



# Personal Transportation

In the U.S., the predominant mode of travel is by automobile and light truck, accounting for about 86% of passenger miles traveled in 2015.<sup>1</sup> The U.S. has less than 5% of the world's population, but has 14% of the world's cars, compared to 6.9% in Japan, 13.7% in China, 5.0% in Germany, and 2.5% in Canada.<sup>2,3</sup> The following consumption patterns indicate that the current transportation system is not sustainable.

## Patterns of Use

### Miles Traveled

- Total U.S. passenger miles traveled in 2015 was 4.47 trillion.<sup>1</sup>
- U.S. population increased 30% from 1990 to 2016, while vehicle miles traveled increased 48% over the same time period.<sup>1,4,5</sup>

### Vehicles and Occupancy

- In 1977, the U.S. average vehicle occupancy was 1.87 persons per vehicle.<sup>6</sup>
- By 2014, average vehicle occupancy had decreased to 1.6 persons per vehicle.<sup>3</sup>
- In 2015, the U.S. had 263 million registered vehicles and 218 million licensed drivers.<sup>1</sup>
- In 2009, 23% of U.S. households had three or more vehicles.<sup>7</sup>

### Average Fuel Economy

- Light-duty vehicle 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.<sup>8</sup>
- The average fuel economy for a light-duty 2016 model year vehicle was 25.6 mpg: 29.8 mpg average for a new passenger car and 22.6 mpg average for a new light truck.<sup>8</sup>
- Even when accounting for recent legislation, the U.S. has some of the lowest required fuel economy standards of any industrialized nation, well below the European Union, China, and Japan.<sup>9</sup>

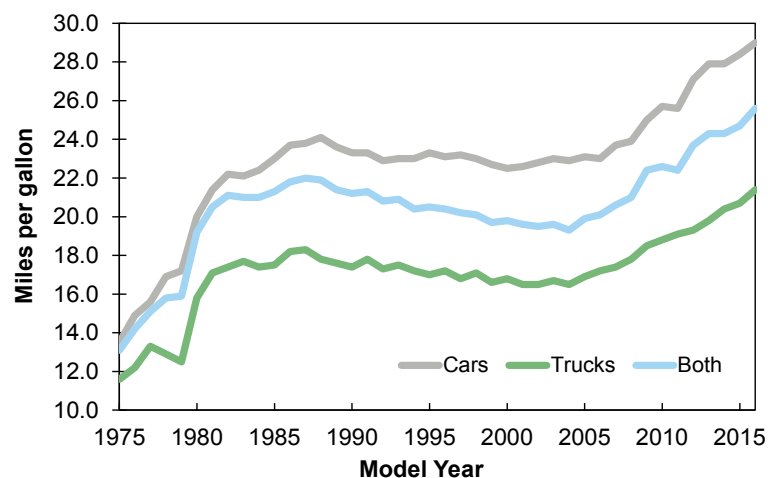
### Vehicle Size

- From 1988 to 2016, average vehicle weight increased 21% (due to growth in SUV market share), horsepower increased by 86%, and acceleration increased (i.e., 0-60 mph times dropped) by 38%.<sup>8</sup>
- The average weight of a passenger car increased 17% from 1988 to 2016, while the average weight of a pickup truck increased by 21%.<sup>8</sup> Had vehicle weights remained at 1988 levels, model year 2010 cars could have achieved 12% higher fuel economy and trucks a 13% increase.<sup>10</sup>
- SUVs and pickups accounted for 34% of new vehicles sold in the U.S. in 2016.<sup>8</sup>

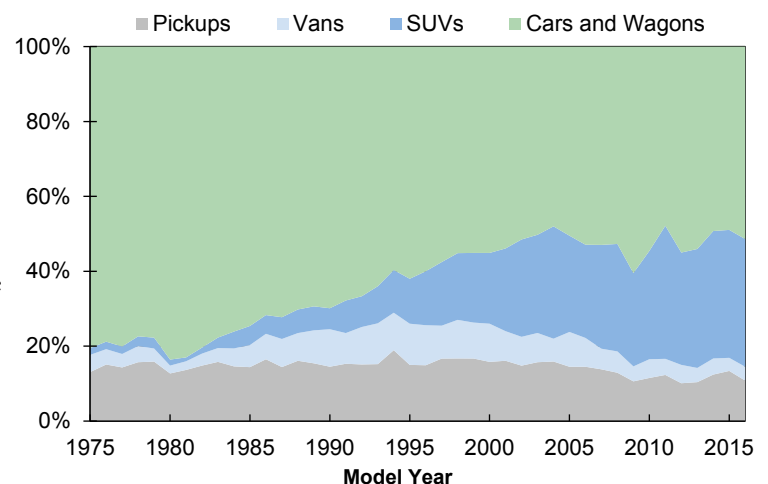
### Energy Use

- The transportation sector makes up 29% of total U.S. energy use. From 1973-2015, the percentage of U.S. energy used in the transportation sector increased by 16%.<sup>3</sup>
- In 2014, American cars and light trucks used 15.5 Quadrillion Btus of energy, representing 15.7% of total U.S. energy consumption.<sup>3</sup>
- In 2016, 95% of total primary energy used by the transportation sector came from fossil fuels; 92% of total primary energy was from petroleum.<sup>11</sup>
- The transportation sector accounted for 27% of U.S. greenhouse gas emissions in 2015—1,807 million metric tons CO<sub>2</sub>e.<sup>12</sup>
- Passenger cars and light-duty trucks were responsible for 758 million metric tons CO<sub>2</sub>e and 325 million metric tons CO<sub>2</sub>e, respectively, together making up 60% of U.S. transportation emissions and 16% of total U.S. emissions.<sup>12</sup>

