



## Diesel-powered Passenger Cars and Light Trucks

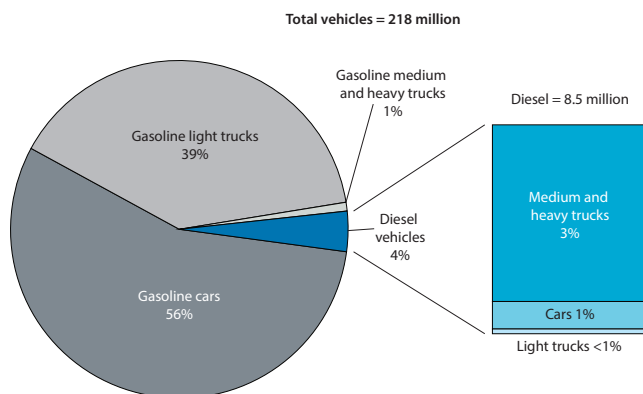
By Matthew Chambers and Rolf Schmitt, BTS

**D**iesel-powered automobiles are in the news following emission concerns raised by the U.S. Environmental Protection Agency (see the recent letter on these issues at: <http://www3.epa.gov/>). This fact sheet contains background information on diesel-powered motor vehicles and diesel fuel.

### Diesel-powered Vehicles as a Share of the Total Fleet

Diesel vehicles are a small percentage of the Nation's fleet of motor vehicles, and most diesel-powered vehicles are medium and heavy trucks (figure 1).

**Figure 1: Composition of Diesel and Non-Diesel Fleet: 2014**



**SOURCE:** U.S. Department of Energy (USDOE), Energy Information Administration (EIA), *Annual Energy Outlook 2015* (April 14, 2015), Tables 40 and 41. Available at <http://www.eia.gov> as of September 2015.

Detailed characteristics of vehicle use are measured in two surveys. The Vehicle Inventory and Use Survey, last conducted in 2002, covers trucks, pickups, vans, and minivans used by households

and businesses. The last survey showed that diesel-powered vehicles are driven significantly farther on average than gasoline-powered vehicles in all weight classes (table 1), and that the difference in miles traveled was much greater for medium and heavy trucks. This was because gasoline-powered heavy trucks were less likely to be used for long haul purposes. Plans are moving forward to restore the survey and collect current statistics for trucks, buses, and automobiles.

**Table 1: Vehicle-Miles of Travel per Vehicle by Fuel Type and Weight: 2002 VIUS**

Gross Vehicle Weight Rating Code	Fuel Type	
	Diesel	Gasoline
Less than 6,001 lbs.	13,632	11,791
6,001 to 10,000 lbs.	14,164	11,501
10,001 to 14,000 lbs.	15,137	11,886
14,001 to 16,000 lbs.	17,456	11,316
16,001 to 19,500 lbs.	19,368	4,139
19,501 to 26,000 lbs.	17,083	5,135
26,001 to 33,000 lbs.	27,020	2,871
33,001 lbs. or more	41,314	7,306

**NOTE:** Light trucks = 0 to 14,000 lbs., Medium trucks = 14,001 to 26,000 lbs., and Heavy trucks = 26,001 or more.

**SOURCE:** U.S. Department of Commerce, Census Bureau, *Vehicle Inventory and Use Survey 2002 Microdata Data*. Available at <https://www.census.gov/> as of September 2015.

The National Household Travel Survey (NHTS) provides data on vehicle use by households, which excludes heavy trucks and other commercial vehicles. The last survey in 2009 showed the diesel fleet on average was older than their gasoline-powered counterparts (table 2). The 2009 NHTS

also showed that diesel-powered light trucks were driven significantly less than those in the 2002 Vehicle Inventory and Use Survey. This was perhaps because personal use of diesel-powered light trucks in the 2009 survey was less than that based on both personal and commercial vehicle uses captured in the 2002 survey. The 2009 NHTS survey shows diesel-powered automobiles traveling slightly farther on average than gasoline-powered automobiles. However the difference was not statistically significant.

**Table 2: Average Annual Vehicle-Miles of Travel per Vehicle and Average Age: 2009 NHTS**

	Passenger Car		
	Diesel	Gasoline	Total
VMT per Vehicle	11,935	11,112	11,117
Average Age	10.9	9.5	9.5

	Light Truck		
	Diesel	Gasoline	Total
VMT per Vehicle	10,985	12,187	12,177
Average Age	9.8	9	7.7

**KEY:** VMT = Vehicle-miles per Travel

**NOTES:** *Light Truck* includes vans, sport utility vehicles, and pickup trucks. *Total* includes electric and natural gas-powered vehicles.

