Chapter 4
Light Vehicles and Characteristics

Summary Statistics from Tables in this Chapter

Source		
Table 4.1	Cars, 2010	
	Registrations (thousands)	*130,892*
	Vehicle miles (million miles)	*1,551,457*
	Fuel economy (miles per gallon)	*23.0*
Table 4.2	Two-axle, four-tire trucks, 2010	
	Registrations (thousands)	*99,552*
	Vehicle miles (million miles)	*1,096,202*
	Fuel economy (miles per gallon)	*17.1*
Table 4.6	Light truck share of total light vehicle sales	
	1970 calendar year	*14.8%*
	2011 calendar year	*52.2%*
Table 4.7	Car sales, 2011 model year (thousands)	7,713
	Small	*2,194*
	Midsize	*2,642*
	Large	*1,226*
Table 4.10	Light truck sales, 2011 model year (thousands)	*4,652*
	Midsize pickup	*80*
	Large pickup	*1,664*
	Midsize van	*553*
	Large van	*18*
	Small truck SUV	*93*
	Midsize truck SUV	*1,071*
	Large truck SUV	*1,193*
Tables 4.21	Corporate average fuel economy	(mpg)
and 4.22	*Car standard, MY 2011*	*30.1*
	Car fuel economy, MY 2011	*33.8*
	Light truck standard, MY 2011 (unreformed)	*24.2*
	Light truck fuel economy, MY 2011	*24.5*
Table 4.28	Average fuel economy loss from 55 to 70 mph	17.1%

Car registrations, along with vehicle travel and fuel use, all declined from 2008 to 2010. The data in this table from 1985–on DO NOT include minivans, pickups, or sport utility vehicles. Much of the data for 2009 were estimated; the FHWA no longer publishes travel and fuel data for cars.

Table 4.1
Summary Statistics for Cars, 1970–2010

Year	Registrations[a] (thousands)	Vehicle travel (million miles)	Miles (per vehicle)	Fuel use (million gallons)	Fuel economy[b] (miles per gallon)	
1970	89,244	916,700	10,272	67,820	13.5	
1975	106,706	1,033,950	9,690	74,140	13.9	
1980	121,601	1,111,596	9,141	69,981	15.9	
1981	123,098	1,133,332	9,207	69,112	16.4	
1982	123,702	1,161,713	9,391	69,116	16.8	
1983	126,444	1,195,054	9,451	70,322	17.0	
1984	128,158	1,227,043	9,574	70,663	17.4	
1985[c]	127,885	1,246,798	9,749	71,518	17.4	
1986	130,004	1,270,167	9,770	73,174	17.4	
1987	131,482	1,315,982	10,009	73,308	18.0	
1988	133,836	1,370,271	10,238	73,345	18.7	
1989	134,559	1,401,221	10,413	73,913	19.0	
1990	133,700	1,408,266	10,533	69,568	20.2	
1991	128,300	1,358,185	10,586	64,318	21.1	
1992	126,581	1,371,569	10,836	65,436	21.0	
1993	127,327	1,374,709	10,797	67,047	20.5	
1994	127,883	1,406,089	10,995	67,874	20.7	
1995	128,387	1,438,294	11,203	68,072	21.1	
1996	129,728	1,469,854	11,330	69,221	21.2	
1997	129,749	1,502,556	11,580	69,892	21.5	
1998	131,839	1,549,577	11,754	71,695	21.6	
1999	132,432	1,569,100	11,848	73,283	21.4	
2000	133,621	1,600,287	11,976	73,065	21.9	
2001	137,633	1,628,332	11,831	73,559	22.1	
2002	135,921	1,658,474	12,202	75,471	22.0	
2003	135,670	1,672,079	12,325	74,590	22.4	
2004	136,431	1,699,890	12,460	75,402	22.5	
2005	136,568	1,708,421	12,510	77,418	22.1	
2006	135,400	1,690,534	12,485	75,009	22.5	
2007	135,933	1,672,467	12,304	74,377	22.5	
2008	137,080	1,571,756	11,466	68,864	22.8	[d]
2009	134,880	1,561,904	11,580	68,228	22.9	
2010	130,892	1,551,457	11,853	67,323	23.0	
			Average annual percentage change			
1970–2010	1.0%	1.3%	0.4%	0.0%	1.3%	
2000–2010	-0.2%	-0.3%	-0.1%	-0.8%	0.5%	

Source:
U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics 2010*, Washington, DC, 2012, Table VM-1 and annual. (Additional resources: www.fhwa.dot.gov)

[a] This number differs from R.L. Polk's estimates of "number of cars in use." See Table 3.3.
[b] Fuel economy for car population.
[c] Beginning in this year the data were revised to exclude minivans, pickups and sport utility vehicles which may have been previously included.
[d] Due to FHWA methodology changes, data from 2009-on are not comparable with previous data.

