix A, Section 7. Car and Light Truck Shares.

Table A.21
Light Duty Truck Load Factor used to Calculate Passenger-Miles

Year	Source	Load Factor
1970	1969 NPTS	1.90
1971	Interpolated	1.89
1972	Interpolated	1.87
1973	Interpolated	1.86
1974	Interpolated	1.84
1975	Interpolated	1.83
1976	Interpolated	1.81
1977	1977 NPTS	1.80
1978	Interpolated	1.81
1979	Interpolated	1.83
1980	Interpolated	1.84
1981	Interpolated	1.86
1982	Interpolated	1.87
1983	1983/84 NPTS	1.90
1984	Interpolated	1.87
1985	Interpolated	1.84
1986	Interpolated	1.81
1987	Interpolated	1.79
1988	Interpolated	1.76
1989	Interpolated	1.73
1990	1990 NPTS	1.70
1991	Interpolated	1.68
1992	Interpolated	1.66
1993	Interpolated	1.64
1994	Interpolated	1.62
1995	1995 NPTS	1.60
1996	Interpolated	1.62
1997	Interpolated	1.64
1998	Interpolated	1.66
1999	Interpolated	1.68
2000	Interpolated	1.70
2001	2001 NHTS	1.72
2002	Interpolated	1.74
2003	Interpolated	1.75
2004	Interpolated	1.77
2005	Interpolated	1.79
2006	Interpolated	1.81
2007	Interpolated	1.82
2008	Interpolated	1.84
2009	2009 NHTS	1.84
2010	Interpolated	1.84
2011	Interpolated	1.83
2012	Interpolated	1.83
2013	Interpolated	1.83
2014	Interpolated	1.83
2015	Interpolated	1.82
2016	Interpolated	1.82
2017	2017 NHTS	1.82

Table A.21 (Continued)
Light Duty Truck Load Factor used to Calculate Passenger-Miles

2018	Interpolated	1.79
2019	Interpolated	1.76
2020	Interpolated	1.73
2021	Interpolated	1.70
2022	2022 NHTS	1.67
2023	2022 NHTS	1.67

Btu per passenger-mile – Light duty truck energy use divided by light duty trucks passenger-miles.

***Energy use* –** See Section 2. Energy Use Sources. Data series shown in TEDB Table 2.9.
***Passenger miles* –** Vehicle miles multiplied by an average load factor.
***Vehicle-miles* –** 1970-2008: DOT, FHWA, *Highway Statistics 2009*, Table VM-1 and previous editions back to 1996 and DOT, FHWA, *Highway Statistics Summary to 1995*. Data series shown in TEDB Table 4.2.
2009-2023: See Appendix A, Section 7. Car and Light Truck Shares.
***Load factor* –** NPTS 1969, 1977, 1983/84, 1990, 1995; NHTS 2001, 2009, 2017, 2022. Data series shown in TEDB Table A.**21**.

4.3 Buses

4.3.1 Transit

Btu per vehicle-mile – Transit bus energy use divided by transit bus vehicle-miles.
***Energy use* –** See Section 2. Energy Use Sources. Data series shown in TEDB Table 7.1.
***Vehicle-miles* –** APTA, *2025 Public Transportation Fact Book*, Washington, DC, 2025. Data series shown on TEDB Table 7.1.

Btu per passenger-mile – Transit bus energy use divided by transit bus passenger-miles.
***Energy use* –** See Section 2. Energy Use Sources. Data series shown in TEDB Table 7.1.
***Passenger-miles* –** APTA, *2025 Public Transportation Fact Book*, Washington, DC, 2025.

4.3.2 Intercity

Btu per passenger-mile – Data are not available.
***Energy use* –** See Section 2. Energy Use Sources. Because the data past 2000 are not available, the rate of change in bus VMT from FHWA, *Highway Statistics 2023*, was used to estimate the change in energy use.
***Passenger-miles* –** Data are not available.

5. NONHIGHWAY MODE ENERGY INTENSITIES

5.1 AIR

5.1.1 Certificated Air Carriers

Btu per passenger-mile – Certificated air carrier energy use divided by passenger-miles.

***Energy use* –** See Section 2. Energy Use Sources. All of domestic fuel use and half of international fuel use was considered to be domestic use.

***Passenger-miles* –** DOT, BTS, *Air Carrier Traffic Statistics*, Washington, DC, www.transtats.bts.gov. Pre-1994 data are from various editions of the *FAA Statistical Handbook of Aviation* (no longer published). Scheduled service passenger-miles of domestic air carriers and half of international air carriers were used to coincide with fuel use.

Note: These data differ from the data in TEDB Table 9.2 because that table contains data on ALL domestic AND international air carrier energy use and passenger-miles.

5.1.2 General Aviation

Btu per passenger-mile – Data are not available.

***Energy use* –** See Section 2. Energy Use Sources. Data series shown in TEDB Table 9.3.

***Passenger-miles* –** Data are not available.

5.2 RAIL

5.2.1 Intercity

Btu per passenger-mile – Intercity rail energy use divided by passenger-miles.

***Energy use* –** See Section 2. Energy Use Sources. Data series shown in TEDB Table 9.10.

***Passenger-miles* –** AAR, *Railroad Fact Book, 2024 Edition*, and previous editions.

5.2.2 Transit

Btu per passenger-mile – Transit rail energy use divided by passenger-miles.

***Energy use* –** See Section 2. Energy Use Sources. Data series shown in TEDB Table 7.4.

***Passenger-miles* –** APTA, *2025 Public Transportation Fact Book*, Washington, DC, 2025. Data series shown on TEDB Table 7.4.

5.2.3 Commuter

Btu per passenger-mile – Commuter rail energy use divided by passenger-miles.

***Energy use* –** See Section 2. Energy Use Sources. Data series shown in TEDB Table 7.3.

***Passenger-miles* –** APTA, *2025 Public Transportation Fact Book*, Washington, DC, 2025. Data series shown on TEDB Table 7.3.

6. FREIGHT MODE ENERGY INTENSITIES

6.1 TRUCK

Btu per vehicle-mile – Heavy single-unit and combination truck energy use divided by vehicle miles

***Energy use* –** See Section 2. Energy Use Sources (medium/heavy trucks).

***Vehicle-miles* –** DOT, FHWA, *Highway Statistics 2023*, Table VM-1 and previous editions back to 1996 and DOT, FHWA, *Highway Statistics Summary to 1995*. Data series is the total of vehicle travel data on TEDB Tables 5.1 and 5.2.

6.2 RAIL

Btu per freight car-mile – Class I rail energy use divided by freight car-miles.

***Energy use* –** See Section 2. Energy Use Sources. Data series shown in TEDB Table 9.8.

***Freight car miles* –** AAR, *Railroad Fact Book, 2024 Edition*, Washington, DC, December 2024. Data series shown in TEDB Table 9.8.

Btu per ton-mile – Class I rail energy use divided by ton-miles.

***Energy use* –** See Section 2. Energy Use Sources. Data series shown in TEDB Table 9.8.

***Ton-miles* –** AAR, *Railroad Fact Book, 2024 Edition*, Washington, DC, December 2024. Data series shown in TEDB Table 9.8.

6.3 WATER

Btu per ton-mile – Domestic waterborne commerce energy use on taxable waterways divided by ton-miles on taxable waterways.

***Energy use* –** Modeled by Chrisman A. Dager, University of Tennessee, Knoxville, using Waterborne Commerce Statistics Center detail records and annual IRS reports on the Inland Waterway Trust Fund tax on diesel fuel used on the inland waterway.
Note: These data are not available for 2015-on.

***Ton-miles* –**U.S. Department of the Army, Army Corps of Engineers, Waterborne Commerce Statistics Center. Includes only ton-miles on taxable waterways.

7. CAR AND LIGHT DUTY TRUCK SHARES

In 2011, the Federal Highway Administration (FHWA) changed the methodology for producing the data on the VM-1 Table in the annual *Highway Statistics* publication. Historically, VM-1 included individual categories for passenger cars and 2-axle, 4-tire trucks. VM-1 included the vehicle miles of travel (VMT), registrations, fuel use, and fuel economy of passenger cars and 2-axle, 4-tire trucks. After the methodology change, the categories of light vehicles on VM-1 changed to Light-Duty Vehicles with Short wheelbase (less than or equal to 121 inches) and Light-Duty Vehicles with Long Wheelbase (over 121 inches). As some passenger cars have long wheelbases and some 2-axle, 4-tire trucks have short wheelbases, the categories of cars and 2-axle, 4-tire trucks are no longer available. Despite these changes, there are many transportation analysts who require information on cars and 2-axle, 4-tire trucks. Thus, a new methodology to estimate the data in these categories was developed for years 2009 through 2023.

7.1 CARS

Registrations – DOT, FHWA, *Highway Statistics 2023*, Table MV-1 and previous editions back to 2009.

Vehicle travel –

***Total for all light vehicles* –** DOT, FHWA, *Highway Statistics 2023*, Table VM-1 and previous editions back to 2009; sum of light-duty short wheelbase and light-duty long wheelbase VMT.

***Cars* –** Using historical shares of passenger cars/2-axle, 4-tire trucks from the Highway Statistics, the percent of light vehicle travel attributable to cars was estimated for 2009-2023, keeping in mind the economic conditions present in those years and the general trend in total light vehicle VMT. The estimated share was applied to total VMT as shown in TEDB Table A.22.

Table A.22
Estimated Car VMT

Year	Total Light Vehicle VMT (billions)	Share Attributable to Cars	Total Car VMT (billions)
2009	2,633.3	59.5%	1,566.8
2010	2,648.5	56.5%	1,496.4
2011	2,650.5	55.0%	1,457.8
2012	2,664.1	54.0%	1,438.6
2013	2,677.8	54.0%	1,446.0
2014	2,710.6	53.0%	1,436.6
2015	2,779.7	52.0%	1,445.4
2016	2,849.7	51.0%	1,453.4
2017	2,877.4	49.5%	1,424.3
2018	2,897.1	49.0%	1,419.6
2019	2,924.1	47.0%	1,374.3
2020	2,574.0	46.0%	1,183.6
2021	2,769.0	44.5%	1,232.2
2022	2,822.7	43.0%	1,213.7
2023	2,879.1	41.0%	1,180.4

Miles per Vehicle – Vehicle travel divided by registrations.
Fuel Use – Vehicle travel divided by fuel economy.
Fuel Economy – DOE, EIA, *Annual Energy Outlook 2023, March 2023,* and previous editions back to 2012.

7.2 2-AXLE, 4-TIRE TRUCKS

Registrations – DOT, FHWA, *Highway Statistics 2023*, Table MV-9 and previous editions back to 2009. (For 2020, car registration data from MV-1 was subtracted from total light-duty vehicles from VM-1 to calculate light truck registrations.
Vehicle travel –

Total for all light vehicles – DOT, FHWA, *Highway Statistics 2023*, Table VM-1 and previous editions back to 2009; sum of light-duty short wheelbase and light-duty long wheelbase VMT.

2-axle, 4-tire truck VMT – Using historical shares of passenger cars/2-axle, 4-tire trucks from the Highway Statistics, the percent of light vehicle travel attributable to cars was estimated for 2009-2020, keeping in mind the economic conditions present in those years and the general trend in total light vehicle VMT. The estimated share was applied to total VMT as shown in TEDB Table A.23.

Table A.23
Estimated 2-axle, 4-tire Truck VMT

Year	Total Light Vehicle VMT (billions)	Share Attributable to 2-axle, 4-tire Trucks	Total 2-axle, 4-tire Truck VMT (billions)
2009	2,633.2	40.5%	1,066.5
2010	2,648.5	43.5%	1,152.1
2011	2,650.5	45.0%	1,192.7
2012	2,664.1	46.0%	1,225.5
2013	2,677.8	46.0%	1,231.8
2014	2,710.6	47.0%	1,274.0
2015	2,779.7	48.0%	1,334.3
2016	2,849.7	49.0%	1,396.4
2017	2,877.4	50.5%	1,453.1
2018	2,897.1	51.0%	1,477.5
2019	2,924.1	53.0%	1,549.7
2020	2,574.0	54.0%	1,389.4
2021	2,769.0	55.5%	1,536.8
2022	2,822.7	57.0%	1,608.9
2023	2,879.1	59.0%	1,698.7

Miles per Vehicle – Vehicle travel divided by registrations.
Fuel Use – Vehicle travel divided by fuel economy.
Fuel Economy – DOE, EIA, *Annual Energy Outlook 2023, March 2023,* and previous editions back to 2012.

CONVERSIONS

Appendix B



Credit: Greg Pease/Stone/Getty Images

CONVERSIONS

A Note About Heating Values

The heat content of a fuel is the quantity of energy released by burning a unit amount of that fuel. However, this value is not absolute and can vary according to several factors. For example, empirical formulae for determining the heating value of liquid fuels depend on the fuels' American Petroleum Institute (API) gravity. The API gravity varies depending on the percentage by weight of the chemical constituents and impurities in the fuel, both of which are affected by the combination of raw materials used to produce the fuel and by the type of manufacturing process. Temperature and climatic conditions are also factors.

Because of these variations, the heating values in B.4 may differ from values in other publications. The figures in this report are representative or average values, not absolute ones. The gross (higher) heating values used here agree with those used by the Energy Information Administration (EIA).

Heating values fall into two categories, usually referred to as “higher” (or gross) and “lower” (or net). If the products of fuel combustion are cooled back to the initial fuel-air or fuel-oxidizer mixture temperature and the water formed during combustion is condensed, the energy released by the process is the higher (gross) heating value. If the products of combustion are cooled to the initial fuel-air temperature, but the water is considered to remain as a vapor, the energy released by the process is the lower (net) heating value. Usually, the difference between the gross and net heating values for fuels used in transportation is around 5-8% for petroleum fuels and 10-16% for alcohol, natural gas and hydrogen; however, it is important to be consistent in their use.

The Transportation Energy Data Book has always used gross heating values for fuel conversion.

Table B.1
Hydrogen Heat Content

1 kilogram hydrogen =	
Higher heating value	Lower heating value
134,200 Btu	113,400 Btu
39.3 kWh	33.2 kWh
141,600 kJ	119,600 kJ
33,800 kCal	28,560 kCal

Table B.2
Hydrogen Conversions

	Weight		Gas		Liquid	
	Pounds (lb)	Kilograms (kg)	Standard cubic feet (SCF)	Normal cubic meter (Nm^3)	Gallons (gal)	Liters (L)
1 lb	1.0	0.4536	192.00	5.047	1.6928	6.408
1 kg	2.205	1.0	423.3	11.126	3.733	14.128
1 SCF gas	0.005209	0.002363	1.0	0.02628	0.00882	0.0339
1 Nm^3 gas	0.19815	0.08988	38.04	1.0	0.3355	1.2699
1 gal liquid	0.5906	0.2679	113.41	2.981	1.0	3.785
1 L liquid	0.7875	0.0334	29.96	0.77881	0.2642	1.0

Table B.3
Pressure Conversions

	Bar	Atmosphere	lb/in^2 (or psi)
Bar	1.0	0.987	14.5
Atmosphere	1.013	1.0	14.696
lb/in^2 (or psi)	0.0689	0.0680	1.0

Table B.4
Heat Content for Various Fuels

Conventional gasoline	125,000 Btu/gal (gross) = 115,400 Btu/gal (net)
E10	120,900 Btu/gal (gross) = 112,400 Btu/gal (net)
E15	119,000 Btu/gal (gross) = 109,400 Btu/gal (net)
Hydrogen	134,200 Btu/kg (gross) = 113,400 Btu/kg (net)
Low-sulfur diesel	138,700 Btu/gal (gross) = 128,700 Btu/gal (net)
Biodiesel	126,200 Btu/gal (gross) = 117,100 Btu/gal (net)
Methanol	64,600 Btu/gal (gross) = 56,600 Btu/gal (net)
Ethanol	84,600 Btu/gal (gross) = 75,700 Btu/gal (net)
E85	90,700 Btu/gal (gross) = 81,600 Btu/gal (net)
Aviation gasoline	120,200 Btu/gal (gross) = 112,000 Btu/gal (net)
Liquefied petroleum gas (LPG)	91,300 Btu/gal (gross) = 83,500 Btu/gal (net)
Butane	103,000 Btu/gal (gross) = 93,000 Btu/gal (net)
Jet fuel (naphtha)	127,500 Btu/gal (gross) = 118,700 Btu/gal (net)
Jet fuel (kerosene)	135,000 Btu/gal (gross) = 128,100 Btu/gal (net)
Lubricants	144,400 Btu/gal (gross) = 130,900 Btu/gal (net)
Waxes	131,800 Btu/gal (gross) = 120,200 Btu/gal (net)
Asphalt and road oil	158,000 Btu/gal (gross) = 157,700 Btu/gal (net)
Liquefied natural gas (LNG)	23,700 Btu/lb (gross) = 20,900 Btu/lb (net)
Compressed natural gas (CNG)	22,500 Btu/lb (gross) = 20,200 Btu/lb (net)
Crude petroleum	138,100 Btu/gal (gross) = 131,800 Btu/gal (net)
Fuel Oils	
Residual	149,700 Btu/gal (gross) = 138,400 Btu/gal (net)
Distillate	138,700 Btu/gal (gross) = 131,800 Btu/gal (net)
Coal	
Production average	19.880 x 10^6 Btu/short ton
Consumption average	19.499 x 10^6 Btu/short ton

Note: Heat content values are approximate. Data are rounded to the nearest hundred.

