



Personal Transportation

factsheets

Patterns of Use

In the U.S., the predominant mode of travel is by automobile and light trucks, accounting for over 92% of passenger miles traveled in 2005.¹ The U.S. has less than 5% of the world's population,² but has 22% of the world's automobiles, compared to 1% in China, 9% in Japan, 7% in Germany, and 3% in Canada.³ The following consumption patterns indicate that the current automobile-dominated transportation system is not sustainable.

↑ Vehicle Miles Traveled

- U.S. passenger miles traveled in 2005 was 4.88 trillion¹
- Annual average vehicle miles grew 2.1% from 1995 to 2005³
- Population grew 1.0% annually over the same period²

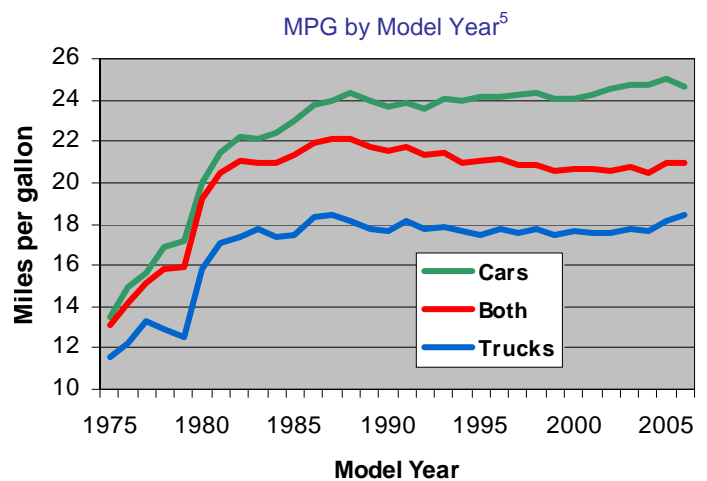
↓ Vehicle Occupancy

- In 1977, U.S. averaged 1.87 persons per vehicle⁴
- In 2005, U.S. averaged 1.63 persons per vehicle¹
- In 2005, the U.S. Department of Transportation reported 40 million more cars than licensed drivers for them¹

↓ Average Fuel Economy⁵

- In 1987-1988, light-duty vehicle fuel economy peaked at 22.1 mpg
- 2006 light-duty vehicle fuel economy was 21.0 mpg
 - Average new passenger car: 24.6 mpg
 - Average new light truck: 18.4 mpg
- The U.S. has the lowest required fuel economy standards, well below the EU, China, and Japan.⁶

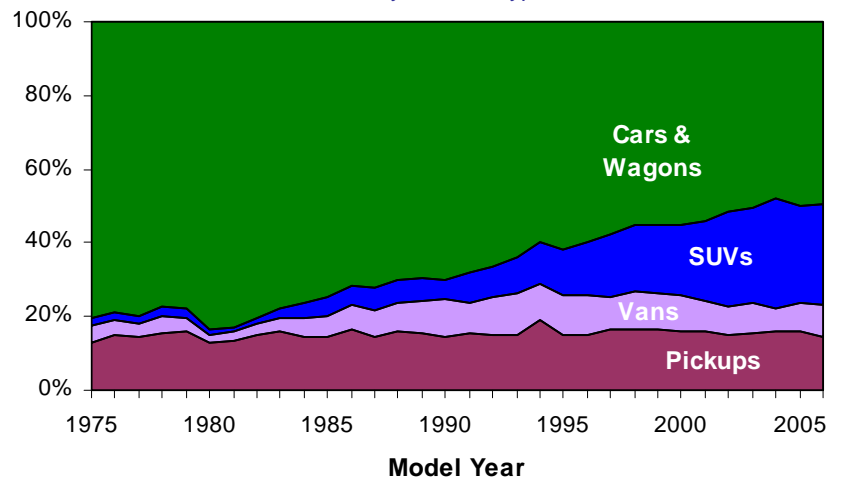
Note: Fuel economy estimates listed above are based on the EPA adjusted fuel economy standards that more closely represent actual driving conditions.