Much of the data for 2009 were estimated; the FHWA no longer publishes travel and fuel use data for two-axle, four tire trucks.

Table 4.2
Summary Statistics for Two-Axle, Four-Tire Trucks, 1970–2010

Year	Registrations (thousands)	Vehicle travel (million miles)	Miles (per vehicle)	Fuel use (million gallons)	Fuel economy (miles per gallon)	
1970	14,211	123,286	8,675	12,313	10.0	
1975	20,418	200,700	9,830	19,081	10.5	
1976	22,301	225,834	10,127	20,828	10.8	
1977	23,624	250,591	10,607	22,383	11.2	
1978	25,476	279,414	10,968	24,162	11.6	
1979	27,022	291,905	10,802	24,445	11.9	
1980	27,876	290,935	10,437	23,796	12.2	
1981	28,928	296,343	10,244	23,697	12.5	
1982	29,792	306,141	10,276	22,702	13.5	
1983	31,214	327,643	10,497	23,945	13.7	
1984	32,106	358,006	11,151	25,604	14.0	
1985[a]	37,214	390,961	10,506	27,363	14.3	
1986	39,382	423,915	10,764	29,074	14.6	
1987	41,107	456,870	11,114	30,598	14.9	
1988	43,805	502,207	11,465	32,653	15.4	
1989	45,945	536,475	11,676	33,271	16.1	
1990	48,275	574,571	11,902	35,611	16.1	
1991	53,033	649,394	12,245	38,217	17.0	
1992	57,091	706,863	12,381	40,929	17.3	
1993	59,994	745,750	12,430	42,851	17.4	
1994	62,904	764,634	12,156	44,112	17.3	
1995	65,738	790,029	12,018	45,605	17.3	
1996	69,134	816,540	11,811	47,354	17.2	
1997	70,224	850,739	12,115	49,389	17.2	
1998	71,330	868,275	12,173	50,462	17.2	
1999	75,356	901,022	11,957	52,859	17.0	
2000	79,085	923,059	11,672	52,939	17.4	
2001	84,188	943,207	11,204	53,522	17.6	
2002	85,011	966,034	11,364	55,220	17.5	
2003	87,187	984,094	11,287	60,758	16.2	
2004	91,845	1,027,164	11,184	63,417	16.2	
2005	95,337	1,041,051	10,920	58,869	17.7	
2006	99,125	1,082,490	10,920	60,685	17.8	
2007	101,470	1,112,271	10,962	61,836	18.0	
2008	99,368	1,058,457	10,652	62,575	16.9	[b]
2009	99,588	1,071,344	10,758	63,159	17.0	
2010	99,552	1,096,202	11,011	64,115	17.1	
			Average annual percentage change			
1970–2010	5.0%	5.6%	0.6%	4.2%	1.4%	
2000–2010	2.3%	1.7%	-0.6%	1.9%	-0.2%	

Source:
U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics 2010*, Washington, DC, 2012, Table MV-9. Previous years Table VM-1. (Additional resources: www.fhwa.dot.gov)

[a] Beginning in this year the data were revised to include all vans (including mini-vans), pickups and sport utility vehicles.

[b] Due to FHWA methodology changes, data from 2009-on are not comparable with previous data.

Because data on Class 2b trucks are scarce, the U.S. DOE funded a study to investigate available sources of data. In the final report, four methodologies are described to estimate the sales of Class 2b trucks. Until another study is funded, the 1999 data are the latest available.

Table 4.3
Summary Statistics on Class 1, Class 2a, and Class 2b Light Trucks

	CY 1999 truck sales (millions)	MY 2000 truck population (millions)	Percent diesel trucks in population	Average age (years)	Estimated annual miles[a] (billions)	Estimated fuel use (billion[a] gallons)	Estimated fuel economy (miles per gallon)
Class 1	5.7	49.7	0.3%	7.3	672.7	37.4	18.0
Class 2a	1.8	19.2	2.5%	7.4	251.9	18.0	14.0
Class 2b	0.5	5.8	24.0%	8.6	76.7	5.5	13.9

Source:
Davis, S.C. and L.F. Truett, *Investigation of Class 2b Trucks (Vehicles of 8,500 to 10,000 lbs GVWR)*, ORNL/TM-2002/49, March 2002, Table 16.