Table B.5
Fuel Equivalents

1 million bbl crude oil/day	= 0.365 billion bbl crude oil/year
	= 2.089 quadrillion Btu/year
	= 107.110 million short tons coal/year
	= 97.170 million metric tons coal/year
	= 2.016 trillion ft^3 natural gas/year
	= 2,203 petajoules/year
1 billion bbl crude oil/year	= 2.740 million bbl crude oil/day
	= 5.722 quadrillion Btu/year
	= 293.451 million short tons coal/year
	= 266.219 million metric tons coal/year
	= 5.523 trillion ft^3 natural gas/year
	= 6,037 petajoules/year
1 quadrillion Btu/year	= 8.000 billion gasoline gallon equivalents/year
	= 0.479 million bbl crude oil/day
	= 174.764 million bbl crude oil/year
	= 51.285 million short tons coal/year
	= 46.525 million metric tons coal/year
	= 965.251 billion ft^3 natural gas/year
	= 1,055 petajoules/year
1 billion short tons coal/year	= 0.907 billion metric tons coal/year
	= 9.336 million bbl crude oil/day
	= 3.408 billion bbl crude oil/year
	= 19.499 quadrillion Btu/year
	= 18.821 trillion ft^3 natural gas/year
	= 20,572 petajoules/year
1 billion metric tons coal/year	= 1.102 billion short tons coal/year
	= 8.470 million bbl crude oil/day
	= 3.091 billion bbl crude oil/year
	= 17.689 quadrillion Btu/year
	= 17.075 trillion ft^3 natural gas/year
	= 18,662 petajoules/year
1 trillion ft^3 natural gas/year	= 0.496 million bbl crude oil/day
	= 0.181 billion bbl crude oil/year
	= 1.036 quadrillion Btu/year
	= 53.131 million short tons coal/year
	= 48.200 million metric tons coal/year
	= 1,093 petajoules/year
1 petajoule/year	= 453.844 bbl crude oil/day
	= 165.653 thousand bbl crude oil/year
	= 0.948 trillion Btu/year
	= 48.661 thousand short tons coal/year
	= 44.100 thousand metric tons coal/year
	= 0.915 billion ft^3 natural gas/year

Table B.6
Energy Unit Conversions

1 Btu	= 778.2 ft-lb	1 kWh	= 3412 Btu[a]
	= 107.6 kg-m		= 2.655×10^{6} ft-lb
	= 1055 J		= 3.671×10^{5} kg-m
	= 39.30×10^{-5} hp-h		= 3.600×10^{6} J
	= 39.85×10^{-5} metric hp-h		= 1.341 hp-h
	= 29.31×10^{-5} kWh		= 1.360 metric hp-h
1 kg-m	= 92.95×10^{-4} Btu	1 Joule	= 94.78×10^{-5} Btu
	= 7.233 ft-lb		= 0.7376 ft-lb
	= 9.806 J		= 0.1020 kg-m
	= 36.53×10^{-7} hp-h		= 37.25×10^{-8} hp-h
	= 37.04×10^{-7} metric hp-h		= 37.77×10^{-8} metric hp-h
	= 27.24×10^{-7} kWh		= 27.78×10^{-8} kWh
1 hp-h	= 2544 Btu	1 metric hp-h	= 2510 Btu
	= 1.98×10^{6} ft-lb		= 1.953×10^{6} ft-lb
	= 2.738×10^{5} kg-m		= 27.00×10^{4} kg-m
	= 2.685×10^{6} J		= 2.648×10^{6} J
	= 1.014 metric hp-h		= 0.9863 hp-h
	= 0.7457 kWh		= 0.7355 kWh

[a]This figure does not take into account the fact that electricity generation and distribution efficiency is approximately 33%. If generation and distribution efficiency are taken into account, 1 kWh = 10,339 Btu.

Table B.7
International Energy Conversions

To:	Petajoules	Giga-calories	Million metric tons of oil equivalent	Million Btu	Gigawatt-hours
From:	*multiply by:*				
Petajoules	1	238.8×10^{3}	2.388×10^{-2}	947.8×10^{3}	277.8
Gigacalories	4.1868×10^{-6}	1	10^{-7}	3.968	1.163×10^{-3}
Million metric tons of oil equivalent	41.868	10^{7}	1	3.968×10^{7}	11,630
Million Btu	1.0551×10^{-6}	0.252	2.52×10^{-8}	1	2.931×10^{-4}
Gigawatt-hours	3.6×10^{-3}	860	8.6×10^{-5}	3412	1

Table B.8
Distance and Velocity Conversions

1 in	= 83.33 x 10^{-3} ft	1 ft	= 12.0 in
	= 27.78 x 10^{-3} yd		= 0.33 yd
	= 15.78 x 10^{-6} mile		= 189.4 x 10^{-6} mile
	= 25.40 x 10^{-3} m		= 0.3048 m
	= 25.40 x 10^{-6} km		= 0.3048 x 10^{-3} km
1 mile	= 63360 in	1 km	= 39370 in
	= 5280 ft		= 3281 ft
	= 1760 yd		= 1093.6 yd
	= 1609 m		= 0.6214 mile
	= 1.609 km		= 1000 m

1 ft/sec = 0.3048 m/s = 0.6818 mph = 1.0972 km/h

1 m/sec = 3.281 ft/s = 2.237 mph = 3.600 km/h

1 km/h = 0.9114 ft/s = 0.2778 m/s = 0.6214 mph

1 mph = 1.467 ft/s = 0.4469 m/s = 1.609 km/h

Table B.9
Volume and Flow Rate Conversions[a]

A U.S. gallon of gasoline weighs 6.2 pounds			
1 U.S. gal	= 231 in^3	1 liter	= 61.02 in^3
	= 0.1337 ft^3		= 3.531 x 10^{-2} ft^3
	= 3.785 liters		= 0.2642 U.S. gal
	= 0.8327 imperial gal		= 0.2200 imperial gal
	= 0.0238 bbl		= 6.29 x 10^{-3} bbl
	= 0.003785 m^3		= 0.001 m^3
1 imperial gal	= 277.4 in^3	1 bbl	= 9702 in^3
	= 0.1605 ft^3		= 5.615 ft^3
	= 4.546 liters		= 158.97 liters
	= 1.201 U.S. gal		= 42 U.S. gal
	= 0.0286 bbl		= 34.97 imperial gal
	= 0.004546 m^3		= 0.15898 m^3
1 U.S. gal/hr	= 3.208 ft^3/day		= 1171 ft^3/year
	= 90.85 liter/day		= 33160 liter/year
	= 19.98 imperial gal/day		= 7294 imperial gal/year
	= 0.5714 bbl/day		= 208.57 bbl/year
1 liter/hr	= 0.8476 ft^3/day		= 309.3 ft^3/year
	= 6.340 U.S. gal/day		= 2308 U.S. gal/year
	= 5.28 imperial gal/day		= 1927 imperial gal/year
	= 0.1510 bbl/day		= 55.10 bbl/year
1 bbl/hr	= 134.7 ft^3/day		= 49184 ft^3/year
	= 1008 U.S. gal/day		= 3.679 x 10^5 U.S. gal/year
	= 839.3 imperial gal/day		= 3.063 x 10^5 imperial gal/year
	= 3816 liter/day		= 1.393 x 10^6 liter/day

[a] The conversions for flow rates are identical to those for volume measures, if the time units are identical. Conversions to/from barrels (bbl) are based on barrels of petroleum.

Table B.10
Power Conversions

	TO					
FROM	Horsepower	Kilowatts	Metric horsepower	Ft-lb per sec	Kilocalories per sec	Btu per sec
Horsepower	1	0.7457	1.014	550	0.1781	0.7068
Kilowatts	1.341	1	1.360	737.6	0.239	0.9478
Metric horsepower	0.9863	0.7355	1	542.5	0.1757	0.6971
Ft-lb per sec	1.818×10^{-3}	1.356×10^{-3}	1.84×10^{-3}	1	0.3238×10^{-3}	1.285×10^{-3}
Kilocalories per sec	5.615	4.184	5.692	3088	1	3.968
Btu per sec	1.415	1.055	1.434	778.2	0.2520	1

Table B.11
Mass Conversions

	TO				
FROM	Pound	Kilogram	Short ton	Long ton	Metric ton
Pound	1	0.4536	5.0×10^{-4}	4.4643×10^{-4}	4.5362×10^{-4}
Kilogram	2.205	1	1.1023×10^{-3}	9.8425×10^{-4}	1.0×10^{-3}
Short ton	2,000	907.2	1	0.8929	0.9072
Long ton	2,240	1,016	1.12	1	1.016
Metric ton	2,205	1,000	1.102	0.9842	1

Table B.12
Fuel Efficiency Conversions

MPG	Miles/liter	Kilometers/L	L/100 kilometers	Grams of CO_2 per mile[a]	Pounds of CO_2 per mile[a]
10	2.64	4.25	23.52	877.80	1.94
15	3.96	6.38	15.68	585.20	1.29
20	5.28	8.50	11.76	438.90	0.97
25	6.60	10.63	9.41	351.12	0.78
30	7.92	12.75	7.84	292.60	0.65
35	9.25	14.88	6.72	250.80	0.55
40	10.57	17.00	5.88	219.45	0.49
45	11.89	19.13	5.23	195.07	0.43
50	13.21	21.25	4.70	175.56	0.39
55	14.53	23.38	4.28	159.60	0.35
60	15.85	25.51	3.92	146.30	0.32
65	17.17	27.63	3.62	135.05	0.30
70	18.49	29.76	3.36	125.40	0.28
75	19.81	31.88	3.14	117.04	0.26
80	21.13	34.01	2.94	109.73	0.24
85	22.45	36.13	2.77	103.27	0.23
90	23.77	38.26	2.61	97.53	0.22
95	25.09	40.38	2.48	92.40	0.20
100	26.42	42.51	2.35	87.78	0.19
105	27.74	44.64	2.24	83.60	0.18
110	29.06	46.76	2.14	79.80	0.18
115	30.38	48.89	2.05	76.33	0.17
120	31.70	51.01	1.96	73.15	0.16
125	33.02	53.14	1.88	70.22	0.16
130	34.34	55.26	1.81	67.52	0.15
135	35.66	57.39	1.74	65.02	0.14
140	36.98	59.51	1.68	62.70	0.14
145	38.30	61.64	1.62	60.54	0.13
150	39.62	63.76	1.57	58.52	0.13
Formula	MPG/3.785	MPG/[3.785/1.609]	235.24/MPG	8,778/MPG	19.4/MPG

[a] For gasoline-fueled vehicles.

Table B.13
SI Prefixes and Their Values

	Value	Prefix	Symbol
One million million millionth	10^{-18}	atto	a
One thousand million millionth	10^{-15}	femto	f
One million millionth	10^{-12}	pico	p
One thousand millionth	10^{-9}	nano	n
One millionth	10^{-6}	micro	μ
One thousandth	10^{-3}	milli	m
One hundredth	10^{-2}	centi	c
One tenth	10^{-1}	deci	
One	10^{0}		
Ten	10^{1}	deca	
One hundred	10^{2}	hecto	
One thousand	10^{3}	kilo	k
One million	10^{6}	mega	M
One billion[a]	10^{9}	giga	G
One trillion[a]	10^{12}	tera	T
One quadrillion[a]	10^{15}	peta	P
One quintillion[a]	10^{18}	exa	E

[a] Care should be exercised in the use of this nomenclature, especially in foreign correspondence, as it is either unknown or carries a different value in other countries. A "billion," for example, signifies a value of 10^{12} in most other countries.

Table B.14
Metric Units and Abbreviations

Quantity	Unit name	Symbol
Energy	Joule	J
Specific energy	Joule/kilogram	J/kg
Specific energy consumption	Joule/kilogram•kilometer	J/(kg•km)
Energy consumption	Joule/kilometer	J/km
Energy economy	kilometer/kilojoule	km/kJ
Power	kilowatt	kW
Specific power	Watt/kilogram	W/kg
Power density	Watt/meter^3	W/m^3
Speed	kilometer/hour	km/h
Acceleration	meter/second^2	m/s^2
Range (distance)	kilometer	km
Weight	kilogram	kg
Torque	Newton•meter	N•m
Volume	meter^3	m^3
Mass; payload	kilogram	kg
Length; width	meter	m
Brake specific fuel consumption	kilogram/Joule	kg/J
Fuel economy (heat engine)	Liters/100 km	L/100 km

Conversion of Constant Dollar Values

Many types of information in this data book are expressed in dollars. Generally, constant dollars are used–that is, dollars of a fixed value for a specific year, such as year 2025 dollars. Converting current dollars to constant dollars or converting constant dollars for one year to constant dollars for another year, requires conversion factors. Table B.15 shows conversion factors for the Consumer Price Index inflation factors. Table B.16 shows conversion factors using the Gross National Product Implicit Price Deflator.

Table B.15
Consumer Price Inflation (CPI) Index

	To:									
From:	**1970**	**1971**	**1972**	**1973**	**1974**	**1975**	**1976**	**1977**	**1978**	**1979**
1970	1.000	1.044	1.077	1.144	1.271	1.387	1.466	1.562	1.680	1.871
1971	0.958	1.000	1.032	1.096	1.217	1.328	1.405	1.496	1.610	1.793
1972	0.928	0.969	1.000	1.062	1.179	1.287	1.361	1.450	1.560	1.737
1973	0.874	0.912	0.941	1.000	1.110	1.212	1.282	1.365	1.468	1.635
1974	0.787	0.822	0.848	0.901	1.000	1.091	1.154	1.229	1.323	1.473
1975	0.721	0.753	0.777	0.825	0.916	1.000	1.058	1.126	1.212	1.349
1976	0.682	0.712	0.735	0.780	0.866	0.946	1.000	1.065	1.146	1.276
1977	0.640	0.668	0.690	0.733	0.814	0.888	0.939	1.000	1.076	1.198
1978	0.595	0.621	0.641	0.681	0.756	0.825	0.873	0.929	1.000	1.113
1979	0.534	0.558	0.576	0.612	0.679	0.741	0.784	0.835	0.898	1.000
1980	0.471	0.492	0.507	0.539	0.598	0.653	0.691	0.735	0.791	0.881
1981	0.427	0.446	0.460	0.488	0.542	0.592	0.626	0.667	0.717	0.799
1982	0.402	0.420	0.433	0.460	0.511	0.558	0.590	0.628	0.676	0.752
1983	0.390	0.407	0.420	0.446	0.495	0.540	0.571	0.608	0.655	0.729
1984	0.373	0.390	0.402	0.427	0.474	0.518	0.548	0.583	0.628	0.699
1985	0.361	0.376	0.388	0.413	0.458	0.500	0.529	0.563	0.606	0.675
1986	0.354	0.370	0.381	0.405	0.450	0.491	0.519	0.553	0.595	0.662
1987	0.342	0.357	0.368	0.391	0.434	0.474	0.501	0.533	0.574	0.639
1988	0.328	0.342	0.353	0.375	0.417	0.455	0.481	0.512	0.551	0.614
1989	0.313	0.327	0.337	0.358	0.398	0.434	0.459	0.489	0.526	0.585
1990	0.297	0.310	0.320	0.340	0.377	0.412	0.435	0.464	0.499	0.555
1991	0.285	0.297	0.307	0.326	0.362	0.395	0.418	0.445	0.479	0.533
1992	0.277	0.289	0.298	0.316	0.351	0.383	0.406	0.432	0.465	0.517
1993	0.269	0.280	0.289	0.307	0.341	0.372	0.394	0.419	0.451	0.502
1994	0.262	0.273	0.282	0.300	0.333	0.363	0.384	0.409	0.440	0.490
1995	0.255	0.266	0.274	0.291	0.323	0.353	0.373	0.398	0.428	0.476
1996	0.247	0.258	0.266	0.283	0.314	0.343	0.363	0.386	0.416	0.463
1997	0.242	0.252	0.260	0.277	0.307	0.335	0.355	0.378	0.406	0.452
1998	0.238	0.248	0.256	0.272	0.302	0.330	0.349	0.372	0.400	0.445
1999	0.233	0.243	0.251	0.267	0.296	0.323	0.342	0.364	0.391	0.436
2000	0.225	0.235	0.243	0.258	0.286	0.312	0.330	0.352	0.379	0.422
2001	0.219	0.229	0.236	0.251	0.278	0.304	0.321	0.342	0.368	0.410
2002	0.216	0.225	0.232	0.247	0.274	0.299	0.316	0.337	0.362	0.404
2003	0.211	0.220	0.227	0.241	0.268	0.292	0.309	0.329	0.354	0.395
2004	0.205	0.214	0.221	0.235	0.261	0.285	0.301	0.321	0.345	0.384
2005	0.199	0.207	0.214	0.227	0.252	0.275	0.291	0.310	0.334	0.372
2006	0.192	0.201	0.207	0.220	0.245	0.267	0.282	0.301	0.323	0.360
2007	0.187	0.195	0.202	0.214	0.238	0.259	0.274	0.292	0.314	0.350
2008	0.180	0.188	0.194	0.206	0.229	0.250	0.264	0.281	0.303	0.337
2009	0.181	0.189	0.195	0.207	0.230	0.251	0.265	0.282	0.304	0.338
2010	0.178	0.186	0.192	0.204	0.226	0.247	0.261	0.278	0.299	0.333
2011	0.172	0.180	0.186	0.197	0.219	0.239	0.253	0.269	0.290	0.323
2012	0.169	0.176	0.182	0.193	0.215	0.234	0.248	0.264	0.284	0.316
2013	0.167	0.174	0.179	0.191	0.212	0.231	0.244	0.260	0.280	0.312
2014	0.164	0.171	0.177	0.188	0.208	0.227	0.240	0.256	0.275	0.307
2015	0.164	0.171	0.176	0.187	0.208	0.227	0.240	0.256	0.275	0.306
2016	0.162	0.169	0.174	0.185	0.205	0.224	0.237	0.252	0.272	0.302
2017	0.158	0.165	0.171	0.181	0.201	0.219	0.232	0.247	0.266	0.296
2018	0.155	0.161	0.166	0.177	0.196	0.214	0.227	0.241	0.260	0.289
2019	0.152	0.158	0.164	0.174	0.193	0.210	0.223	0.237	0.255	0.284
2020	0.150	0.156	0.162	0.172	0.190	0.208	0.220	0.234	0.252	0.281
2021	0.143	0.149	0.154	0.164	0.182	0.199	0.210	0.224	0.241	0.268
2022	0.133	0.138	0.143	0.152	0.168	0.184	0.194	0.207	0.223	0.248
2023	0.127	0.133	0.137	0.146	0.162	0.177	0.187	0.199	0.214	0.238
2024	0.124	0.129	0.133	0.142	0.157	0.172	0.181	0.193	0.208	0.231

