



Personal Transportation

In the U.S., the predominant mode of travel is by automobile and light truck, accounting for about 87% of passenger miles traveled in 2020.¹ The U.S. has just over 4% of the world's population, but has 12% of the world's cars, compared to 19.6% in China, 5.7% in Japan, 4.4% in Germany, and 4.9% in Russia.^{2,3} The countries with the most growth in registered cars since 1990 are China, India, and Indonesia, with average change of 18%, 9.8%, and 9.6%, respectively.³ The transportation consumption patterns that follow indicate that the current system is unsustainable.

Patterns of Use

Miles Traveled

- Total U.S. passenger miles traveled in 2020 were 4.9 trillion.¹
- U.S. population increased 35% from 1990 to 2022. Vehicle miles traveled (VMT) increased 35% over the same time period.^{1,2,4}
- 69% of the total annual vehicle miles traveled in the U.S. occur in urban areas.¹

Vehicles and Occupancy

- In 1977, the U.S. average vehicle occupancy was 1.87 persons per vehicle.⁵
- In 2019, average car occupancy was 1.5 persons per vehicle.³
- In 2020, the U.S. had 276 million registered vehicles and 228 million licensed drivers.¹
- In 2017, 24% of U.S. households had three or more vehicles.⁶

Average Fuel Economy

- The average vehicle fleet fuel economy peaked at 22.0 miles per gallon (mpg) in 1987, declined until the early 2000s, then increased again surpassing 22.0 mpg in 2009.⁷
- The average fuel economy for a 2020 model year vehicle was 25.4 mpg: 30.7 mpg for a new passenger car (sedan/wagon and car SUV) and 22.6 mpg for a new truck (truck SUV, minivan/van, and pickup).⁷
- Given the legislation in place, the U.S. has some of the lowest fuel economy standards of any industrialized nation, well below the European Union, China, and Japan.⁸

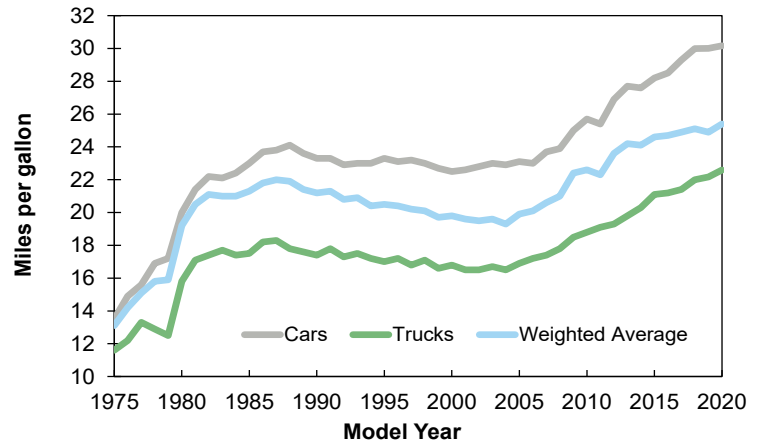
Vehicle Size

- From 1990 to 2020, average new vehicle weight increased 22% (due to SUV market share growth), horsepower increased by 82%, and acceleration increased (i.e., 0-60 mph times dropped) by 32%.⁷
- During the same period, the average weight of a new passenger car increased 11%, while the average weight of a new pickup truck increased by 30%.⁷
- SUVs, vans, and pickups accounted for 56% of new vehicles sold in the U. S. in 2020.⁷
- A study from the University of Michigan recommends following green lightweighting principles to reduce vehicle mass and improve energy efficiency.⁹

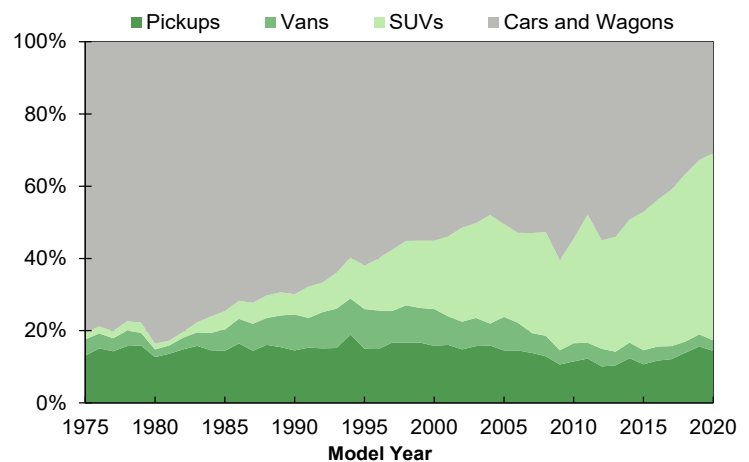
Energy Use

- The transportation sector makes up 28% of total U.S. energy use. Since 1990, the energy use in the transportation sector grew by 20%, though the share of U.S. energy used for transportation increased by 1 percent.³
- In 2019, American cars and light trucks used 15.1 quadrillion Btus of energy, representing 15% of total U.S. energy consumption.³
- In 2021, 95% of total primary energy used for transportation came from fossil fuels; 90% of total primary energy was from petroleum.¹⁰
- The transportation sector accounted for 27% of U.S. greenhouse gas emissions in 2020—1,628 million metric tons CO₂e.¹¹
- In 2020, passenger cars and light-duty trucks were responsible for 618 million metric tons CO₂e and 316 million metric tons CO₂e, respectively, together making up 57% of U.S. transportation emissions and 16% of total U.S. emissions.¹¹