Note: CY - calendar year. MY - model year.

Table 4.4
Sales Estimates of Class 1, Class 2a, and Class 2b Light Trucks, 1989–1999

	Sales estimates (thousands)			
Calendar year	Class 1 (6,000 lbs and under)	Class 2a (6,001-8,500 lbs)	Class 2b (8,501-10,000 lbs)	Total
1989	3,313	918	379	4,610
1990	3,451	829	268	4,548
1991	3,246	670	206	4,122
1992	3,608	827	194	4,629
1993	4,119	975	257	5,351
1994	4,527	1,241	265	6,033
1995	4,422	1,304	327	6,053
1996	4,829	1,356	334	6,519
1997	5,085	1,315	397	6,797
1998	5,263	1,694	342	7,299
1999	5,707	1,845	521	8,073
		Percent change		
1989–1999	72.3%	101.0%	37.5%	75.1%

Source:
Davis, S.C. and L.F. Truett, *Investigation of Class 2b Trucks (Vehicles of 8,500 to 10,000 lbs GVWR)*, ORNL/TM-2002/49, March 2002, Table 1.

Note: These data were calculated using Methodology 4 from the report.

[a] Estimates derived using 2000 population data and 1997 usage data. See source for details.

Car sales in 2009 and 2010 were below 6 million. In 1980, the Big 3 (Chrysler, Ford and General Motors) held 73.8% of the market; by 2011, that had dropped to 33.3%.

Table 4.5
New Retail Car Sales in the United States, 1970–2011

Calendar year	Domestic[a]	Import[b]	Total	Percentage imports	Percentage Big 3 sales[c]	Percentage diesel
	(thousands)					
1970	7,119	1,280	8,400	15.2%	[d]	0.07%
1975	7,053	1,571	8,624	18.2%	[d]	0.31%
1980	6,580	2,369	8,949	26.5%	73.8%	4.32%
1985	8,205	2,775	10,979	25.3%	72.9%	0.83%
1986	8,215	3,189	11,404	28.0%	70.9%	0.37%
1987	7,085	3,107	10,192	30.5%	67.6%	0.17%
1988	7,543	3,004	10,547	28.5%	69.3%	0.02%
1989	7,098	2,680	9,779	27.4%	67.9%	0.13%
1990	6,919	2,384	9,303	25.6%	65.7%	0.08%
1991	6,162	2,023	8,185	24.7%	64.2%	0.10%
1992	6,286	1,927	8,213	23.5%	65.8%	0.06%
1993	6,742	1,776	8,518	20.8%	67.3%	0.04%
1994	7,255	1,735	8,991	19.3%	65.9%	0.04%
1995	7,114	1,506	8,620	17.5%	65.3%	0.03%
1996	7,206	1,272	8,479	15.0%	64.1%	0.09%
1997	6,862	1,355	8,217	16.5%	62.2%	0.09%
1998	6,705	1,380	8,085	17.1%	59.7%	0.14%
1999	6,919	1,719	8,638	19.9%	58.3%	0.16%
2000	6,762	2,016	8,778	23.0%	55.0%	0.26%
2001	6,254	2,098	8,352	25.1%	51.4%	0.18%
2002	5,817	2,226	8,042	27.7%	48.4%	0.39%
2003	5,473	2,083	7,556	27.6%	47.1%	0.52%
2004	5,334	2,149	7,483	28.7%	44.9%	0.40%
2005	5,473	2,187	7,660	28.6%	43.1%	0.63%
2006	5,417	2,345	7,762	30.2%	40.5%	0.86%
2007	5,198	2,365	7,562	31.3%	36.9%	0.11%
2008	4,490	2,278	6,769	33.7%	34.2%	0.12%
2009	3,558	1,843	5,401	34.1%	31.3%	2.94%
2010	3,792	1,844	5,635	32.7%	31.7%	2.69%
2011	4,240	1,850	6,089	30.4%	33.3%	1.47%
			Average annual percentage change			
1970–2011	-1.3%	0.9%	-0.8%			
2001–2011	-3.8%	-1.3%	-3.1%			

Source:

Domestic and import data - 1970–97: American Automobile Manufacturers Association, *Motor Vehicle Facts and Figures 1998*, Detroit, MI, 1998, p. 15, and annual. 1997 data from *Economic Indicators, 4th Quarter 1997*. 1998–2010: Ward's Communication, *Ward's Automotive Yearbook*, Detroit, MI, 2009, p. 249. 2011: Ward's Communications, www.wardsauto.com.