Table B.15
Consumer Price Inflation (CPI) Index (Continued)

	To:									
From:	**1980**	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**	**1987**	**1988**	**1989**
1970	2.124	2.343	2.487	2.567	2.678	2.773	2.825	2.928	3.049	3.196
1971	2.035	2.244	2.383	2.459	2.565	2.657	2.706	2.805	2.921	3.062
1972	1.971	2.175	2.309	2.383	2.486	2.574	2.622	2.718	2.830	2.967
1973	1.856	2.047	2.173	2.243	2.340	2.423	2.468	2.559	2.664	2.793
1974	1.671	1.844	1.957	2.020	2.108	2.183	2.223	2.304	2.400	2.515
1975	1.532	1.690	1.794	1.851	1.931	2.000	2.037	2.112	2.199	2.305
1976	1.448	1.598	1.696	1.750	1.826	1.891	1.926	1.996	2.079	2.179
1977	1.360	1.500	1.592	1.644	1.715	1.776	1.809	1.875	1.952	2.046
1978	1.264	1.394	1.480	1.528	1.594	1.650	1.681	1.742	1.814	1.902
1979	1.135	1.252	1.329	1.372	1.431	1.482	1.510	1.565	1.629	1.708
1980	1.000	1.103	1.171	1.209	1.261	1.306	1.330	1.379	1.436	1.505
1981	0.906	1.000	1.062	1.096	1.143	1.184	1.206	1.250	1.301	1.364
1982	0.854	0.942	1.000	1.032	1.077	1.115	1.136	1.177	1.226	1.285
1983	0.827	0.913	0.969	1.000	1.043	1.080	1.100	1.141	1.188	1.245
1984	0.793	0.875	0.929	0.959	1.000	1.036	1.055	1.093	1.139	1.193
1985	0.766	0.845	0.897	0.926	0.966	1.000	1.019	1.056	1.099	1.152
1986	0.752	0.829	0.880	0.909	0.948	0.982	1.000	1.036	1.079	1.131
1987	0.725	0.800	0.849	0.877	0.915	0.947	0.965	1.000	1.041	1.092
1988	0.697	0.768	0.816	0.842	0.878	0.910	0.926	0.960	1.000	1.048
1989	0.665	0.733	0.778	0.803	0.838	0.868	0.884	0.916	0.954	1.000
1990	0.630	0.695	0.738	0.762	0.795	0.823	0.839	0.869	0.905	0.949
1991	0.605	0.667	0.709	0.731	0.763	0.790	0.805	0.834	0.869	0.910
1992	0.587	0.648	0.688	0.710	0.741	0.767	0.781	0.810	0.843	0.884
1993	0.570	0.629	0.668	0.689	0.719	0.745	0.758	0.786	0.819	0.858
1994	0.556	0.613	0.651	0.672	0.701	0.726	0.740	0.767	0.798	0.837
1995	0.541	0.596	0.633	0.654	0.682	0.706	0.719	0.745	0.776	0.814
1996	0.525	0.579	0.615	0.635	0.662	0.686	0.699	0.724	0.754	0.790
1997	0.513	0.566	0.601	0.621	0.647	0.670	0.683	0.708	0.737	0.773
1998	0.506	0.558	0.592	0.611	0.637	0.660	0.672	0.697	0.726	0.761
1999	0.495	0.546	0.579	0.598	0.624	0.646	0.658	0.682	0.710	0.744
2000	0.479	0.528	0.560	0.578	0.603	0.625	0.636	0.660	0.687	0.720
2001	0.465	0.513	0.545	0.562	0.587	0.608	0.619	0.641	0.668	0.700
2002	0.458	0.505	0.536	0.554	0.578	0.598	0.609	0.631	0.658	0.689
2003	0.448	0.494	0.524	0.541	0.565	0.585	0.596	0.617	0.643	0.674
2004	0.436	0.481	0.511	0.527	0.550	0.570	0.580	0.601	0.626	0.656
2005	0.422	0.465	0.494	0.510	0.532	0.551	0.561	0.582	0.606	0.635
2006	0.409	0.451	0.479	0.494	0.515	0.534	0.544	0.563	0.587	0.615
2007	0.397	0.438	0.465	0.480	0.501	0.519	0.529	0.548	0.571	0.598
2008	0.383	0.422	0.448	0.463	0.483	0.500	0.509	0.528	0.549	0.576
2009	0.384	0.424	0.450	0.464	0.484	0.502	0.511	0.530	0.551	0.578
2010	0.378	0.417	0.443	0.457	0.476	0.493	0.503	0.521	0.543	0.569
2011	0.366	0.404	0.429	0.443	0.462	0.478	0.487	0.505	0.526	0.551
2012	0.359	0.396	0.420	0.434	0.453	0.469	0.477	0.495	0.515	0.540
2013	0.354	0.390	0.414	0.428	0.446	0.462	0.470	0.488	0.508	0.532
2014	0.348	0.384	0.408	0.421	0.439	0.455	0.463	0.480	0.500	0.524
2015	0.348	0.384	0.407	0.420	0.438	0.454	0.462	0.479	0.499	0.523
2016	0.343	0.379	0.402	0.415	0.433	0.448	0.457	0.473	0.493	0.517
2017	0.336	0.371	0.394	0.406	0.424	0.439	0.447	0.463	0.483	0.506
2018	0.328	0.362	0.384	0.397	0.414	0.429	0.436	0.452	0.471	0.494
2019	0.322	0.356	0.377	0.390	0.406	0.421	0.429	0.444	0.463	0.485
2020	0.318	0.351	0.373	0.385	0.401	0.416	0.423	0.439	0.457	0.479
2021	0.304	0.335	0.356	0.368	0.383	0.397	0.404	0.419	0.437	0.458
2022	0.282	0.311	0.330	0.340	0.355	0.368	0.375	0.388	0.404	0.424
2023	0.270	0.298	0.317	0.327	0.341	0.353	0.360	0.373	0.388	0.407
2024	0.263	0.290	0.308	0.318	0.331	0.343	0.349	0.362	0.377	0.395

Table B.15
Consumer Price Inflation (CPI) Index (Continued)

	To:									
From:	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**
1970	3.369	3.510	3.616	3.724	3.820	3.928	4.044	4.137	4.201	4.294
1971	3.227	3.363	3.464	3.568	3.659	3.763	3.874	3.963	4.025	4.114
1972	3.127	3.258	3.356	3.457	3.545	3.646	3.754	3.840	3.900	3.986
1973	2.944	3.068	3.160	3.255	3.338	3.432	3.534	3.615	3.671	3.752
1974	2.651	2.763	2.846	2.931	3.006	3.091	3.183	3.256	3.306	3.379
1975	2.429	2.532	2.608	2.686	2.755	2.833	2.916	2.983	3.030	3.097
1976	2.297	2.394	2.466	2.540	2.605	2.678	2.757	2.821	2.865	2.928
1977	2.157	2.248	2.315	2.384	2.446	2.515	2.589	2.649	2.690	2.749
1978	2.005	2.089	2.152	2.216	2.273	2.337	2.406	2.462	2.500	2.555
1979	1.800	1.876	1.933	1.990	2.041	2.099	2.161	2.211	2.245	2.295
1980	1.586	1.653	1.703	1.754	1.799	1.850	1.904	1.948	1.978	2.022
1981	1.438	1.498	1.543	1.590	1.630	1.677	1.726	1.766	1.793	1.833
1982	1.354	1.411	1.454	1.497	1.536	1.579	1.626	1.663	1.689	1.726
1983	1.312	1.367	1.409	1.451	1.488	1.530	1.575	1.611	1.637	1.673
1984	1.258	1.311	1.350	1.391	1.426	1.467	1.510	1.545	1.569	1.603
1985	1.215	1.266	1.304	1.343	1.377	1.416	1.458	1.492	1.515	1.548
1986	1.193	1.243	1.280	1.318	1.352	1.391	1.432	1.464	1.487	1.520
1987	1.151	1.199	1.235	1.272	1.305	1.342	1.381	1.413	1.435	1.467
1988	1.105	1.151	1.186	1.221	1.253	1.288	1.326	1.357	1.378	1.408
1989	1.054	1.098	1.131	1.165	1.195	1.229	1.265	1.294	1.315	1.344
1990	1.000	1.042	1.073	1.106	1.134	1.166	1.200	1.228	1.247	1.275
1991	0.960	1.000	1.030	1.061	1.088	1.119	1.152	1.178	1.197	1.223
1992	0.932	0.971	1.000	1.030	1.056	1.086	1.118	1.144	1.162	1.187
1993	0.904	0.943	0.971	1.000	1.026	1.055	1.086	1.111	1.128	1.153
1994	0.882	0.919	0.947	0.975	1.000	1.028	1.059	1.083	1.100	1.124
1995	0.858	0.894	0.921	0.948	0.972	1.000	1.030	1.053	1.070	1.093
1996	0.833	0.868	0.894	0.921	0.945	0.971	1.000	1.023	1.039	1.062
1997	0.814	0.849	0.874	0.900	0.923	0.950	0.978	1.000	1.016	1.038
1998	0.802	0.836	0.861	0.887	0.909	0.935	0.963	0.985	1.000	1.022
1999	0.785	0.818	0.842	0.867	0.890	0.915	0.942	0.963	0.978	1.000
2000	0.759	0.791	0.815	0.839	0.861	0.885	0.911	0.932	0.947	0.967
2001	0.738	0.769	0.792	0.816	0.837	0.861	0.886	0.906	0.920	0.941
2002	0.727	0.757	0.780	0.803	0.824	0.847	0.872	0.892	0.906	0.926
2003	0.710	0.740	0.763	0.785	0.805	0.828	0.853	0.872	0.886	0.905
2004	0.692	0.721	0.743	0.765	0.785	0.807	0.831	0.850	0.863	0.882
2005	0.669	0.697	0.718	0.740	0.759	0.780	0.803	0.822	0.835	0.853
2006	0.648	0.676	0.696	0.717	0.735	0.756	0.778	0.796	0.809	0.826
2007	0.630	0.657	0.677	0.697	0.715	0.735	0.757	0.774	0.786	0.804
2008	0.607	0.633	0.652	0.671	0.688	0.708	0.729	0.745	0.757	0.774
2009	0.609	0.635	0.654	0.674	0.691	0.710	0.731	0.748	0.760	0.777
2010	0.599	0.625	0.643	0.663	0.680	0.699	0.720	0.736	0.748	0.764
2011	0.581	0.605	0.624	0.642	0.659	0.678	0.698	0.714	0.725	0.741
2012	0.569	0.593	0.611	0.629	0.645	0.664	0.683	0.699	0.710	0.726
2013	0.561	0.585	0.602	0.620	0.636	0.654	0.674	0.689	0.700	0.715
2014	0.552	0.575	0.593	0.610	0.626	0.644	0.663	0.678	0.689	0.704
2015	0.551	0.575	0.592	0.610	0.625	0.643	0.662	0.677	0.688	0.703
2016	0.545	0.567	0.585	0.602	0.617	0.635	0.654	0.669	0.679	0.694
2017	0.533	0.556	0.572	0.590	0.605	0.622	0.640	0.655	0.665	0.680
2018	0.520	0.542	0.559	0.575	0.590	0.607	0.625	0.639	0.649	0.663
2019	0.511	0.533	0.549	0.565	0.580	0.596	0.614	0.628	0.638	0.652
2020	0.505	0.526	0.542	0.558	0.573	0.589	0.606	0.620	0.630	0.644
2021	0.482	0.503	0.518	0.533	0.547	0.562	0.579	0.592	0.602	0.615
2022	0.447	0.465	0.479	0.494	0.506	0.521	0.536	0.548	0.557	0.569
2023	0.429	0.447	0.460	0.474	0.486	0.500	0.515	0.527	0.535	0.547
2024	0.417	0.434	0.447	0.461	0.472	0.486	0.500	0.512	0.520	0.531

Table B.15
Consumer Price Inflation (CPI) Index (Continued)