↑ Vehicle Size⁵

- During 1987-2006:
 - Average vehicle weight increased 29% (due to the growth in SUV market share)
 - Horsepower increased by 86%
 - Acceleration increased by 26%
- Had the weight distributions remained at 1980s levels, Model Year 2006 cars could have achieved a 33% higher fuel economy; trucks a 27% increase.
- Cars and wagons now make up less than 50% of the new vehicles sold in the United States.

Sale Fraction by Vehicle Type, 1975-2005⁵



Overall

The transportation sector used 16% more energy in 2006 than in 1996, which represents a 1.5% annual rate of growth. In 2006, American cars and light trucks used 17.2 quadrillion BTUs of energy, which represents 17.3% of the total U.S. energy consumption.³

¹ U.S. Department of Transportation (2006) *Highway Statistics 2005*. Federal Highway Administration.

² U.S. Census Bureau (2007) "Data Finders - Population Clocks."

³ U.S. Department of Energy, Oak Ridge National Lab (2007) *Transportation Energy Data Book: Edition 26*.

⁴ U.S. Department of Transportation (1981) *Vehicle Occupancy: Report 6*, 1977 National Personal Transportation Study. Office of Highway Planning.

⁵ U.S. Environmental Protection Agency (2006) *Light-Duty Automotive Technology and Fuel Economy Trends: 1975 Through 2006*.

Life Cycle Impacts

A typical passenger car is responsible for the following burdens during its product lifetime (raw material extraction through end-of-life). Most of these emissions are due to fuel use while driving.

Total Life Cycle Burdens for 1995 Mid-Sized Sedan⁷

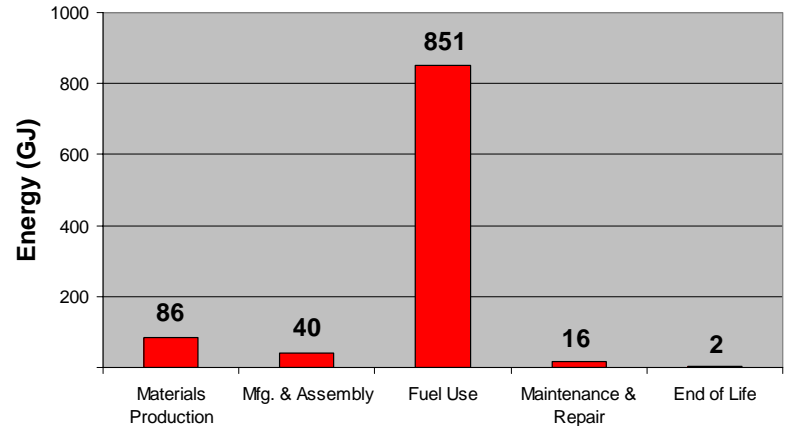
Environmental Flow	Lifetime (120,000 miles) Total (kg)	Per Mile (g)
CO ₂	6,1327	511*
CO	1,938	16
SO _x	137	1.1
NO _x	256	2.1
NMHC	259	2.2
Methane	70	0.58
Particulates	55	0.46
Solid Waste	4,376	36.5
Energy	995 GJ **	8.3 MJ

* Equivalent to 1.1 lb CO₂/mile

** Equivalent to 163 barrels of oil

(Life cycle energy is presented by stage in the figure on the right)

Life Cycle Energy Consumption⁷

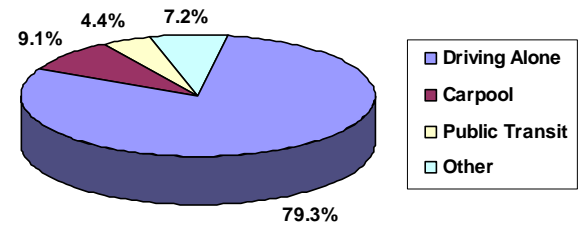


Solutions and Sustainable Alternatives

Reduce Vehicle Miles Traveled

- Live closer to work
 - Average commute length: 8.5 miles in 1983
12.2 miles in 2001³
- Consider telecommuting/home office
 - Telecommuters travel 53% to 77% less on days they telecommute compared to days that they do not.^{9, 10}
- Combine errands to avoid unnecessary trips
- Join a carpool, consider car-sharing programs
- Use alternative modes (bike, bus, train)