Diesel data - Ward's Communications, *Ward's Automotive Yearbook*, Detroit, MI, 2009, p. 31, and Ward's Communications, www.wardsauto.com.

[a] North American built.
[b] Does not include import tourist deliveries.
[c] Big 3 includes Chrysler, Ford and General Motors.
[d] Data are not available.

Light trucks, which include pick-ups, minivans, sport-utility vehicles, and other trucks less than 10,000 pounds gross vehicle weight (GVW), accounted for more than half of light vehicle sales from 2001 to 2007 and again in 2011.

Table 4.6
New Retail Sales of Trucks 10,000 Pounds GVW and Less in the United States, 1970–2011

Calendar year	Light truck sales[a] (thousands)	Percentages				
		Import[b]	Big 3 sales[c]	Diesel[d]	Light trucks of light-duty vehicle sales[e]	Light trucks of total truck sales
1970	1,457	4.5%		[f]	14.8%	80.5%
1975	2,053	10.0%		[f]	20.9%	82.8%
1980	1,960	24.4%		3.5%	17.5%	78.6%
1985	3,688	22.6%	78.2%	3.3%	23.9%	77.7%
1986	4,594	21.3%	76.9%	3.7%	28.6%	93.4%
1987	4,610	20.0%	78.3%	2.3%	30.9%	92.2%
1988	4,800	14.8%	81.6%	2.3%	31.1%	91.5%
1989	4,610	13.9%	81.9%	2.9%	31.7%	91.0%
1990	4,548	13.5%	80.9%	2.2%	32.8%	93.8%
1991	4,122	13.1%	79.4%	3.2%	33.4%	94.4%
1992	4,629	8.8%	83.1%	2.4%	36.0%	94.4%
1993	5,351	7.1%	83.4%	2.3%	38.5%	94.2%
1994	6,033	6.8%	82.9%	2.5%	40.1%	94.0%
1995	6,053	6.6%	83.4%	3.8%	41.1%	93.2%
1996	6,519	6.7%	83.8%	3.1%	43.2%	93.4%
1997	6,797	8.5%	81.9%	2.7%	44.9%	93.4%
1998	7,299	9.0%	80.5%	2.6%	47.0%	92.6%
1999	8,073	9.6%	78.0%	2.8%	47.8%	92.0%
2000	8,386	10.2%	76.1%	3.3%	48.3%	92.8%
2001	8,598	11.4%	75.3%	2.8%	50.2%	94.3%
2002	8,633	12.4%	74.7%	2.7%	51.3%	94.9%
2003	8,938	13.7%	72.4%	2.8%	53.7%	95.0%
2004	9,254	13.5%	70.1%	2.7%	54.9%	94.3%
2005	9,114	13.3%	68.2%	2.7%	53.8%	93.1%
2006	8,574	15.7%	63.9%	2.8%	51.9%	92.3%
2007	8,305	16.7%	61.9%	3.1%	51.6%	93.3%
2008	6,246	17.6%	59.8%	3.3%	47.3%	92.9%
2009	4,834	18.3%	56.5%	4.0%	46.5%	93.0%
2010	5,758	15.6%	57.6%	4.8%	49.8%	93.8%
2011	6,449	15.2%	59.4%	5.3%	50.6%	92.8%
		Average annual percentage change				
1970–2011	3.7%					
2001–2011	-2.8%					

Source:
Ward's Communications, *Ward's Automotive Yearbook*, Detroit, MI, 2011, and updates at www.wardsauto.com. (Additional resources: www.wardsauto.com)

[a] Includes all trucks of 10,000 pounds gross vehicle weight and less sold in the United States.
[b] Excluding transplants.
[c] Big 3 includes Chrysler, Ford and General Motors.
[d] Based on model year factory installations.
[e] Light-duty vehicles include cars and light trucks.
[f] Indicates less than 1 percent.

The sales-weighted fuel economy of new cars (including wagons and non-truck SUVs) increased dramatically from 1975 (15.8 mpg) to 1985 (26.9 mpg), but rose only 1.9 mpg from 1985 to 2005. Since 2005, fuel economy rose 4.0 mpg—from 28.8 mpg in 2005 to 32.8 mpg in 2011.