	To:									
From:	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
1970	4.438	4.564	4.637	4.742	4.869	5.034	5.196	5.344	5.549	5.529
1971	4.252	4.373	4.442	4.543	4.664	4.822	4.978	5.120	5.316	5.297
1972	4.120	4.237	4.304	4.402	4.519	4.672	4.823	4.960	5.151	5.132
1973	3.878	3.989	4.052	4.144	4.255	4.399	4.541	4.670	4.849	4.832
1974	3.493	3.592	3.649	3.732	3.832	3.961	4.089	4.206	4.367	4.352
1975	3.201	3.292	3.344	3.420	3.511	3.630	3.747	3.854	4.002	3.988
1976	3.026	3.112	3.162	3.234	3.320	3.432	3.543	3.644	3.784	3.770
1977	2.842	2.922	2.969	3.036	3.117	3.223	3.327	3.421	3.553	3.540
1978	2.641	2.716	2.759	2.822	2.897	2.995	3.092	3.180	3.302	3.290
1979	2.372	2.439	2.478	2.534	2.602	2.690	2.777	2.856	2.966	2.955
1980	2.090	2.149	2.183	2.233	2.292	2.370	2.447	2.516	2.613	2.604
1981	1.894	1.948	1.979	2.024	2.078	2.149	2.218	2.281	2.369	2.360
1982	1.784	1.835	1.864	1.907	1.958	2.024	2.089	2.149	2.231	2.223
1983	1.729	1.778	1.806	1.847	1.897	1.961	2.024	2.082	2.162	2.154
1984	1.657	1.705	1.731	1.771	1.818	1.880	1.940	1.996	2.072	2.065
1985	1.600	1.646	1.672	1.710	1.756	1.815	1.874	1.927	2.001	1.994
1986	1.571	1.616	1.641	1.679	1.724	1.782	1.839	1.892	1.964	1.957
1987	1.516	1.559	1.584	1.620	1.663	1.719	1.775	1.825	1.895	1.889
1988	1.456	1.497	1.521	1.555	1.597	1.651	1.704	1.753	1.820	1.813
1989	1.389	1.428	1.451	1.484	1.523	1.575	1.626	1.672	1.736	1.730
1990	1.318	1.355	1.376	1.408	1.445	1.494	1.542	1.586	1.647	1.641
1991	1.264	1.300	1.321	1.351	1.387	1.434	1.480	1.522	1.581	1.575
1992	1.227	1.262	1.282	1.311	1.346	1.392	1.437	1.478	1.535	1.529
1993	1.192	1.226	1.245	1.273	1.307	1.352	1.395	1.435	1.490	1.485
1994	1.162	1.195	1.214	1.242	1.275	1.318	1.360	1.399	1.453	1.448
1995	1.130	1.162	1.180	1.207	1.240	1.281	1.323	1.360	1.413	1.408
1996	1.098	1.129	1.147	1.173	1.204	1.245	1.285	1.321	1.372	1.367
1997	1.073	1.103	1.121	1.146	1.177	1.217	1.256	1.292	1.341	1.337
1998	1.056	1.087	1.104	1.129	1.159	1.198	1.237	1.272	1.321	1.316
1999	1.034	1.063	1.080	1.104	1.134	1.172	1.210	1.245	1.292	1.288
2000	1.000	1.028	1.045	1.069	1.097	1.134	1.171	1.204	1.250	1.246
2001	0.972	1.000	1.016	1.039	1.067	1.103	1.138	1.171	1.216	1.211
2002	0.957	0.984	1.000	1.023	1.050	1.086	1.121	1.153	1.197	1.193
2003	0.936	0.963	0.978	1.000	1.027	1.061	1.096	1.127	1.170	1.166
2004	0.912	0.938	0.952	0.974	1.000	1.034	1.067	1.098	1.140	1.136
2005	0.882	0.907	0.921	0.942	0.967	1.000	1.032	1.062	1.102	1.098
2006	0.854	0.878	0.892	0.913	0.937	0.969	1.000	1.028	1.068	1.064
2007	0.831	0.854	0.868	0.887	0.911	0.942	0.972	1.000	1.038	1.035
2008	0.800	0.823	0.836	0.855	0.877	0.907	0.936	0.963	1.000	0.996
2009	0.803	0.825	0.839	0.858	0.881	0.910	0.940	0.966	1.004	1.000
2010	0.790	0.812	0.825	0.844	0.866	0.896	0.925	0.951	0.987	0.984
2011	0.766	0.787	0.800	0.818	0.840	0.868	0.896	0.922	0.957	0.954
2012	0.750	0.771	0.784	0.801	0.823	0.851	0.878	0.903	0.938	0.934
2013	0.739	0.760	0.772	0.790	0.811	0.838	0.865	0.890	0.924	0.921
2014	0.727	0.748	0.760	0.777	0.798	0.825	0.852	0.876	0.909	0.906
2015	0.727	0.747	0.759	0.776	0.797	0.824	0.851	0.875	0.908	0.905
2016	0.717	0.738	0.750	0.767	0.787	0.814	0.840	0.864	0.897	0.894
2017	0.703	0.723	0.734	0.751	0.771	0.797	0.822	0.846	0.878	0.875
2018	0.686	0.705	0.716	0.733	0.752	0.778	0.803	0.826	0.857	0.854
2019	0.674	0.693	0.704	0.720	0.739	0.764	0.789	0.811	0.842	0.839
2020	0.665	0.684	0.695	0.711	0.730	0.755	0.779	0.801	0.832	0.829
2021	0.635	0.654	0.664	0.679	0.697	0.721	0.744	0.765	0.795	0.792
2022	0.588	0.605	0.615	0.629	0.645	0.667	0.689	0.708	0.736	0.733
2023	0.565	0.581	0.590	0.604	0.620	0.641	0.662	0.680	0.707	0.704
2024	0.549	0.565	0.573	0.587	0.602	0.623	0.643	0.661	0.686	0.684

Table B.15
Consumer Price Inflation (CPI) Index (Continued)

	To:									
From:	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
1970	5.620	5.797	5.917	6.004	6.101	6.109	6.186	6.318	6.472	6.589
1971	5.384	5.554	5.669	5.752	5.845	5.852	5.926	6.052	6.200	6.313
1972	5.217	5.381	5.493	5.573	5.664	5.670	5.742	5.864	6.007	6.116
1973	4.911	5.066	5.171	5.247	5.332	5.338	5.406	5.521	5.656	5.758
1974	4.423	4.563	4.657	4.725	4.802	4.808	4.868	4.972	5.093	5.186
1975	4.053	4.181	4.268	4.330	4.400	4.406	4.461	4.556	4.667	4.752
1976	3.832	3.953	4.035	4.094	4.161	4.166	4.218	4.308	4.413	4.493
1977	3.598	3.712	3.789	3.844	3.907	3.911	3.961	4.045	4.144	4.219
1978	3.344	3.450	3.521	3.573	3.631	3.635	3.681	3.760	3.851	3.921
1979	3.004	3.098	3.162	3.209	3.261	3.265	3.306	3.376	3.459	3.521
1980	2.646	2.730	2.786	2.827	2.873	2.876	2.913	2.975	3.047	3.103
1981	2.399	2.475	2.526	2.563	2.604	2.607	2.640	2.697	2.762	2.813
1982	2.260	2.331	2.379	2.414	2.453	2.456	2.487	2.540	2.602	2.649
1983	2.189	2.258	2.305	2.339	2.377	2.380	2.410	2.461	2.521	2.567
1984	2.099	2.165	2.210	2.242	2.278	2.281	2.310	2.359	2.417	2.461
1985	2.027	2.091	2.134	2.165	2.200	2.203	2.231	2.278	2.334	2.376
1986	1.990	2.052	2.095	2.126	2.160	2.163	2.190	2.236	2.291	2.333
1987	1.920	1.980	2.021	2.051	2.084	2.086	2.113	2.158	2.210	2.251
1988	1.843	1.901	1.941	1.969	2.001	2.004	2.029	2.072	2.123	2.161
1989	1.759	1.814	1.852	1.879	1.909	1.911	1.936	1.977	2.025	2.062
1990	1.668	1.721	1.757	1.782	1.811	1.813	1.836	1.875	1.921	1.956
1991	1.601	1.652	1.686	1.710	1.738	1.740	1.762	1.800	1.844	1.877
1992	1.554	1.603	1.636	1.660	1.687	1.689	1.711	1.747	1.790	1.822
1993	1.509	1.557	1.589	1.612	1.638	1.640	1.661	1.696	1.738	1.769
1994	1.471	1.518	1.549	1.572	1.597	1.599	1.619	1.654	1.694	1.725
1995	1.431	1.476	1.507	1.529	1.553	1.555	1.575	1.608	1.648	1.678
1996	1.390	1.434	1.463	1.485	1.509	1.511	1.530	1.562	1.600	1.629
1997	1.359	1.401	1.430	1.451	1.475	1.477	1.495	1.527	1.565	1.593
1998	1.338	1.380	1.409	1.429	1.452	1.454	1.472	1.504	1.541	1.568
1999	1.309	1.350	1.378	1.398	1.421	1.423	1.441	1.471	1.507	1.535
2000	1.266	1.306	1.333	1.353	1.375	1.376	1.394	1.423	1.458	1.485
2001	1.231	1.270	1.296	1.315	1.337	1.338	1.355	1.384	1.418	1.444
2002	1.212	1.250	1.276	1.295	1.316	1.317	1.334	1.363	1.396	1.421
2003	1.185	1.222	1.248	1.266	1.287	1.288	1.304	1.332	1.365	1.389
2004	1.154	1.191	1.215	1.233	1.253	1.255	1.271	1.298	1.329	1.353
2005	1.117	1.152	1.176	1.193	1.212	1.214	1.229	1.255	1.286	1.309
2006	1.082	1.116	1.139	1.156	1.174	1.176	1.191	1.216	1.246	1.268
2007	1.052	1.085	1.107	1.124	1.142	1.143	1.158	1.182	1.211	1.233
2008	1.013	1.045	1.066	1.082	1.100	1.101	1.115	1.138	1.166	1.187
2009	1.016	1.048	1.070	1.086	1.103	1.105	1.119	1.143	1.170	1.192
2010	1.000	1.032	1.053	1.068	1.086	1.087	1.101	1.124	1.152	1.172
2011	0.969	1.000	1.021	1.036	1.052	1.054	1.067	1.090	1.116	1.137
2012	0.950	0.980	1.000	1.015	1.031	1.032	1.045	1.068	1.094	1.114
2013	0.936	0.966	0.986	1.000	1.016	1.017	1.030	1.052	1.078	1.097
2014	0.921	0.950	0.970	0.984	1.000	1.001	1.014	1.035	1.061	1.080
2015	0.920	0.949	0.969	0.983	0.999	1.000	1.013	1.034	1.059	1.079
2016	0.909	0.937	0.957	0.971	0.986	0.988	1.000	1.021	1.046	1.065
2017	0.890	0.918	0.937	0.950	0.966	0.967	0.979	1.000	1.024	1.043
2018	0.868	0.896	0.914	0.928	0.943	0.944	0.956	0.976	1.000	1.018
2019	0.853	0.880	0.898	0.911	0.926	0.927	0.939	0.959	0.982	1.000
2020	0.843	0.869	0.887	0.900	0.915	0.916	0.927	0.947	0.970	0.988
2021	0.805	0.830	0.847	0.860	0.874	0.875	0.886	0.905	0.927	0.943
2022	0.745	0.769	0.785	0.796	0.809	0.810	0.820	0.838	0.858	0.874
2023	0.716	0.738	0.754	0.765	0.777	0.778	0.788	0.804	0.824	0.839
2024	0.695	0.717	0.732	0.743	0.755	0.756	0.765	0.781	0.800	0.815

Table B.15
Consumer Price Inflation (CPI) Index (Continued)

	To:				
From:	**2020**	**2021**	**2022**	**2023**	**2024**
1970	6.670	6.984	7.543	7.853	8.085
1971	6.390	6.691	7.226	7.524	7.745
1972	6.192	6.483	7.001	7.290	7.505
1973	5.829	6.103	6.591	6.863	7.065
1974	5.250	5.496	5.936	6.181	6.363
1975	4.811	5.037	5.440	5.664	5.831
1976	4.549	4.762	5.143	5.355	5.513
1977	4.271	4.471	4.829	5.028	5.176
1978	3.969	4.156	4.489	4.673	4.811
1979	3.565	3.732	4.031	4.197	4.321
1980	3.141	3.288	3.552	3.698	3.807
1981	2.847	2.981	3.220	3.352	3.451
1982	2.682	2.808	3.033	3.158	3.251
1983	2.599	2.721	2.938	3.059	3.149
1984	2.491	2.608	2.817	2.933	3.019
1985	2.405	2.518	2.720	2.832	2.915
1986	2.361	2.472	2.670	2.780	2.862
1987	2.278	2.385	2.576	2.682	2.761
1988	2.188	2.291	2.474	2.576	2.652
1989	2.087	2.185	2.360	2.457	2.530
1990	1.980	2.073	2.239	2.331	2.400
1991	1.900	1.990	2.149	2.237	2.303
1992	1.845	1.931	2.086	2.172	2.236
1993	1.791	1.875	2.025	2.109	2.171
1994	1.746	1.828	1.975	2.056	2.117
1995	1.698	1.778	1.920	1.999	2.058
1996	1.650	1.727	1.865	1.942	1.999
1997	1.613	1.688	1.823	1.898	1.954
1998	1.588	1.662	1.795	1.869	1.924
1999	1.553	1.626	1.757	1.829	1.883
2000	1.503	1.574	1.700	1.769	1.822
2001	1.461	1.530	1.652	1.721	1.771
2002	1.439	1.506	1.627	1.694	1.744
2003	1.407	1.473	1.591	1.656	1.705
2004	1.370	1.434	1.549	1.613	1.661
2005	1.325	1.387	1.498	1.560	1.606
2006	1.284	1.344	1.452	1.511	1.556
2007	1.248	1.307	1.411	1.470	1.513
2008	1.202	1.259	1.359	1.415	1.457
2009	1.206	1.263	1.364	1.420	1.462
2010	1.187	1.243	1.342	1.397	1.439
2011	1.151	1.205	1.301	1.355	1.395
2012	1.127	1.180	1.275	1.327	1.366
2013	1.111	1.163	1.256	1.308	1.347
2014	1.093	1.145	1.236	1.287	1.325
2015	1.092	1.143	1.235	1.286	1.323
2016	1.078	1.129	1.219	1.270	1.307
2017	1.056	1.105	1.194	1.243	1.280
2018	1.031	1.079	1.165	1.213	1.249
2019	1.012	1.060	1.145	1.192	1.227
2020	1.000	1.047	1.131	1.177	1.212
2021	0.955	1.000	1.080	1.124	1.158
2022	0.884	0.926	1.000	1.041	1.072
2023	0.849	0.889	0.960	1.000	1.029
2024	0.825	0.864	0.933	0.971	1.000

Source:
U.S. Bureau of Labor Statistics.

Table B.15
Gross National Product Implicit Price Deflator

	To:									
From:	**1970**	**1971**	**1972**	**1973**	**1974**	**1975**	**1976**	**1977**	**1978**	**1979**
1970	1.000	1.051	1.096	1.156	1.260	1.377	1.453	1.544	1.652	1.789
1971	0.952	1.000	1.043	1.101	1.199	1.311	1.383	1.469	1.572	1.703
1972	0.912	0.958	1.000	1.055	1.150	1.256	1.326	1.408	1.507	1.632
1973	0.865	0.909	0.948	1.000	1.090	1.191	1.257	1.335	1.429	1.547
1974	0.793	0.834	0.870	0.918	1.000	1.093	1.153	1.225	1.311	1.420
1975	0.726	0.763	0.796	0.840	0.915	1.000	1.055	1.121	1.200	1.299
1976	0.688	0.723	0.754	0.796	0.867	0.948	1.000	1.062	1.137	1.231
1977	0.648	0.681	0.710	0.749	0.816	0.892	0.941	1.000	1.070	1.159
1978	0.605	0.636	0.663	0.700	0.763	0.834	0.880	0.934	1.000	1.083
1979	0.559	0.587	0.613	0.646	0.704	0.770	0.812	0.863	0.923	1.000
1980	0.513	0.539	0.562	0.593	0.646	0.706	0.745	0.791	0.847	0.917
1981	0.468	0.492	0.513	0.542	0.590	0.645	0.680	0.723	0.774	0.838
1982	0.441	0.463	0.483	0.510	0.556	0.607	0.641	0.681	0.729	0.789
1983	0.424	0.446	0.465	0.491	0.535	0.584	0.617	0.655	0.701	0.759
1984	0.410	0.430	0.449	0.474	0.516	0.564	0.595	0.632	0.677	0.733
1985	0.397	0.417	0.435	0.459	0.500	0.547	0.577	0.613	0.656	0.710
1986	0.389	0.409	0.427	0.450	0.490	0.536	0.566	0.601	0.643	0.696
1987	0.380	0.399	0.416	0.439	0.478	0.523	0.552	0.586	0.627	0.679
1988	0.367	0.385	0.402	0.424	0.462	0.505	0.533	0.566	0.606	0.656
1989	0.353	0.371	0.387	0.408	0.445	0.486	0.513	0.545	0.583	0.631
1990	0.340	0.357	0.373	0.393	0.429	0.468	0.494	0.525	0.562	0.608
1991	0.329	0.346	0.360	0.380	0.414	0.453	0.478	0.508	0.543	0.588
1992	0.322	0.338	0.352	0.372	0.405	0.443	0.467	0.496	0.531	0.575
1993	0.314	0.330	0.344	0.363	0.396	0.433	0.456	0.485	0.519	0.562
1994	0.308	0.323	0.337	0.356	0.388	0.424	0.447	0.475	0.508	0.550
1995	0.301	0.316	0.330	0.348	0.380	0.415	0.438	0.465	0.498	0.539
1996	0.296	0.311	0.324	0.342	0.373	0.407	0.430	0.457	0.489	0.529
1997	0.291	0.305	0.319	0.336	0.366	0.400	0.422	0.449	0.480	0.520
1998	0.287	0.302	0.315	0.332	0.362	0.396	0.418	0.444	0.475	0.514
1999	0.283	0.298	0.311	0.328	0.357	0.390	0.412	0.437	0.468	0.507
2000	0.277	0.291	0.304	0.320	0.349	0.382	0.403	0.428	0.458	0.496
2001	0.271	0.285	0.297	0.313	0.341	0.373	0.394	0.418	0.448	0.485
2002	0.267	0.280	0.292	0.309	0.336	0.367	0.388	0.412	0.441	0.477
2003	0.262	0.275	0.287	0.303	0.330	0.360	0.380	0.404	0.432	0.468
2004	0.255	0.268	0.279	0.295	0.321	0.351	0.370	0.393	0.421	0.456
2005	0.247	0.260	0.271	0.286	0.311	0.340	0.359	0.381	0.408	0.442
2006	0.240	0.252	0.263	0.277	0.302	0.330	0.348	0.370	0.396	0.429
2007	0.233	0.245	0.256	0.270	0.294	0.321	0.339	0.360	0.385	0.417
2008	0.229	0.240	0.251	0.265	0.288	0.315	0.333	0.353	0.378	0.410
2009	0.227	0.239	0.249	0.263	0.287	0.313	0.331	0.351	0.376	0.407
2010	0.225	0.236	0.246	0.260	0.283	0.310	0.327	0.347	0.371	0.402
2011	0.220	0.231	0.241	0.255	0.278	0.303	0.320	0.340	0.364	0.394
2012	0.216	0.227	0.237	0.250	0.272	0.298	0.314	0.334	0.357	0.387
2013	0.213	0.223	0.233	0.246	0.268	0.293	0.309	0.328	0.351	0.380
2014	0.209	0.220	0.229	0.242	0.263	0.288	0.304	0.322	0.345	0.374
2015	0.207	0.218	0.227	0.239	0.261	0.285	0.301	0.320	0.342	0.370
2016	0.205	0.215	0.225	0.237	0.258	0.282	0.298	0.317	0.339	0.367
2017	0.202	0.212	0.221	0.233	0.254	0.278	0.293	0.311	0.333	0.361
2018	0.197	0.207	0.216	0.228	0.248	0.271	0.286	0.304	0.326	0.353
2019	0.194	0.204	0.213	0.224	0.244	0.267	0.282	0.299	0.320	0.347
2020	0.191	0.201	0.210	0.221	0.241	0.264	0.278	0.295	0.316	0.342
2021	0.183	0.192	0.201	0.212	0.231	0.252	0.266	0.282	0.302	0.327
2022	0.171	0.180	0.187	0.198	0.215	0.235	0.248	0.264	0.282	0.306
2023	0.165	0.173	0.181	0.191	0.208	0.227	0.239	0.254	0.272	0.295
2024	0.161	0.169	0.176	0.186	0.203	0.221	0.234	0.248	0.266	0.288