**SOURCE:** U.S. Department of Transportation, Federal Highway Administration, *National Household Travel Survey* (NHTS) 2009 (June 2011). Available at <http://nhts.ornl.gov> as of September 2015.

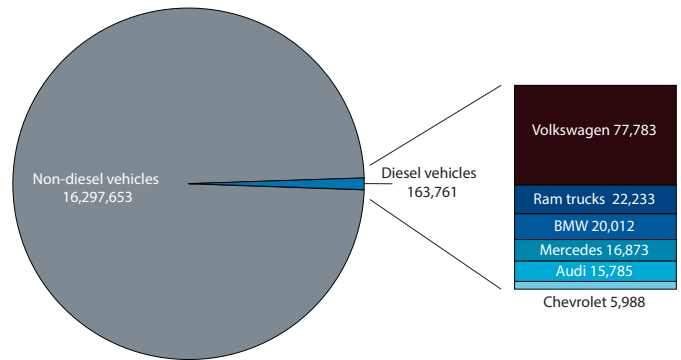
### Sales of Diesel-powered Passenger Cars and Light Trucks

In 2014, over 16.4 million passenger cars and light trucks were sold in the United States [USDOC BEA 2015]. Diesel-powered cars accounted for about 3 percent of total auto sales in the United States, which is considerably lower than 50 percent in Europe [LUSSENHOP 2015]. In 2014, Volkswagen accounted for more than half of U.S. diesel car sales (figure 2) with diesel version of just three models—the Jetta, Passat, and Golf [COBB 2015].

Only 1.5 percent of all light duty vehicles (including passenger cars, sport utility vehicles, minivans, and all but the largest pickup trucks and vans) in Model Year 2014 were diesel-powered. This percentage is up from less than 0.1 percent in the mid-90s, but below the peak of 5.9 percent in Model Year 1981. In model year 2014 Volkswagen’s fleet had the highest

percentage of diesel-powered light duty vehicles in the United States (20.1 percent), followed by Daimler (6.9 percent), BMW (6.0 percent), Chrysler-Fiat (2.8 percent), and GM (0.5 percent) [USEPA 2014].

**Figure 2: Passenger Car and Light Truck Sales: 2014**



**SOURCE:** Cobb, J. *December 2014 Dashboard* (January 6, 2015). Available at <http://www.hybridcars.com/> as of September 2015.

Diesel is more popular for medium and heavy trucks than passenger cars in the U.S. For example, 72 percent of the trucks with a gross vehicle weight rating 10,001 and above sold in the United States in 2013 were diesel-powered, up from 69 percent in 2009 [USDOE ORNL 2015].

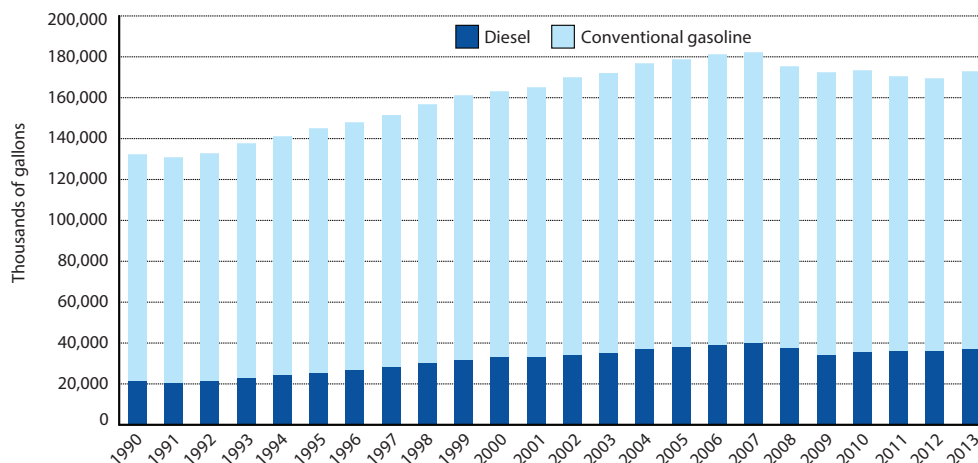
### Diesel Fuel Consumption

Diesel fuel consumption increased steadily from 1990 until the recession after 2007, and has gradually been rebounding since 2009 (figure 3). By comparison, ethanol consumption by the transportation sector has increased 1,700 percent from 0.7 billion gallons in 1990 to 12.6 billion gallons in 2013. Biodiesel consumption has increased 139,000 percent from 0.01 billion gallons in 2001 to 1.4 billion gallons in 2013 [USEPA 2015]. The creation of the Renewable Fuel Standards program in early 2000’s contributed to this increase.