Distribution of Workers by Mode⁸



Purchase Fuel Efficient Vehicles

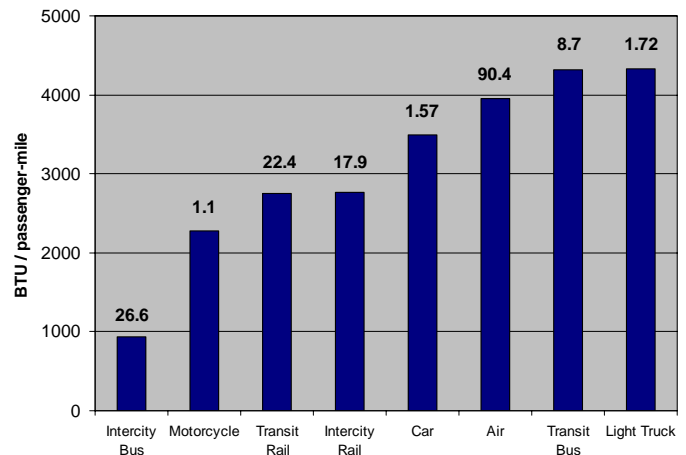
- Match intended use with vehicle type
 - e.g., small sedan for urban commuting
- Consider buying a best-in-class vehicle^{***}
 - Toyota Yaris® (subcompact car) 34/40 mpg (city/highway)
 - Honda Civic Hybrid® (compact car) 49/51 mpg (city/highway)
 - Toyota Prius® (mid-sized car) 60/51 mpg (city/highway)
 - Honda Fit® (small wagon) 33/38 mpg (city/highway)
 - Ford Focus Wagon® (mid-sized wagon) 27/37 mpg (city/highway)
 - Hyundai Sonata® (large car) 24/34 mpg (city/highway)
 - Ford Escape Hybrid FWD® (SUV) 36/31 mpg (city/highway)
 - Honda Odyssey® (2WD minivan) 20/28 mpg (city/highway)

***Drawn from the Model Year 2007 Fuel Economy Guide, mpg based on manual transmission vehicles where more than one transmission is available. (See www.fueleconomy.gov for complete listing of best-in-class vehicles) All registered trademarks are property of their respective makes.

Encourage Supporting Policies

- Plan denser, mixed-use communities
- Raise fuel economy standards
- Reduce highway speed limits
 - slowing from 70 to 55 mph will improve fuel economy 17%³

Energy Intensity of U.S. Passenger Travel (Average Vehicle Occupancy) 2004^{3, 11}



⁶ An, F. and A. Sauer (2004) "Comparison of Passenger Vehicle Fuel Economy and GHG Emission Standards Around the World." Prepared for the Pew Center on Global Climate Change.

⁷ Keoleian, G. A., K. Kar, M. Manion, and J. Bulkeley (1997) *Industrial Ecology of the Automobile: A Life Cycle Perspective*. SAE R-194. Society of Automotive Engineers. CSS97-04 and

Keoleian, G. A., G. Lewis, R. B. Coulon, V.J. Camobreco, and H. P. Teulon. (1998) *LCI Modeling Challenges and Solutions for a Complex Product System: A Mid-Sized Automobile*. CSS98-07.

⁸ U.S. Department of Housing and Urban Development (2006) *American Housing Survey for the United States 2005*.

⁹ Mokhtarian, P. and K. Varma (1998) "The Trade-Off Between Trips and Distance Traveled in Analyzing the Emissions Impacts of Center-Based Telecommuting." *Transportation Research D* 3(6): 419-28.

¹⁰ Koenig, B., D. Henderson, and P. Mokhtarian (1996) "The Travel and Emissions Impacts of Telecommuting for the State of California Telecommuting Pilot Project." *Transportation Research C* 4(1): 13-32.

¹¹ U.S. Department of Energy, Oak Ridge National Lab (2002) *Transportation Energy Data Book: Edition 26 and Greyhound Annual 10-K Filing Report for 2002*.