Table B.16
Gross National Product Implicit Price Deflator (Continued)

	To:									
From:	**1980**	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**	**1987**	**1988**	**1989**
1970	1.951	2.136	2.268	2.357	2.442	2.519	2.570	2.634	2.727	2.834
1971	1.857	2.032	2.158	2.243	2.324	2.397	2.446	2.507	2.595	2.698
1972	1.780	1.948	2.068	2.150	2.227	2.298	2.344	2.403	2.488	2.586
1973	1.687	1.847	1.961	2.038	2.111	2.178	2.222	2.278	2.358	2.451
1974	1.548	1.694	1.799	1.870	1.937	1.999	2.039	2.090	2.164	2.249
1975	1.417	1.551	1.646	1.711	1.773	1.829	1.866	1.913	1.980	2.058
1976	1.342	1.470	1.560	1.622	1.680	1.733	1.768	1.813	1.877	1.950
1977	1.264	1.384	1.469	1.527	1.582	1.632	1.665	1.707	1.767	1.836
1978	1.181	1.293	1.372	1.426	1.478	1.524	1.555	1.594	1.651	1.716
1979	1.090	1.193	1.267	1.317	1.364	1.408	1.436	1.472	1.524	1.584
1980	1.000	1.095	1.162	1.208	1.252	1.291	1.317	1.350	1.398	1.453
1981	0.913	1.000	1.062	1.103	1.143	1.179	1.203	1.233	1.277	1.327
1982	0.860	0.942	1.000	1.039	1.077	1.111	1.133	1.162	1.203	1.250
1983	0.828	0.906	0.962	1.000	1.036	1.069	1.090	1.118	1.157	1.203
1984	0.799	0.875	0.929	0.965	1.000	1.032	1.052	1.079	1.117	1.161
1985	0.774	0.848	0.900	0.936	0.969	1.000	1.020	1.046	1.083	1.125
1986	0.759	0.831	0.882	0.917	0.950	0.980	1.000	1.025	1.061	1.103
1987	0.741	0.811	0.861	0.895	0.927	0.956	0.976	1.000	1.035	1.076
1988	0.715	0.783	0.831	0.864	0.895	0.924	0.942	0.966	1.000	1.039
1989	0.688	0.753	0.800	0.831	0.861	0.889	0.907	0.929	0.962	1.000
1990	0.663	0.726	0.771	0.801	0.830	0.856	0.874	0.896	0.927	0.964
1991	0.641	0.702	0.746	0.775	0.803	0.828	0.845	0.866	0.897	0.932
1992	0.627	0.687	0.729	0.758	0.785	0.810	0.826	0.847	0.877	0.911
1993	0.613	0.671	0.712	0.740	0.767	0.791	0.807	0.827	0.857	0.890
1994	0.600	0.657	0.697	0.725	0.751	0.775	0.790	0.810	0.839	0.872
1995	0.588	0.643	0.683	0.710	0.735	0.759	0.774	0.793	0.821	0.854
1996	0.577	0.632	0.671	0.697	0.722	0.745	0.760	0.779	0.807	0.838
1997	0.567	0.621	0.659	0.685	0.710	0.732	0.747	0.766	0.793	0.824
1998	0.561	0.614	0.652	0.677	0.702	0.724	0.739	0.757	0.784	0.815
1999	0.553	0.605	0.642	0.668	0.692	0.714	0.728	0.746	0.773	0.803
2000	0.540	0.592	0.628	0.653	0.676	0.698	0.712	0.730	0.755	0.785
2001	0.529	0.579	0.614	0.638	0.661	0.682	0.696	0.714	0.739	0.768
2002	0.520	0.570	0.605	0.629	0.651	0.672	0.686	0.703	0.728	0.756
2003	0.510	0.559	0.593	0.616	0.639	0.659	0.672	0.689	0.713	0.742
2004	0.497	0.544	0.578	0.600	0.622	0.642	0.655	0.671	0.695	0.722
2005	0.482	0.528	0.560	0.582	0.603	0.622	0.635	0.651	0.674	0.700
2006	0.467	0.512	0.543	0.565	0.585	0.604	0.616	0.631	0.653	0.679
2007	0.455	0.498	0.529	0.550	0.570	0.588	0.600	0.615	0.636	0.661
2008	0.446	0.489	0.519	0.539	0.559	0.576	0.588	0.603	0.624	0.649
2009	0.444	0.486	0.516	0.536	0.555	0.573	0.585	0.599	0.620	0.645
2010	0.438	0.480	0.510	0.530	0.549	0.566	0.578	0.592	0.613	0.637
2011	0.430	0.470	0.499	0.519	0.538	0.555	0.566	0.580	0.601	0.624
2012	0.422	0.462	0.490	0.509	0.528	0.545	0.556	0.569	0.590	0.613
2013	0.415	0.454	0.482	0.501	0.519	0.535	0.546	0.560	0.580	0.603
2014	0.408	0.446	0.474	0.492	0.510	0.526	0.537	0.550	0.570	0.592
2015	0.404	0.442	0.469	0.488	0.505	0.521	0.532	0.545	0.565	0.587
2016	0.400	0.438	0.465	0.483	0.501	0.517	0.527	0.540	0.559	0.581
2017	0.393	0.430	0.457	0.475	0.492	0.508	0.518	0.531	0.550	0.571
2018	0.385	0.421	0.447	0.465	0.481	0.497	0.507	0.519	0.538	0.559
2019	0.378	0.414	0.440	0.457	0.474	0.488	0.498	0.511	0.529	0.550
2020	0.373	0.409	0.434	0.451	0.467	0.482	0.492	0.504	0.522	0.542
2021	0.357	0.391	0.415	0.431	0.447	0.461	0.470	0.482	0.499	0.519
2022	0.333	0.365	0.387	0.403	0.417	0.430	0.439	0.450	0.466	0.484
2023	0.321	0.352	0.374	0.388	0.402	0.415	0.423	0.434	0.449	0.467
2024	0.314	0.343	0.365	0.379	0.393	0.405	0.413	0.424	0.438	0.456

Table B.16
Gross National Product Implicit Price Deflator (Continued)

	To:									
From:	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**
1970	2.941	3.041	3.110	3.184	3.252	3.320	3.381	3.440	3.478	3.530
1971	2.799	2.894	2.960	3.030	3.095	3.160	3.218	3.273	3.310	3.359
1972	2.683	2.774	2.837	2.904	2.966	3.029	3.084	3.138	3.173	3.220
1973	2.543	2.630	2.690	2.753	2.812	2.871	2.924	2.974	3.008	3.052
1974	2.334	2.413	2.468	2.526	2.580	2.635	2.683	2.729	2.760	2.801
1975	2.136	2.208	2.258	2.312	2.361	2.411	2.455	2.498	2.526	2.563
1976	2.024	2.093	2.140	2.191	2.238	2.285	2.327	2.367	2.394	2.429
1977	1.905	1.970	2.015	2.063	2.107	2.151	2.191	2.228	2.253	2.287
1978	1.780	1.841	1.882	1.927	1.968	2.010	2.046	2.082	2.105	2.136
1979	1.644	1.700	1.738	1.779	1.817	1.856	1.890	1.922	1.944	1.973
1980	1.508	1.559	1.594	1.632	1.667	1.702	1.733	1.763	1.783	1.809
1981	1.377	1.424	1.456	1.491	1.523	1.555	1.583	1.611	1.629	1.653
1982	1.297	1.341	1.372	1.404	1.434	1.464	1.491	1.517	1.534	1.557
1983	1.248	1.291	1.320	1.351	1.380	1.409	1.435	1.460	1.476	1.498
1984	1.205	1.246	1.274	1.304	1.332	1.360	1.385	1.409	1.425	1.446
1985	1.168	1.207	1.235	1.264	1.291	1.318	1.342	1.366	1.381	1.401
1986	1.144	1.183	1.210	1.239	1.265	1.292	1.316	1.338	1.354	1.374
1987	1.116	1.154	1.181	1.209	1.234	1.260	1.284	1.306	1.320	1.340
1988	1.078	1.115	1.140	1.167	1.192	1.218	1.240	1.261	1.275	1.294
1989	1.038	1.073	1.097	1.123	1.147	1.171	1.193	1.213	1.227	1.245
1990	1.000	1.034	1.058	1.083	1.106	1.129	1.150	1.170	1.183	1.200
1991	0.967	1.000	1.023	1.047	1.069	1.092	1.112	1.131	1.144	1.161
1992	0.946	0.978	1.000	1.024	1.045	1.068	1.087	1.106	1.118	1.135
1993	0.924	0.955	0.977	1.000	1.021	1.043	1.062	1.080	1.092	1.109
1994	0.904	0.935	0.956	0.979	1.000	1.021	1.040	1.058	1.070	1.086
1995	0.886	0.916	0.937	0.959	0.979	1.000	1.018	1.036	1.048	1.063
1996	0.870	0.899	0.920	0.942	0.962	0.982	1.000	1.017	1.029	1.044
1997	0.855	0.884	0.904	0.926	0.945	0.965	0.983	1.000	1.011	1.026
1998	0.846	0.874	0.894	0.915	0.935	0.955	0.972	0.989	1.000	1.015
1999	0.833	0.862	0.881	0.902	0.921	0.941	0.958	0.974	0.985	1.000
2000	0.815	0.842	0.862	0.882	0.901	0.920	0.937	0.953	0.964	0.978
2001	0.797	0.824	0.843	0.863	0.881	0.900	0.916	0.932	0.942	0.956
2002	0.785	0.811	0.830	0.849	0.868	0.886	0.902	0.918	0.928	0.942
2003	0.769	0.796	0.814	0.833	0.851	0.869	0.885	0.900	0.910	0.923
2004	0.749	0.775	0.792	0.811	0.828	0.846	0.861	0.876	0.886	0.899
2005	0.726	0.751	0.768	0.786	0.803	0.820	0.835	0.850	0.859	0.872
2006	0.705	0.729	0.745	0.763	0.779	0.796	0.810	0.824	0.833	0.846
2007	0.686	0.709	0.726	0.743	0.759	0.775	0.789	0.802	0.811	0.823
2008	0.673	0.696	0.712	0.729	0.744	0.760	0.774	0.787	0.796	0.808
2009	0.669	0.692	0.708	0.724	0.740	0.755	0.769	0.782	0.791	0.803
2010	0.661	0.683	0.699	0.716	0.731	0.746	0.760	0.773	0.782	0.793
2011	0.648	0.670	0.685	0.701	0.716	0.731	0.745	0.757	0.766	0.777
2012	0.636	0.657	0.672	0.688	0.703	0.718	0.731	0.744	0.752	0.763
2013	0.625	0.646	0.661	0.677	0.691	0.706	0.719	0.731	0.739	0.750
2014	0.614	0.635	0.650	0.665	0.679	0.694	0.706	0.719	0.727	0.737
2015	0.609	0.630	0.644	0.659	0.673	0.687	0.700	0.712	0.720	0.731
2016	0.603	0.624	0.638	0.653	0.667	0.681	0.693	0.705	0.713	0.724
2017	0.593	0.613	0.627	0.642	0.655	0.669	0.681	0.693	0.701	0.711
2018	0.580	0.599	0.613	0.628	0.641	0.655	0.667	0.678	0.686	0.696
2019	0.570	0.590	0.603	0.617	0.631	0.644	0.656	0.667	0.675	0.685
2020	0.563	0.582	0.595	0.609	0.622	0.635	0.647	0.658	0.666	0.675
2021	0.538	0.557	0.569	0.583	0.595	0.608	0.619	0.629	0.637	0.646
2022	0.503	0.520	0.531	0.544	0.556	0.567	0.578	0.588	0.594	0.603
2023	0.485	0.501	0.512	0.525	0.536	0.547	0.557	0.567	0.573	0.582
2024	0.473	0.489	0.500	0.512	0.523	0.534	0.544	0.553	0.559	0.568

Table B.16
Gross National Product Implicit Price Deflator (Continued)

	To:									
From:	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
1970	3.610	3.691	3.748	3.822	3.925	4.048	4.173	4.286	4.369	4.396
1971	3.435	3.513	3.567	3.638	3.736	3.853	3.972	4.079	4.158	4.183
1972	3.293	3.367	3.419	3.487	3.581	3.693	3.807	3.910	3.986	4.010
1973	3.121	3.192	3.241	3.305	3.394	3.501	3.609	3.707	3.778	3.801
1974	2.864	2.929	2.974	3.033	3.114	3.212	3.311	3.401	3.467	3.488
1975	2.621	2.680	2.722	2.776	2.850	2.940	3.030	3.112	3.173	3.192
1976	2.484	2.540	2.579	2.630	2.701	2.786	2.872	2.950	3.007	3.025
1977	2.339	2.391	2.428	2.476	2.543	2.623	2.704	2.777	2.831	2.848
1978	2.185	2.234	2.269	2.313	2.376	2.450	2.526	2.594	2.644	2.660
1979	2.017	2.063	2.095	2.136	2.194	2.262	2.332	2.396	2.442	2.457
1980	1.850	1.892	1.921	1.959	2.012	2.075	2.139	2.197	2.240	2.253
1981	1.690	1.728	1.755	1.790	1.838	1.896	1.954	2.007	2.046	2.058
1982	1.592	1.628	1.653	1.686	1.731	1.785	1.840	1.890	1.927	1.939
1983	1.532	1.566	1.591	1.622	1.666	1.718	1.771	1.819	1.854	1.865
1984	1.478	1.512	1.535	1.566	1.608	1.658	1.709	1.756	1.790	1.800
1985	1.433	1.465	1.488	1.518	1.558	1.607	1.657	1.702	1.735	1.745
1986	1.405	1.436	1.459	1.487	1.527	1.575	1.624	1.668	1.700	1.711
1987	1.370	1.401	1.423	1.451	1.490	1.537	1.584	1.627	1.659	1.669
1988	1.324	1.353	1.374	1.402	1.439	1.484	1.530	1.572	1.602	1.612
1989	1.274	1.302	1.322	1.349	1.385	1.428	1.472	1.512	1.541	1.551
1990	1.227	1.255	1.275	1.300	1.335	1.377	1.419	1.457	1.486	1.495
1991	1.187	1.214	1.233	1.257	1.291	1.331	1.372	1.410	1.437	1.445
1992	1.161	1.187	1.205	1.229	1.262	1.302	1.342	1.378	1.405	1.413
1993	1.134	1.159	1.177	1.201	1.233	1.271	1.311	1.346	1.372	1.381
1994	1.110	1.135	1.153	1.175	1.207	1.245	1.283	1.318	1.344	1.352
1995	1.087	1.112	1.129	1.151	1.182	1.219	1.257	1.291	1.316	1.324
1996	1.068	1.092	1.109	1.130	1.161	1.197	1.234	1.268	1.292	1.300
1997	1.050	1.073	1.090	1.111	1.141	1.177	1.213	1.246	1.270	1.278
1998	1.038	1.061	1.078	1.099	1.128	1.164	1.200	1.232	1.256	1.264
1999	1.023	1.046	1.062	1.083	1.112	1.147	1.182	1.214	1.238	1.245
2000	1.000	1.023	1.038	1.059	1.087	1.121	1.156	1.187	1.210	1.218
2001	0.978	1.000	1.016	1.036	1.063	1.097	1.131	1.161	1.184	1.191
2002	0.963	0.985	1.000	1.020	1.047	1.080	1.113	1.144	1.166	1.173
2003	0.944	0.966	0.981	1.000	1.027	1.059	1.092	1.121	1.143	1.150
2004	0.920	0.940	0.955	0.974	1.000	1.031	1.063	1.092	1.113	1.120
2005	0.892	0.912	0.926	0.944	0.970	1.000	1.031	1.059	1.079	1.086
2006	0.865	0.884	0.898	0.916	0.941	0.970	1.000	1.027	1.047	1.053
2007	0.842	0.861	0.874	0.892	0.916	0.944	0.974	1.000	1.019	1.026
2008	0.826	0.845	0.858	0.875	0.898	0.927	0.955	0.981	1.000	1.006
2009	0.821	0.840	0.853	0.870	0.893	0.921	0.949	0.975	0.994	1.000
2010	0.811	0.830	0.842	0.859	0.882	0.910	0.938	0.963	0.982	0.988
2011	0.795	0.813	0.825	0.842	0.864	0.891	0.919	0.944	0.962	0.968
2012	0.780	0.798	0.810	0.826	0.849	0.875	0.902	0.927	0.945	0.950
2013	0.767	0.785	0.797	0.813	0.834	0.861	0.887	0.911	0.929	0.934
2014	0.754	0.771	0.783	0.799	0.820	0.846	0.872	0.896	0.913	0.918
2015	0.747	0.764	0.776	0.791	0.813	0.838	0.864	0.887	0.905	0.910
2016	0.740	0.757	0.769	0.784	0.805	0.830	0.856	0.879	0.896	0.901
2017	0.727	0.744	0.755	0.770	0.791	0.816	0.841	0.864	0.880	0.886
2018	0.712	0.728	0.739	0.754	0.774	0.798	0.823	0.845	0.861	0.867
2019	0.700	0.716	0.727	0.741	0.761	0.785	0.809	0.831	0.847	0.852
2020	0.691	0.706	0.717	0.731	0.751	0.775	0.799	0.820	0.836	0.841
2021	0.661	0.676	0.686	0.700	0.718	0.741	0.764	0.784	0.800	0.804
2022	0.617	0.631	0.640	0.653	0.671	0.692	0.713	0.732	0.747	0.751
2023	0.595	0.608	0.618	0.630	0.647	0.667	0.688	0.706	0.720	0.724
2024	0.580	0.593	0.603	0.615	0.631	0.651	0.671	0.689	0.702	0.707