MPG by Model Year, 1975-2016<sup>8</sup>



Market Share by Vehicle Type, 1975-2016<sup>8</sup>



## Life Cycle Impacts

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

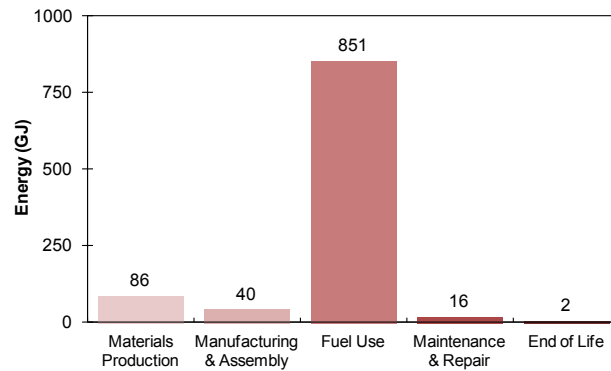
Total Life Cycle Burdens, 1995 Mid-Size Sedan<sup>13</sup>

Environmental Flow	Lifetime (120,000 miles) Total (kg)	Per Mile (g)
CO <sub>2</sub>	61,300	511*
CO	1,940	16
SO <sub>x</sub>	137	1.1
NO <sub>x</sub>	256	2.1
NMHC	259	2.1
Methane	70	0.58
Solid Waste	4,380	36.5
Energy	995 GJ **	8.3 MJ

\* Equivalent to 1.1 lb CO<sub>2</sub>/mile

\*\* Equivalent to 163 barrels of oil

Life Cycle Energy Consumption, 1995 Mid-Size Sedan<sup>13</sup>

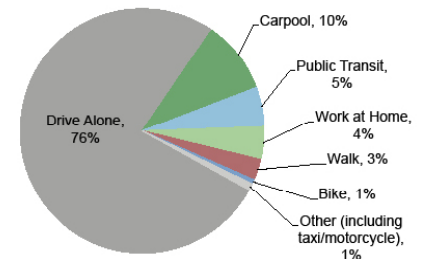


## Solutions and Sustainable Alternatives

### Reduce Vehicle Miles Traveled

- Live closer to work. The average commute was 12.2 miles in 2009 (up from 8.5 in 1983).<sup>3</sup>
- Consider telecommuting or working from home.
- In 2014, 76.4% of workers in the U.S. commuted by driving alone, and only 9.6% of workers carpooled (a drop from 19.7% in 1980).<sup>3</sup> Joining a carpool can help lower household fuel costs, prevent greenhouse gas emissions, and reduce traffic congestion.
- Roughly one-fifth of vehicle trips are shopping-related. Combine errands (trip chaining) to avoid unnecessary driving.<sup>3</sup>
- Use alternative modes of transportation, such as bikes, buses, or trains. According to the Texas Transportation Institute, public transit saved Americans 865 million hours of travel time and 450 million gallons of gasoline in 2011 by reducing traffic congestion.<sup>14</sup>

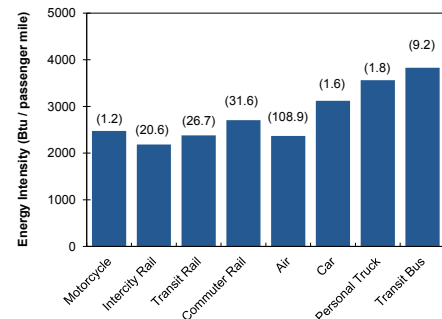
U.S. Modes of Transportation to Work<sup>3</sup>



### Promote Fuel 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.<sup>15</sup>
- Drive responsibly. Aggressive driving habits can lower highway fuel efficiency by up to 33%, and speeds over 50 mph significantly lower gas mileage.<sup>16</sup>
- 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.<sup>17</sup>
- Improvements in information technology related to vehicles promise to reduce energy wasted from drivers stuck in traffic. Currently, about one-third of drivers stuck in traffic in major cities are looking for parking.<sup>18</sup>

Energy Intensity of U.S. Passenger Travel, 2014<sup>3</sup>  
(With average persons per vehicle in parentheses)



### Encourage Supportive Public Policy

- Dense, mixed-use communities encourage foot and bike traffic while reducing travel time between residences, businesses, and office spaces.
- In 2010, the U.S. EPA and National Highway Traffic Safety Administration (NHTSA) raised Corporate Average Fuel Economy (CAFE) standards to 34.1 miles per gallon by model year 2016. These standards are projected to save 1.8 billion gallons of fuel and prevent 960 million metric tons of CO<sub>2</sub> emissions.<sup>19</sup>
- In 2012, the Obama Administration finalized standards increasing fuel economy to 54.5 miles per gallon by model year 2025, a step projected to reduce U.S. oil consumption by 12 billion barrels and save consumers more than \$1.7 trillion in fuel costs.<sup>20</sup>

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