MPG by Model Year, 1975-2020⁷



Market Share by Vehicle Type, 1975-2020⁷



Life Cycle Impacts

A typical passenger car is responsible for various burdens during its lifetime (raw material extraction through end-of-life). Most of these impacts are due to fuel production and vehicle operations. Vehicle lifetime energy use for fuel production and vehicle operations is 1.22 and 4.54 MJ/mi, respectively, while energy use for material production, manufacturing, maintenance, and end-of-life combined is only 0.56 MJ/mi.¹²

Solutions and Sustainable Alternatives

Reduce Vehicle Miles Traveled

- Live closer to work. Driving to/from work represents 30% of vehicle miles driven, and the average commute is 12 miles.³ Consider telecommuting or working from home if possible.
- In 2020, 74.9% of workers in the U.S. commuted by driving alone, and only 9% of workers carpooled (a drop from 19.7% in 1980).³ Joining a carpool can help lower household fuel costs, prevent GHG emissions, and reduce traffic congestion.
- Roughly one-fifth of vehicle trips are shopping-related. Combine errands (trip chaining) to avoid unnecessary driving.³
- In 2019, traffic congestion caused Americans to spend an extra 8.7 billion hours on roads and buy an additional 3.5 billion gallons of gas. Using alternative modes of transportation, such as bikes, buses, or trains can reduce GHG emissions and decrease wasted time and money.¹³
- Micromobility (e.g., bikes, scooters, etc.) and shared transportation services (e.g., bike shares) have grown rapidly in recent years. In 2019, 136 million trips were taken by shared micromobility users.³

Promote Energy Efficiency

- Consider buying a vehicle that is best-in-class for fuel economy. Each year, the U.S. Environmental Protection Agency and Department of Energy jointly publish the Fuel Economy Guide, which ranks the most efficient vehicles in production.¹⁴
- Drive responsibly. Aggressive driving habits can lower fuel efficiency by 10% to 40%, and speeds over 50 mph significantly lower gas mileage.¹⁵
- Gallons per mile (gpm) is a better indicator of fuel efficiency than mpg. For example, upgrading from a 16 mpg to 20 mpg vehicle saves 125 gallons of fuel over 10,000 miles, whereas upgrading from a 34 to 50 mpg vehicle saves 94 gallons over 10,000 miles.¹⁶
- Improvements in information technology related to vehicles such as automation and platooning will likely reduce energy wasted from drivers stuck in traffic.¹⁷
- When driving electric vehicles, use best battery charging practices to maximize battery life and minimize GHG emissions.¹⁸

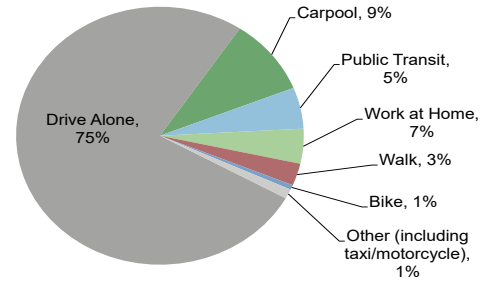
Encourage Supportive Public Policy

- Dense, mixed-use communities encourage foot and bike travel while reducing time between residences, businesses, and office spaces.
- In 2012, the Obama National Highway Traffic Safety Administration (NHTSA) set the most stringent fuel economy and GHG emissions standards ever set in the U.S.¹⁹ In 2020, the Trump NHTSA and EPA significantly weakened these standards.²⁰ In 2021, the Biden administration essentially restored the original Obama standards that are projected to raise average new car and SUV fuel economy to about 40 mpg by 2026.²¹ The next set of fuel economy and GHG standards, for new sales in Model Year 2027 and later, will determine whether U.S. light vehicles can do their fair share toward meeting long-term climate goals.²²
- Some believe that fuel economy standards tied to vehicle size could incentivize a market shift toward larger vehicles, a trend we see currently. A University of Michigan study predicted vehicle footprint increases of 2-32%, which could undermine the progress made in fuel economy by 1-4 mpg.²³

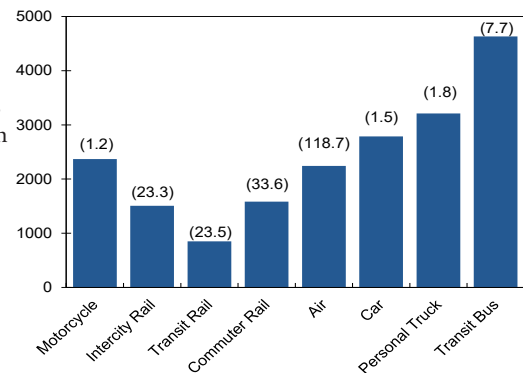
Total Life Cycle Burdens, 2014 Mid-Size Sedan¹²

Environmental Flow	Per Mile (g)
CO ₂	424
CO	2.89
SO _x	0.21
NO _x	0.30
VOC	0.56
Methane	0.54
GHG	445
Energy	6.32 MJ

U.S. Modes of Transportation to Work³



Energy Intensity of U.S. Passenger Travel, 2019³
(With average persons per vehicle in parentheses)



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