Table B.16
Gross National Product Implicit Price Deflator (Continued)

	To:									
From:	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
1970	4.449	4.541	4.626	4.705	4.786	4.830	4.876	4.963	5.073	5.157
1971	4.234	4.322	4.402	4.477	4.555	4.597	4.641	4.723	4.828	4.907
1972	4.059	4.143	4.220	4.291	4.366	4.406	4.448	4.527	4.627	4.704
1973	3.847	3.927	4.000	4.068	4.139	4.177	4.217	4.291	4.387	4.459
1974	3.530	3.603	3.670	3.733	3.798	3.833	3.869	3.937	4.025	4.091
1975	3.231	3.298	3.359	3.416	3.475	3.507	3.541	3.603	3.684	3.744
1976	3.062	3.125	3.183	3.237	3.294	3.324	3.355	3.415	3.491	3.548
1977	2.882	2.942	2.997	3.048	3.101	3.129	3.159	3.215	3.286	3.341
1978	2.693	2.749	2.800	2.847	2.897	2.924	2.951	3.003	3.070	3.121
1979	2.487	2.538	2.585	2.629	2.675	2.700	2.725	2.773	2.835	2.882
1980	2.281	2.328	2.371	2.412	2.454	2.476	2.500	2.544	2.600	2.643
1981	2.083	2.127	2.166	2.203	2.241	2.262	2.283	2.324	2.375	2.415
1982	1.962	2.003	2.040	2.075	2.111	2.130	2.150	2.189	2.237	2.274
1983	1.888	1.927	1.963	1.996	2.031	2.050	2.069	2.106	2.153	2.188
1984	1.822	1.860	1.895	1.927	1.960	1.978	1.997	2.032	2.078	2.112
1985	1.766	1.803	1.837	1.868	1.900	1.918	1.936	1.970	2.014	2.047
1986	1.731	1.767	1.800	1.831	1.863	1.880	1.898	1.931	1.974	2.007
1987	1.689	1.724	1.756	1.786	1.817	1.834	1.851	1.884	1.926	1.958
1988	1.631	1.665	1.696	1.725	1.755	1.771	1.788	1.820	1.860	1.891
1989	1.570	1.602	1.632	1.660	1.689	1.704	1.720	1.751	1.790	1.819
1990	1.513	1.544	1.573	1.600	1.627	1.642	1.658	1.687	1.725	1.753
1991	1.463	1.493	1.521	1.547	1.574	1.588	1.603	1.632	1.668	1.696
1992	1.431	1.460	1.487	1.513	1.539	1.553	1.568	1.595	1.631	1.658
1993	1.397	1.426	1.453	1.478	1.503	1.517	1.531	1.559	1.593	1.620
1994	1.368	1.397	1.423	1.447	1.472	1.485	1.500	1.526	1.560	1.586
1995	1.340	1.368	1.393	1.417	1.442	1.455	1.469	1.495	1.528	1.553
1996	1.316	1.343	1.368	1.391	1.416	1.429	1.442	1.468	1.500	1.525
1997	1.294	1.320	1.345	1.368	1.392	1.404	1.418	1.443	1.475	1.499
1998	1.279	1.306	1.330	1.353	1.376	1.389	1.402	1.427	1.458	1.482
1999	1.260	1.287	1.310	1.333	1.356	1.368	1.381	1.406	1.437	1.461
2000	1.233	1.258	1.281	1.303	1.326	1.338	1.351	1.375	1.405	1.428
2001	1.205	1.230	1.253	1.275	1.297	1.309	1.321	1.344	1.374	1.397
2002	1.187	1.212	1.234	1.255	1.277	1.289	1.301	1.324	1.353	1.376
2003	1.164	1.188	1.210	1.231	1.252	1.264	1.276	1.298	1.327	1.349
2004	1.134	1.157	1.179	1.199	1.219	1.231	1.242	1.264	1.292	1.314
2005	1.099	1.122	1.143	1.162	1.182	1.193	1.204	1.226	1.253	1.274
2006	1.066	1.088	1.108	1.127	1.147	1.157	1.168	1.189	1.216	1.236
2007	1.038	1.059	1.079	1.098	1.117	1.127	1.138	1.158	1.183	1.203
2008	1.018	1.039	1.059	1.077	1.095	1.106	1.116	1.136	1.161	1.180
2009	1.012	1.033	1.052	1.070	1.089	1.099	1.109	1.129	1.154	1.173
2010	1.000	1.021	1.040	1.057	1.076	1.086	1.096	1.115	1.140	1.159
2011	0.980	1.000	1.019	1.036	1.054	1.064	1.074	1.093	1.117	1.135
2012	0.962	0.982	1.000	1.017	1.035	1.044	1.054	1.073	1.097	1.115
2013	0.946	0.965	0.983	1.000	1.017	1.027	1.037	1.055	1.078	1.096
2014	0.930	0.949	0.966	0.983	1.000	1.009	1.019	1.037	1.060	1.077
2015	0.921	0.940	0.958	0.974	0.991	1.000	1.009	1.027	1.050	1.067
2016	0.912	0.931	0.949	0.965	0.982	0.991	1.000	1.018	1.040	1.057
2017	0.897	0.915	0.932	0.948	0.965	0.973	0.983	1.000	1.022	1.039
2018	0.877	0.895	0.912	0.927	0.944	0.952	0.961	0.978	1.000	1.016
2019	0.863	0.881	0.897	0.912	0.928	0.937	0.946	0.962	0.984	1.000
2020	0.851	0.869	0.885	0.900	0.916	0.924	0.933	0.950	0.971	0.987
2021	0.814	0.831	0.847	0.861	0.876	0.884	0.892	0.908	0.928	0.944
2022	0.760	0.776	0.790	0.804	0.818	0.825	0.833	0.848	0.867	0.881
2023	0.733	0.748	0.762	0.775	0.789	0.796	0.803	0.818	0.836	0.850
2024	0.715	0.730	0.744	0.756	0.770	0.777	0.784	0.798	0.816	0.829

Table B.16
Gross National Product Implicit Price Deflator (Continued)

	To:				
From:	**2020**	**2021**	**2022**	**2023**	**2024**
1970	5.226	5.464	5.853	6.069	6.220
1971	4.973	5.200	5.570	5.776	5.919
1972	4.767	4.984	5.339	5.536	5.674
1973	4.519	4.725	5.061	5.248	5.378
1974	4.146	4.335	4.644	4.816	4.935
1975	3.795	3.968	4.250	4.407	4.516
1976	3.596	3.760	4.027	4.176	4.280
1977	3.386	3.540	3.792	3.932	4.030
1978	3.163	3.307	3.542	3.673	3.764
1979	2.920	3.054	3.271	3.392	3.476
1980	2.679	2.801	3.000	3.111	3.188
1981	2.447	2.559	2.741	2.842	2.912
1982	2.305	2.410	2.581	2.677	2.743
1983	2.218	2.319	2.484	2.575	2.639
1984	2.140	2.238	2.397	2.486	2.547
1985	2.075	2.169	2.324	2.410	2.469
1986	2.034	2.126	2.278	2.362	2.420
1987	1.984	2.074	2.222	2.304	2.361
1988	1.916	2.004	2.146	2.225	2.281
1989	1.844	1.928	2.065	2.141	2.194
1990	1.777	1.858	1.990	2.064	2.115
1991	1.718	1.797	1.925	1.996	2.045
1992	1.680	1.757	1.882	1.951	2.000
1993	1.641	1.716	1.838	1.906	1.953
1994	1.607	1.680	1.800	1.866	1.913
1995	1.574	1.646	1.763	1.828	1.873
1996	1.546	1.616	1.731	1.795	1.839
1997	1.519	1.589	1.702	1.764	1.808
1998	1.502	1.571	1.683	1.745	1.788
1999	1.480	1.548	1.658	1.719	1.762
2000	1.448	1.514	1.621	1.681	1.723
2001	1.416	1.480	1.586	1.644	1.685
2002	1.394	1.458	1.561	1.619	1.659
2003	1.367	1.429	1.531	1.588	1.627
2004	1.331	1.392	1.491	1.546	1.585
2005	1.291	1.350	1.446	1.499	1.536
2006	1.252	1.309	1.402	1.454	1.490
2007	1.219	1.275	1.365	1.416	1.451
2008	1.196	1.251	1.340	1.389	1.424
2009	1.189	1.243	1.331	1.381	1.415
2010	1.175	1.228	1.315	1.364	1.398
2011	1.151	1.203	1.289	1.336	1.370
2012	1.130	1.181	1.265	1.312	1.345
2013	1.111	1.161	1.244	1.290	1.322
2014	1.092	1.142	1.223	1.268	1.299
2015	1.082	1.131	1.212	1.256	1.288
2016	1.072	1.121	1.200	1.245	1.276
2017	1.053	1.101	1.179	1.223	1.253
2018	1.030	1.077	1.154	1.196	1.226
2019	1.013	1.060	1.135	1.177	1.206
2020	1.000	1.046	1.120	1.161	1.190
2021	0.956	1.000	1.071	1.111	1.138
2022	0.893	0.934	1.000	1.037	1.063
2023	0.861	0.900	0.964	1.000	1.025
2024	0.840	0.878	0.941	0.976	1.000

Source: U.S. Department of Commerce, Bureau of Economic Analysis, *Survey of Current Business*, Washington, DC, monthly.

GLOSSARY OF TERMS

Glossary



GLOSSARY

Acceleration power – Often measured in kilowatts. Pulse power obtainable from a battery used to accelerate a vehicle. This is based on a constant current pulse for 30 seconds at no less than 2/3 of the maximum open-circuit-voltage, at 80% depth-of-discharge relative to the battery's rated capacity and at 20° C ambient temperature.

Age – The amount of time a person or thing has existed.

Air Carrier – The commercial system of air transportation consisting of certificated air carriers, air taxis (including commuters), supplemental air carriers, commercial operators of large aircraft, and air travel clubs.

Certificated route air carrier: An air carrier holding a Certificate of Public Convenience and Necessity issued by the Department of Transportation to conduct scheduled interstate services. Nonscheduled or charter operations may also be conducted by these carriers. These carriers operate large aircraft (30 seats or more, or a maximum payload capacity of 7,500 pounds or more) in accordance with Federal Aviation Regulation part 121.

Domestic air operator: Commercial air transportation within and between the 50 States and the District of Columbia. Includes operations of certificated route air carriers, Pan American, local service, helicopter, intra-Alaska, intra-Hawaii, all-cargo carriers and other carriers. Also included are transborder operations conducted on the domestic route segments of U.S. air carriers. Domestic operators are classified based on their operating revenue as follows:

Majors - over $1 billion
Nationals - $100 million to $1 billion
Large Regionals - $20 million to $99 million
Medium Regionals – Less than $20 million

International air operator: Commercial air transportation outside the territory of the United States, including operations between the U.S. and foreign countries and between the U.S. and its territories and possessions.

Supplemental air carrier: A class of air carriers which hold certificates authorizing them to perform passenger and cargo charter services supplementing the scheduled service of the certificated route air carriers. Supplemental air carriers are often referred to as nonscheduled air carriers or "nonskeds."

Alcohol – The family name of a group of organic chemical compounds composed of carbon, hydrogen, and oxygen. The molecules in the series vary in chain length and are composed of a hydrocarbon plus a hydroxyl group. Alcohol includes methanol and ethanol.

Alternative fuel – For transportation applications, includes the following: methanol; denatured ethanol, and other alcohols; fuel mixtures containing 85 percent or more by volume of methanol, denatured ethanol, and other alcohols with gasoline or other fuels; natural gas; liquefied petroleum gas (propane); hydrogen; coal-derived liquid fuels; fuels (other than alcohol) derived from biological materials (biofuels such as soy diesel fuel); and electricity (including electricity from solar energy). The term "alternative fuel" does not include alcohol or other blended portions of primarily petroleum-based fuels used as oxygenates or extenders, i.e. MTBE, ETBE, other ethers, and the 10-percent ethanol portion of gasohol.

Amtrak – See Rail.

Anthropogenic – Human made. Usually used in the context of emissions that are produced as the result of human activities.

Aviation – See *General aviation*.

Aviation gasoline – All special grades of gasoline for use in aviation reciprocating engines, as given in the American Society for Testing and Materials (ASTM) Specification D 910. Includes all refinery products within the gasoline range that are to be marketed straight or in blends as aviation gasoline without further processing (any refinery operation except mechanical blending). Also included are finished components in the gasoline range which will be used for blending or compounding into aviation gasoline.

Barges – Shallow, non-self-propelled vessels used to carry bulk commodities on the rivers and the Great Lakes.

Battery efficiency – Measured in percentage. Net DC energy delivered on discharge, as a percentage of the total DC energy required to restore the initial state-of-charge. The efficiency value must include energy losses resulting from self-discharge, cell equalization, thermal loss compensation, and all battery-specific auxiliary equipment.

Bike sharing – Allows users access to bicycles on an as-needed basis for a pre-determined fee. Station-based bike sharing typically involves an unattended kiosk and bikes can be returned to any kiosk. Some bike share users have annual/monthly memberships and others are casual users paying higher usage rates than members. Some bike share programs offer electric-assist bikes, often called e-bikes.

Btu – British thermal unit. The amount of energy required to raise the temperature of 1 pound of water 1 degree Fahrenheit at or near 39.2 degrees Fahrenheit. An average Btu content of fuel is the heat value per quantity of fuel as determined from tests of fuel samples.

Bunker – A storage tank.

Bunker fuels – Fuel supplied to ships and aircraft, both domestic and foreign, consisting primarily of residual and distillate fuel oil for ships and kerosene-based jet fuel for aircraft.

Bus –A mode of transit service characterized by roadway vehicles powered by diesel, gasoline, battery, or alternative fuel engines contained within the vehicle.

Intercity bus: A standard-sized bus equipped with front doors only, high backed seats, luggage compartments separate from the passenger compartment and usually with restroom facilities, for high-speed long-distance service.

Motor bus: Rubber-tired, self-propelled, manually steered bus with fuel supply on board the vehicle. Motor bus types include intercity, school, and transit.

School and other nonrevenue bus: Bus services for which passengers are not directly charged for transportation, either on a per passenger or per vehicle basis.

Transit bus: A bus designed for frequent stop service with front and center doors, low-back seating, and without luggage storage compartments or restroom facilities.

Trolley coach: Rubber-tired electric transit vehicle, manually-steered, propelled by a motor drawing current, normally through overhead wires, from a central power source not on board the vehicle.

Calendar year – The period of time between January 1 and December 31 of any given year.

Captive imports – Products produced overseas specifically for domestic manufacturers.

Carsharing – Users have access to a light vehicle on a temporary basis, typically paying a fee for each use in addition to membership fees. The carshare operator maintains a fleet of vehicles that are parked in various locations across a city or urban area. The operator typically provides insurance, gasoline, parking, and maintenance.