### Diesel Fuel Prices

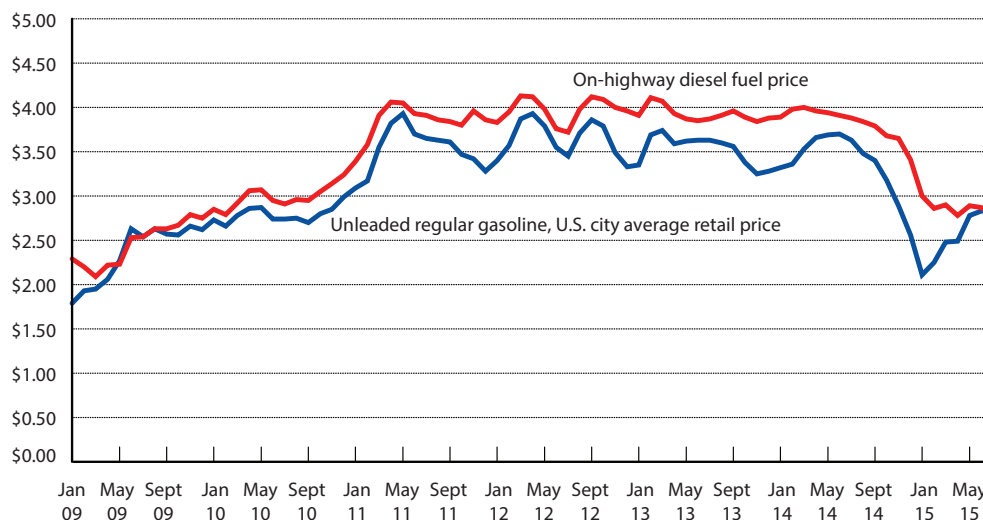
Retail motor gasoline and on-highway diesel fuel prices are back down from highs reached over the past few years. The average annual price of on-highway diesel fuel increased from \$2.47 in 2009 to a peak of \$3.97 in 2012. For comparison, the average annual price of unleaded regular gasoline increased from \$2.35 in 2009 to \$3.62 in 2012. In July 2015,

**Figure 3: U.S. Motor Fuel Consumption: 1990–2013**



**SOURCE:** U.S. Department of Energy, Energy Information Administration, *U.S. Conventional Gasoline/No 2 Diesel Sales/Deliveries to On-Highway Consumers*, available at <http://www.eia.doe.gov/> as of September 2015.

**Figure 4: U.S. Retail Motor Gasoline and On-highway Diesel Fuel Prices: January 2009–July 2015**



**NOTE:** Dollars per gallon including taxes

**SOURCE:** U.S. Department of Energy, Energy Information Administration, *Monthly Energy Review* (July 2015), table 9.4, available at <http://www.eia.doe.gov/> as of September 2015.

the prices stood at \$2.79 for diesel and \$2.83 for gas, thus diesel is slightly cheaper than regular—an occurrence that has not been seen since summer 2009 (figure 4).

**Emissions**

Diesel-powered vehicles generally have better fuel economy than gasoline-powered ones, thus their CO<sub>2</sub> per vehicle-mile travelled may be lower than a comparable gasoline-powered vehicle. However, diesel remains a major source of harmful pollutants (e.g.,

ozone forming emission, including nitrogen compounds NO<sub>x</sub> as well as particulate matter (PM), which is a mixture of solid particles and liquid droplets found in the air) when burned. According to the U.S. Environmental Protection Agency, using ultra low sulfur diesel fuel and advanced emission control systems can reduce vehicle PM and NO<sub>x</sub> emissions [USDOE EIA 2014].

Diesel-powered motor vehicles account for about 4 percent of the fleet (figure 1), but they account for about half of the on-road NO<sub>x</sub> emissions. In 2013,

gasoline-powered motor vehicles contributed 2,365 kilotons; in comparison, diesel-powered motor vehicles contributed 2,125 kilotons of on-road NO<sub>x</sub> emissions [USEPA 2015].

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### About This Fact Sheet

Matthew Chambers, a Senior Transportation Specialist, and Rolf Schmitt, the Deputy Director, in the Bureau of Transportation Statistics (BTS) prepared this fact sheet. Aaron Jette and Jonathan Frazier, John A. Volpe National Transportation Systems Center, provided assistance with data collection and visualization.

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