Car size classifications – Size classifications of cars are established by the Environmental Protection Agency (EPA) as follows:

Minicompact – less than 85 cubic feet of passenger and luggage volume.
Subcompact – between 85 to 99 cubic feet of passenger and luggage volume.
Compact – between 100 to 109 cubic feet of passenger and luggage volume.
Midsize – between 110 to 119 cubic feet of passenger and luggage volume.
Large – 120 cubic feet or more of passenger and luggage volume.
Two seater – cars designed primarily to seat only two adults.
Small station wagon – less than 130 cubic feet of passenger and luggage volume.
Mid-size station wagon – between 130 to 159 cubic feet of passenger and luggage volume.
Large station wagon – 160 or more cubic feet of passenger and luggage volume.

Carbon dioxide (CO_2) – A colorless, odorless, non-poisonous gas that is a normal part of the ambient air. Carbon dioxide is a product of fossil fuel combustion.

Carbon monoxide (CO) – A colorless, odorless, highly toxic gas that is a by-product of incomplete fossil fuel combustion. Carbon monoxide, one of the major air pollutants, can be harmful in small amounts if breathed over a certain period of time.

Car-mile (railroad) – A single railroad car moved a distance of one mile.

Cargo ton-mile – See *Ton-mile*.

Certificated route air carriers – See *Air carriers*.

Class I freight railroad – See *Rail*.

Coal slurry – Finely crushed coal mixed with sufficient water to form a fluid.

Combination trucks – Consist of a power unit (a truck tractor) and one or more trailing units (a semi-trailer or trailer). The most frequently used combination is popularly referred to as a "tractor-semitrailer" or "tractor trailer."

Commercial sector – An energy-consuming sector that consists of service-providing facilities of: businesses; Federal, State, and local governments; and other private and public organizations, such as religious, social or fraternal groups. Includes institutional living quarters.

Commuter rail – A mode of transit service (also called metropolitan rail, regional rail, or suburban rail) characterized by an electric or diesel propelled railway for urban passenger train service consisting of local short distance travel operating between a central city and adjacent suburbs.

Compact car – See *car size classifications*.

Compression ignition – The form of ignition that initiates combustion in a diesel engine. The rapid compression of air within the cylinders generates the heat required to ignite the fuel as it is injected.

Constant dollars – A time series of monetary figures is expressed in constant dollars when the effect of change over time in the purchasing power of the dollar has been removed. Usually, the data are expressed in terms of dollars of a selected year or the average of a set of years.

Consumer Price Index (CPI) – A measure of the average change over time in the prices paid by urban consumers for a market basket of consumer goods and services.

Continuous discharge capacity – Measured as percent of rated energy capacity. Energy delivered in a constant power discharge required by an electric vehicle for hill climbing and/or high-speed cruise, specified as the percent of its rated energy capacity delivered in a one-hour constant-power discharge.

Conventional Refueling Station – An establishment for refueling motor vehicles with traditional transportation fuels, such as gasoline and diesel fuel.

Corporate Average Fuel Economy (CAFE) Standards – CAFE standards were originally established by Congress for new cars, and later for light-duty trucks, in Title V of the Motor Vehicle Information and Cost Savings Act (15 U.S.C.1901, et seq.) with subsequent amendments. Under CAFE, car manufacturers are required by law to produce vehicle fleets with a composite sales-weighted fuel economy which cannot be lower than the CAFE standards in a given year, or for every vehicle which does not meet the standard, a fine is paid for every one-tenth of a mpg below the standard.

Criteria pollutant – A pollutant determined to be hazardous to human health and regulated under EPA's National Ambient Air Quality Standards. The 1970 amendments to the Clean Air Act require EPA to describe the health and welfare impacts of a pollutant as the "criteria" for inclusion in the regulatory regime.

Crude oil – A mixture of hydrocarbons that exists in liquid phase in natural underground reservoirs and remains liquid at atmospheric pressure after passing through surface separating facilities. Crude oil production is measured at the wellhead and includes lease condensate.

Crude oil imports – The volume of crude oil imported into the 50 States and the District of Columbia, including imports from U.S. territories, but excluding imports of crude oil into the Hawaiian Foreign Trade Zone.

Curb weight – The weight of a vehicle including all standard equipment, spare tire and wheel, all fluids and lubricants to capacity, full tank of fuel, and the weight of major optional accessories normally found on the vehicle.

Current dollars – Represents dollars current at the time designated or at the time of the transaction. In most contexts, the same meaning would be conveyed by the use of the term "dollars." See also constant dollars.

Demand Response – A transit mode that includes passenger cars, vans, and small buses operating in response to calls from passengers to the transit operator who dispatches the vehicles. The vehicles do not operate over a fixed route on a fixed schedule. Can also be known as paratransit or dial-a-ride.

Diesel fuel – See *Distillate fuel oil*.

Disposable personal income – See *Income*.

Distillate fuel oil – The lighter fuel oils distilled off during the refining process. Included are products known as ASTM grades numbers 1 and 2 heating oils, diesel fuels, and number 4 fuel oil. The major uses of distillate fuel oils include heating, fuel for on-and off-highway diesel engines, and railroad diesel fuel.

Domestic air operator – See *Air carrier*.

Domestic water transportation – See *Internal water transportation*.

E85 – 85% ethanol and 15% gasoline.

E95 – 95% ethanol and 5% gasoline.

Electric utilities sector – Consists of privately and publicly owned establishments which generate electricity primarily for resale.

Emission standards – Limits or ranges established for pollution levels emitted by vehicles as well as stationary sources. The first standards were established under the 1963 Clean Air Act.

End-use sector – See *Sector*.

Energy capacity – Often measured in kilowatt hours. The energy delivered by the battery up to termination of discharge specified by the battery manufacturer.

Energy efficiency – In reference to transportation, the inverse of energy intensiveness: the ratio of outputs from a process to the energy inputs; for example, miles traveled per gallon of fuel (mpg).

Energy intensity – In reference to transportation, the ratio of energy inputs to a process to the useful outputs from that process; for example, gallons of fuel per passenger-mile or Btu per ton-mile.

Ethanol (C_2H_5OH) – Otherwise known as ethyl alcohol, alcohol, or grain-spirit. A clear, colorless, flammable oxygenated hydrocarbon with a boiling point of 78.5 degrees Celsius in anhydrous state. In transportation, ethanol is used as a vehicle fuel by itself (E100 – 100% ethanol by volume), blended with gasoline (E85 – 85% ethanol by volume), or as a gasoline octane enhancer and oxygenate (10% by volume).

Excise tax – Paid when purchases are made on a specific good, such as gasoline. Excise taxes are often included in the price of the product. There are also excise taxes on activities, such as highway usage by trucks.

Ferry boat – A transit mode comprising vessels carrying passengers and in some cases vehicles over a body of water, and that are generally steam or diesel-powered.

Fixed operating cost – See *Operating cost*.

Fleet vehicles –

Private fleet vehicles: Ideally, a vehicle could be classified as a member of a fleet if it is:

a) operated in mass by a corporation or institution,
b) operated under unified control, or
c) used for non-personal activities.

However, the definition of a fleet is not consistent throughout the fleet industry. Some companies make a distinction between cars that were bought in bulk rather than singularly, or whether they are operated in bulk, as well as the minimum number of vehicles that constitute a fleet (i.e. 4 or 10).

Government fleet vehicles: Includes vehicles owned by all Federal, state, county, city, and metro units of government, including toll road operations.

Foreign freight – Movements between the United States and foreign countries and between Puerto Rico, the Virgin Islands, and foreign countries. Trade between U.S. territories and possessions (e.g. American Samoa, Guam, North Mariana Islands and U.S. Outlying Islands) and foreign countries is excluded. Traffic to or from the Panama Canal Zone is included, but traffic with U.S. origin and U.S. destination traveling through the Panama Canal is not.

Gas Guzzler Tax – Originates from the 1978 Energy Tax Act (Public Law 95-618). A new car purchaser is required to pay the tax if the car purchased has a combined city/highway fuel economy rating that is below the standard for that year. For model years 1986 and later, the standard is 22.5 mpg.

Gasohol – A mixture of 10% anhydrous ethanol and 90% gasoline by volume; 7.5% anhydrous ethanol and 92.5% gasoline by volume; or 5.5% anhydrous ethanol and 94.5% gasoline by volume. There are other fuels that contain methanol and gasoline, but these fuels are not referred to as gasohol.

Gasoline – See *Motor gasoline*.

General aviation – That portion of civil aviation which encompasses all facets of aviation except air carriers. It includes any air taxis, commuter air carriers, and air travel clubs which do not hold Certificates of Public Convenience and Necessity.

Gross Domestic Product (GDP) – The market value of goods and services produced by labor and property in the United States, regardless of nationality; gross domestic product replaced gross national product as the primary measure of U.S. production in 1991.

Gross National Product (GNP) – A measure of monetary value of the goods and services becoming available to the nation from economic activity. The market value of goods and services produced by labor and property supplied by U.S. residents, regardless of where they are located. Calculated quarterly by the Department of Commerce, the gross national product is the broadest available measure of the level of economic activity.

Gross vehicle weight (gvw) – The weight of the empty truck plus the maximum anticipated load weight, including passengers, fluids, and cargo.

Gross vehicle weight rating (gvwr) – The gross vehicle weight which is assigned to each new truck by the manufacturer. This rating may be different for trucks of the same model because of certain features, such as heavy-duty suspension. Passenger cars are not assigned gross vehicle weight ratings.

Heavy-heavy truck – See *Truck size classifications*.

Heavy rail – A mode of transit service (also called metro, subway, rapid transit, or rapid rail) operating on an electric railway with the capacity for a heavy volume of traffic. Characterized by high speed and rapid acceleration of passenger rail cars.

Household – Consists of all persons who occupy a housing unit, including the related family members and all unrelated persons, if any, who share the housing unit.

Housing unit – A house, apartment, a group of rooms, or a single room occupied or intended for occupancy as separate living quarters. Separate living quarters are those in which the occupants do not live and eat with any other persons in the structure and which have either (1) direct access from the outside of the building or through a common hallway intended to be used by the occupants of another unit or by the general public, or (2) complete kitchen facilities for the exclusive use of the occupants. The occupants may be a single family, one person living alone, two or more families living together, or any other group of related or unrelated persons who share living arrangements.

Hybrid-electric vehicles – Combines the benefits of gasoline engines and electric motors and can be configured to obtain different objectives, such as improved fuel economy, increased power, or additional auxiliary power for electronic devices and power tools.

Hybrid rail – A subset of commuter rail operating exclusively on freight railroad right-of-way.

Hydrocarbon (HC) – A compound that contains only hydrogen and carbon. The simplest and lightest forms of hydrocarbon are gaseous. With greater molecular weights they are liquid, while the heaviest are solids.

Income –

Disposable personal income: Personal income less personal tax and non-tax payments.

National income: The aggregate earnings of labor and property which arise in the current production of goods and services by the nation's economy.

Personal income: The current income received by persons from all sources, net of contributions for social insurance.

Industrial sector – Construction, manufacturing, agricultural and mining establishments.

Inertia weight – The curb weight of a vehicle plus 300 pounds.

Intercity bus – See *Bus*.

Intermodal – Transportation activities involving more than one mode of transportation, including transportation connections and coordination of various modes.

Internal water transportation – Includes all local (intraport) traffic and traffic between ports or landings wherein the entire movement takes place on inland waterways. Also termed internal are movements involving carriage on both inland waterways and the water of the Great Lakes, and inland movements that cross short stretches of open water that link inland systems.

International air operator – See *Air carrier*.

International freight – See *Foreign freight*.

Jet fuel – Includes both naphtha-type and kerosene-type fuels meeting standards for use in aircraft turbine engines. Although most jet fuel is used in aircraft, some is used for other purposes such as generating electricity in gas turbines.

Kerosene-type jet fuel: A quality kerosene product with an average gravity of 40.7 degrees API and 10% to 90% distillation temperatures of 217 to 261 degrees Celsius. Used primarily as fuel for commercial turbojet and turboprop aircraft engines. It is a relatively low freezing point distillate of the kerosene type.

Naphtha-type jet fuel: A fuel in the heavy naphtha boiling range with an average gravity of 52.8 degrees API and 10% to 90% distillation temperatures of 117 to 233 degrees Celsius used for turbojet and turboprop aircraft engines, primarily by the military. Excludes ramjet and petroleum.

Kerosene – A petroleum distillate in the 300 to 500 degrees Fahrenheit boiling range and generally having a flash point higher than 100 degrees Fahrenheit by the American Society of Testing and Material (ASTM) Method D56, a gravity range from 40 to 46 degrees API, and a burning point in the range of 150 to 175 degrees Fahrenheit. It is a clean-burning product suitable for use as an illuminant when burned in wick lamps. Includes grades of kerosene called range oil having properties similar to Number 1 fuel oil, but with a gravity of about 43 degrees API and an end point of 625 degrees Fahrenheit. Used in space heaters, cooking stoves, and water heaters.

Kerosene-type jet fuel – See Jet fuel.

Large car – See *Car size classifications*.

Lease Condensate – A liquid recovered from natural gas at the well or at small gas/oil separators in the field. Consists primarily of pentanes and heavier hydrocarbons (also called field condensate).

Light-duty vehicles – Cars and light-duty trucks combined.

Light-duty truck – Light-duty trucks are defined differently by different agencies/companies. Therefore, this document does not have one single definition of light-duty trucks. The Federal Highway Administration typically defines light trucks as being less than 10,000 pounds GVWR. Ward's Automotive typically defines light trucks as being less than 14,000 pounds GVWR. The Environmental Protection Agency defines light-duty trucks size classes as follows:

Class	Gross Vehicle Weight Rating (GVWR)	
Pickup Trucks	**Through 2007**	**As of 2008**
Small	< 4,500 lb	< 6,000 lb
Standard	4,500 to 8,500 lb	6,000 to 8,500 lb
Vans	**Through 2010**	**As of 2011**
Passenger	< 8,500 lb	< 10,000 lb
Cargo	< 8,500 lb	
Minivans	< 8,500 lb	
SUVs	**Through 2010**	**2011–12**
All	< 8,500 lb	< 10,000 lb
	As of 2013	
Small	< 6,000 lb	
Standard	6,000 to 9,999 lb	
Special Purpose Vehicles	**Through 2010** < 8,500 lb	**As of 2011** < 8,500 lb or < 10,000 lb depending on configuration

Light-heavy truck – See *Truck size classifications*.

Light rail – Mode of transit service (also called streetcar, tramway or trolley) operating passenger rail cars singly (or in short, usually two-car or three-car trains) on fixed rails in right-of-way that is often separated from other traffic for part or much of the way.

Liquefied petroleum gas (LPG) – Consists of propane and butane and is usually derived from natural gas. In locations where there is no natural gas and the gasoline consumption is low, naphtha is converted to LPG by catalytic reforming.

Load factor – Total passenger miles divided by total vehicle miles.

Low emission vehicle – Any vehicle certified to the low emission standards which are set by the Federal government and/or the state of California.

M85 – 85% methanol and 15% gasoline.

M100 – 100% methanol.

Medium truck – See *Truck size classifications*.

Methanol (CH_3OH) – A colorless highly toxic liquid with essentially no odor and very little taste. It is the simplest alcohol and boils at 64.7 degrees Celsius. In transportation, methanol is used as a vehicle fuel by itself (M100), or blended with gasoline (M85).

Midsize car – See *Car size classifications*.

Minicompact car – See *Car size classifications*.

Model year – In this publication, model year is referring to the "sales" model year, the period from October 1 to the next September 30.

Motor bus – See *Bus*.

Motor gasoline – A mixture of volatile hydrocarbons suitable for operation of an internal combustion engine whose major components are hydrocarbons with boiling points ranging from 78 to 217 degrees Celsius and whose source is distillation of petroleum and cracking, polymerization, and other chemical reactions by which the naturally occurring petroleum hydrocarbons are converted into those that have superior fuel properties.

Regular gasoline: Gasoline which has an antiknock index, i.e., octane rating, greater than or equal to 85 and less than 88. Note that octane requirements may vary by altitude.

Midgrade gasoline: Gasoline which has an antiknock index, i.e., octane rating, greater than or equal to 88 and less than or equal to 90. Note that octane requirements may vary by altitude.

Premium gasoline: Gasoline which has an antiknock index, i.e., octane rating, greater than 90. Note that octane requirements may vary by altitude.

Reformulated gasoline: Finished motor gasoline formulated for use in motor vehicles, the composition and properties of which meet the requirements of the reformulated gasoline regulations promulgated by the U.S. Environmental Protection Agency under Section 211(k) of the Clean Air Act. For more details on this clean fuel program see http://www.epa.gov/otaq/fuels/gasolinefuels/rfg/index.htm. Note: This category includes oxygenated fuels program reformulated gasoline (OPRG) but excludes reformulated gasoline blendstock for oxygenate blending (RBOB).

MTBE – Methyl Tertiary Butyl Ether–a colorless, flammable, liquid oxygenated hydrocarbon containing 18.15 percent oxygen.

Naphtha-type jet fuel – See *Jet fuel*.

National income – See *Income*.

National Household Travel Survey (NHTS) – A nationwide survey of households that provides information on the characteristics and personal travel patterns of the U.S. population. Surveys were conducted in 2001, 2009, 2017, and 2022 by the Federal Highway Administration, U.S. DOT. This is a follow-on to the NPTS.

Nationwide Personal Transportation Survey (NPTS) – A nationwide survey of households that provides information on the characteristics and personal travel patterns of the U.S. population. Surveys were conducted in 1969, 1977, 1983, 1990, and 1995 by the U.S. Bureau of Census for the U.S. Department of Transportation.

Natural gas – A mixture of hydrocarbon compounds and small quantities of various non-hydrocarbons existing in the gaseous phase or in solution with crude oil in natural underground reservoirs at reservoir conditions.

Natural gas, dry: Natural gas which remains after: 1) the liquefiable hydrocarbon portion has been removed from the gas stream; and 2) any volumes of nonhydrocarbon gases have been removed where they occur in sufficient quantity to render the gas unmarketable. Dry natural gas is also known as consumer-grade natural gas. The parameters for measurement are cubic feet at 60 degrees Fahrenheit and 14.73 pounds per square inch absolute.

Natural gas, wet: The volume of natural gas remaining after removal of lease condensate in lease and/or field separation facilities, if any, and after exclusion of nonhydrocarbon gases where they occur in sufficient quantity to render the gas unmarketable. Natural gas liquids may be recovered from volumes of natural gas, wet after lease separation, at natural gas processing plants.

Natural gas plant liquids: Natural gas liquids recovered from natural gas in processing plants and from natural gas field facilities and fractionators. Products obtained include ethane, propane, normal butane, isobutane, pentanes plus, and other products from natural gas processing plants.

Nitrogen oxides (NO_x) – A product of combustion of fossil fuels whose production increases with the temperature of the process. It can become an air pollutant if concentrations are excessive.

Nonattainment area – Any area that does not meet the national primary or secondary ambient air quality standard established by the Environmental Protection Agency for designated pollutants, such as carbon monoxide and ozone.

Oil Stocks – Oil stocks include crude oil (including strategic reserves), unfinished oils, natural gas plant liquids, and refined petroleum products.

Operating cost –

Fixed operating cost: In reference to passenger car operating cost, refers to those expenditures that are independent of the amount of use of the car, such as insurance costs, fees for license and registration, depreciation and finance charges.

Variable operating cost: In reference to passenger car operating cost, expenditures which are dependent on the amount of use of the car, such as the cost of gas and oil, tires, and other maintenance.

Organization for Economic Cooperation and Development (OECD) – Consists of Australia, Austria, Belgium, Canada, Chile, Colombia, Costa Rica, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Latvia, Lithuania, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, South Korea, Spain, Sweden, Switzerland, Turkey, United Kingdom, and United States. Total OECD includes the United States Territories (Guam, Puerto Rico, and the U.S. Virgin Islands).

OECD Europe: Consists of Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, and United Kingdom.

OECD Pacific: Consists of Australia, Japan, South Korea, and New Zealand.

Organization for Petroleum Exporting Countries (OPEC) – Includes Algeria, Congo, Equatorial Guinea, Gabon, Iran, Iraq, Kuwait, Libya, Nigeria, Saudi Arabia, UAE, and Venezuela.

Arab OPEC – Consists of Algeria, Bahrain, Egypt, Iraq, Kuwait, Libya, Saudi Arabia, Syria, Tunisia, and the United Arab Emirates.

Other single-unit truck – See *Single-unit truck*.

Oxygenate – A substance which, when added to gasoline, increases the amount of oxygen in that gasoline blend. Includes fuel ethanol, methanol, and methyl tertiary butyl ether (MTBE).

Paratransit – Mode of transit service (also called demand response or dial-a-ride) characterized by the use of passenger cars, vans or small buses operating in response to calls from passengers or their agents to the transit operator, who then dispatches a vehicle to pick up the passengers and transport them to their destinations.

Particulates – Carbon particles formed by partial oxidation and reduction of the hydrocarbon fuel. Also included are trace quantities of metal oxides and nitrides, originating from engine wear, component degradation, and inorganic fuel additives. In the transportation sector, particulates are emitted mainly from diesel engines.

Passenger-miles traveled (PMT) – One person traveling the distance of one mile. Total passenger-miles traveled, thus, give the total mileage traveled by all persons.

Passenger rail – See *Rail*, "*Amtrak*" and "*Transit Railroad*".

Persian Gulf countries – Consists of Bahrain, Iran, Iraq, Kuwait, Qatar, Saudi Arabia, and the United Arab Emirates.

Personal Consumption Expenditures (PCE) – As used in the national accounts, the market value of purchases of goods and services by individuals and nonprofit institutions and the value of food, clothing, housing, and financial services received by them as income in kind. It includes the rental value of owner-occupied houses but excludes purchases of dwellings, which are classified as capital goods (investment).

Personal income – See *Income*.

Petroleum – A generic term applied to oil and oil products in all forms, such as crude oil, lease condensate, unfinished oil, refined petroleum products, natural gas plant liquids, and non-hydrocarbon compounds blended into finished petroleum products.

Petroleum consumption: A calculated demand for petroleum products obtained by summing domestic production, imports of crude petroleum and natural gas liquids, imports of petroleum products, and the primary stocks at the beginning of the period and then subtracting the exports and the primary stocks at the end of the period.

Petroleum exports: Shipments of petroleum products from the 50 States and the District of Columbia to foreign countries, Puerto Rico, the Virgin Islands, and other U.S. possessions and territories.

Petroleum imports: All imports of crude petroleum, natural gas liquids, and petroleum products from foreign countries and receipts from Guam, Puerto Rico, the Virgin Islands, and the Hawaiian Trade Zone. The commodities included are crude oil, unfinished oils, plant condensate, and refined petroleum products.

Petroleum inventories: The amounts of crude oil, unfinished oil, petroleum products, and natural gas liquids held at refineries, at natural gas processing plants, in pipelines, at bulk terminals operated by refining and pipeline companies, and at independent bulk terminals. Crude oil held in storage on leases is also included; these stocks are known as primary stocks. Secondary stocks–those held by jobbers dealers, service station operators, and consumers–are excluded. Prior to 1975, stock held at independent bulk terminals were classified as secondary stocks.

Petroleum products supplied: For each petroleum product, the amount supplied is calculated by summing production, crude oil burned directly, imports, and net withdrawals from primary stocks and subtracting exports.

Plug-in hybrid-electric vehicles (PHEVs) – Hybrid-electric vehicles with high-capacity batteries that can be charged by plugging them into an electrical outlet or charging station. There are two basic PHEV configurations:

Parallel or Blended PHEV: Both the engine and electric motor are mechanically connected to the wheels, and both propel the vehicle under most driving conditions. Electric-only operation usually occurs only at low speeds.

Series PHEVs, also called Extended Range Electric Vehicles (EREVs): Only the electric motor turns the wheels; the gasoline engine is only used to generate electricity. Series PHEVs can run solely on electricity until the battery needs to be recharged. The gasoline engine will then generate the electricity needed to power the electric motor. For shorter trips, these vehicles might use no gasoline at all.

Processing Gain – The amount by which the total volume of refinery output is greater than the volume of input for given period of time. The processing gain arises when crude oil and other hydrocarbons are processed into products that are, on average, less dense than the input.

Processing Loss – The amount by which the total volume of refinery output is less than the volume of input for given period of time. The processing loss arises when crude oil and other hydrocarbons are processed into products that are, on average, denser than the input.

Proved Reserves of Crude Oil – The estimated quantities of all liquids defined as crude oil, which geological and engineering data demonstrate with reasonable certainty to be recoverable in future years from known reservoirs under existing economic and operating conditions.

Quad – Quadrillion, 10^{15}. In this publication, a Quad refers to Quadrillion Btu.

Rail –

Amtrak (American Railroad Tracks): Operated by the National Railroad Passenger Corporation of Washington, DC. This rail system was created by President Nixon in 1970, and was given the responsibility for the operation of intercity, as distinct from suburban, passenger trains between points designated by the Secretary of Transportation.

Class I freight railroad: Defined by the Surface Transportation Board (formerly the Interstate Commerce Commission) each year based on annual operating revenue. A railroad is dropped from the Class I list if it fails to meet the annual earnings threshold for three consecutive years.

Commuter railroad: Those portions of mainline railroad (not electric railway) transportation operations which encompass urban passenger train service for local travel between a central city and adjacent suburbs. Commuter railroad service–using both locomotive-hauled and self-propelled railroad passenger cars–is characterized by multi-trip tickets, specific station-to-station fares, and usually only one or two stations in the central business district. Also known as suburban railroad.

Transit railroad: Includes "heavy" and "light" transit rail. **Heavy transit rail** is characterized by exclusive rights-of-way, multi-car trains, high speed rapid acceleration, sophisticated signaling, and high platform loading. Also known as subway, elevated railway, or metropolitan railway (metro). **Light transit rail** may be on exclusive or shared rights-of-way, high or low platform loading, multi-car trains or single cars, automated or manually operated. In generic usage, light rail includes streetcars, trolley cars, and tramways.

Refiner sales price – Sales from the refinery made directly to ultimate consumers, including bulk consumers (such as agriculture, industry, and electric utilities) and residential and commercial consumers.

Reformulated gasoline (RFG) – See *Motor gasoline*.

RFG area – An ozone nonattainment area designated by the Environmental Protection Agency which requires the use of reformulated gasoline.

Residential sector – An energy consuming sector that consists of living quarters for private households. Excludes institutional living quarters.

Residential Transportation Energy Consumption Survey (RTECS) – This survey was designed by the Energy Information Administration of the Department of Energy to provide information on how energy is used by households for personal vehicles. It has been conducted five times since 1979, the most recent being 1994.

Residual fuel oil – The heavier oils that remain after the distillate fuel oils and lighter hydrocarbons are boiled off in refinery operations. Included are products know as ASTM grade numbers 5 and 6 oil, heavy diesel oil, Navy Special Fuel Oil, Bunker C oil, and acid sludge and pitch used as refinery fuels. Residual fuel oil is used for the production of electric power, for heating, and for various industrial purposes.

Ride hailing – Ride hailing services (also called transportation network companies) provide on-demand transportation for a fee, typically via a mobile phone application that matches drivers and riders. The most popular ride hailing companies in the U.S. are Uber and Lyft.

Rural – Usually refers to areas with population less than 5,000.

Sales period – October 1 of the previous year to September 30 of the given year. Approximately the same as a model year.

Sales-weighted miles per gallon (mpg) – Calculation of a composite vehicle fuel economy based on the distribution of vehicle sales.

Scrappage rate – As applied to motor vehicles, it is usually expressed as the percentage of vehicles of a certain type in a given age class that are retired from use (lacking registration) in a given year.

School and other nonrevenue bus – See *Bus*.

Sector – A group of major energy-consuming components of U.S. society developed to measure and analyze energy use. The sectors most commonly referred to are: residential, commercial, industrial, transportation, and electric power.

Shared micromobility –Refers to small fleets of fully or partially human-powered vehicles including bikes, e-bikes and e-scooters.

Shared mobility – Any mode of shared transportation, such as public transit, bike and scooter sharing, carsharing, carpooling, and ride hailing.

Single-unit truck – Includes two-axle, four-tire trucks and other single-unit trucks.

Two-axle, four-tire truck: A motor vehicle consisting primarily of a single motorized device with two axles and four tires.

Other single-unit truck: A motor vehicle consisting primarily of a single motorized device with more than two axles or more than four tires.

Spark ignition engine – An internal combustion engine in which the charge is ignited electrically (e.g., with a spark plug).

Special fuels – Consist primarily of diesel fuel with small amount of liquefied petroleum gas, as defined by the Federal Highway Administration.

Specific acceleration power – Measured in watts per kilogram. Acceleration power divided by the battery system weight. Weight must include the total battery system.

Specific energy – Measured in watt hours per kilogram. The rated energy capacity of the battery divided by the total battery system weight.

Subcompact car – See *Car size classifications*.

Supplemental air carrier – See *Air carrier*.

Survival rate – As applied to motor vehicles, it is usually expressed as the percentage of vehicles of a certain type in a given age class that will be in use at the end of a given year.

Tax incentives – In general, a means of employing the tax code to stimulate investment in or development of a socially desirable economic objective without direct expenditure from the budget of a given unit of government. Such incentives can take the form of tax exemptions or credits.

Test weight – The weight setting at which a vehicle is tested on a dynamometer by the U.S. Environmental Protection Agency (EPA). This weight is determined by the EPA using the inertia weight of the vehicle.

Ton-mile – The movement of one ton of freight the distance of one mile. Ton-miles are computed by multiplying the weight in tons of each shipment transported by the distance hauled.

Transmission types –

Light duty vehicles have many variations, but transmissions typically fall into a few broad categories:

- Single speed transmissions are common among all-electric vehicles (EVs) which have electric motors that don't require multiple gears for transmitting power to the wheels.
- Automatic transmissions can have up to ten gears and are capable of changing gears automatically as vehicle speed increases or decreases.
- Manual transmissions can range from three to seven gears and require the operator of the vehicle to manually shift from one gear to the next.
- Continuously variable transmissions (CVTs) are a type of automatic transmission that does not have fixed gear ratios. CVTs can be found in both hybrid and non-hybrid vehicles.

Transit bus – See *Bus*.

Transit railroad – See *Rail*.

Transportation network company (TNC) – provides on-demand transportation for a fee, typically via a mobile phone application that matches drivers and riders. The most popular TNCs in the U.S. are Uber and Lyft.

Transportation sector – Consists of both private and public passenger and freight transportation, as well as government transportation, including military operations.

Truck Inventory and Use Survey (TIUS) – Survey designed to collect data on the characteristics and operational use of the nation's truck population. It was conducted every five years by the U.S. Bureau of the Census. Surveys were conducted in 1963, 1967, 1972, 1977, 1982, 1987, and 1992. For the 1997 survey, it was renamed the Vehicle Inventory and Use Survey in anticipation of including additional vehicle types. However, no additional vehicle types were added to the 1997 survey.

Trolleybus – Mode of transit service (also called transit coach) using vehicles propelled by a motor drawing current from overhead wires via connecting poles called a trolley pole, from a central power source not onboard the vehicle.

Truck size classifications – U.S. Bureau of the Census has categorized trucks by gross vehicle weight (gvw) as follows:

Light – Less than 10,000 pounds gvw (Also see *Light-duty truck*.)
Medium – 10,001 to 20,000 pounds gvw
Light-heavy – 20,001 to 26,000 pounds gvw
Heavy-heavy – 26,001 pounds gvw or more.

Two-axle, four-tire truck – See *Single-unit truck*.

Two-seater car – See *Car size classifications*.

Ultra-low emission vehicle – Any vehicle certified to the ultra-low emission standards which are set by the Federal government and/or the state of California.

Urban – Usually refers to areas with population of 5,000 or greater.

Vanpool: A ridesharing prearrangement using vans or small buses providing round-trip transportation between the participant's prearranged boarding points and a common and regular destination.

Variable operating cost – See *Operating cost*.

Vehicle Inventory and Use Survey – Formerly named the Truck Inventory and Use Survey, this survey was designed to collect data on the characteristics and operational use of the nation's truck population. Conducted in 1997, 2002 and 2021. See *Truck Inventory and Use Survey*.

Vehicle-miles traveled (VMT) – One vehicle traveling the distance of one mile. Total vehicle miles, thus, is the total mileage traveled by all vehicles.

Volatile organic compounds (VOCs) – Organic compounds that participate in atmospheric photochemical reactions.

Waterborne Commerce –

Coastwise: Domestic traffic receiving a carriage over the ocean, or the Gulf of Mexico. Traffic between Great Lakes ports and seacoast ports, when having a carriage over the ocean, is also termed Coastwise.

Domestic: Includes coastwise, lakewise, and internal waterborne movements.

Foreign: Waterborne import, export, and in-transit traffic between the United States, Puerto Rico and the Virgin Islands and any foreign country.

Internal: Vessel movements (origin and destination) which take place solely on inland waterways. An inland waterway is one geographically located within the boundaries of the contiguous 48 states or within the boundaries of the State of Alaska.

Lakewise: Waterborne traffic between the United States ports on the Great Lakes System. The Great Lakes System is treated as a separate waterway system rather than as a part of the inland waterway system. In comparing historical data for the Great Lakes System, one should note that prior to calendar year 1990, marine products, sand and gravel being moved from the Great Lakes to Great Lake destinations were classified as local traffic. From 1990-on, these activities are classified as lakewise traffic.

Well-to-wheel – A life cycle analysis used in transportation to consider the entire energy cycle for a given mode, rather than just tailpipe emissions. The analysis starts at the primary energy source and ends with the turning wheels of the vehicle.

Zero-emission vehicle – Any vehicle certified to the zero emission standards which are set by the Federal government and/or the state of California. These standards apply to the vehicle emissions only.