Table 4.7
Period Sales, Market Shares, and Sales-Weighted Fuel Economies of New Domestic and Import Cars, Selected Model Years 1975–2011[a]
(thousands)

	Sales period								
	1975	1980	1985	1990	1995	2000	2005	2010	2011
CARS									
Small									
Total sales, units	4,089	4,825	5,519	4,999	5,190	4,266	3,185	2,507	2,194
Market share, %	49.5%	51.1%	50.7%	56.3%	53.5%	43.1%	35.1%	35.1%	28.4%
Fuel economy, mpg	18.3	26.1	29.8	29.8	30.7	30.3	31.1	34.1	34.4
Midsize									
Total sales, units	1,631	2,987	2,777	2,342	2,515	2,894	2,886	2,261	2,642
Market share, %	19.7%	31.6%	25.5%	26.4%	25.9%	29.2%	31.8%	31.6%	34.3%
Fuel economy, mpg	13.6	21.6	24.9	26.2	26.1	27.0	29.8	34.1	34.5
Large									
Total sales, units	1,555	963	1,512	1,092	1,305	1,665	1,234	832	1,226
Market share, %	18.8%	10.2%	13.9%	12.3%	13.4%	16.8%	13.6%	11.6%	15.9%
Fuel economy, mpg	13.1	19.1	22.3	23.7	24.4	25.6	26.4	28.3	30.5
WAGONS									
Small									
Total sales, units	477	310	496	160	198	68	365	450	487
Market share, %	5.8%	3.3%	4.6%	1.8%	2.0%	0.7%	4.0%	6.3%	6.3%
Fuel economy, mpg	22.4	28.6	32.5	29.6	33.3	29.2	32.4	34.1	34.7
Midsize									
Total sales, units	289	257	342	184	176	234	238	8	4
Market share, %	3.5%	2.7%	3.1%	2.1%	1.8%	2.4%	2.6%	0.1%	0.1%
Fuel economy, mpg	13.2	21.1	25.2	25.3	26.6	27.3	26.0	28.6	24.9
Large									
Total sales, units	197	102	146	31	10	0.0	118.3	0	0
Market share, %	2.4%	1.1%	1.3%	0.4%	0.1%	0.0%	1.3%	0.0%	0.0%
Fuel economy, mpg	11.9	19.1	20.9	22.7	22.8	[b]	22.2	[b]	[b]
NON-TRUCK SUVS									
Small									
Total sales, units	6	0	0	27	25	131	45	3	0
Market share, %	0.1%	0.0%	0.0%	0.3%	0.3%	1.3%	0.5%	0.0%	0.0%
Fuel economy, mpg	12.0	[b]	[b]	23.4	29.2	23.3	29.9	21.9	[b]
Midsize									
Total sales, units	14	4	104	46	288	575	737	689	774
Market share, %	0.2%	0.0%	1.0%	0.5%	3.0%	5.8%	8.1%	9.6%	10.0%
Fuel economy, mpg	14.8	16.3	21.4	21.0	20.6	21.7	24.5	28.9	29.4
Large									
Total sales, units	7	0	0	0	0	65	278	397	386
Market share, %	0.1%	0.0%	0.0%	0.0%	0.0%	0.7%	3.1%	5.6%	5.0%
Fuel economy, mpg	13.1	19.5	[b]	[b]	[b]	17.7	23.4	27.3	27.5
TOTAL									
Total sales, units	8,265	9,448	10,895	8,882	9,708	9,899	9,088	7,147	7,713
Market share, %	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100%	100%
Fuel economy, mpg	15.8	23.5	26.9	27.7	28.0	27.5	28.8	32.3	32.8

Source:
U.S. Environmental Protection Agency, *Light-Duty Automotive Technology, Carbon Dioxide Emissions, and Fuel Economy Trends: 1975 Through 2011*, March 2012. (Additional resources: www.epa.gov/otaq/fetrends.htm)

[a] The fuel economy data on this table are EPA laboratory test values.
[b] No vehicles in this category were sold in this model year.

The term "wagon" conjures up images of the station wagons from the 1960's. However, most of the cars that are now classified as wagons have little in common with those station wagons. The wagons below make up the category "wagon" on Tables 4.7 through 4.15.

Table 4.8
Definition of Wagons in Model Year 2011

Small wagon
BMW 328i Sports Wagon
BMW 328i Xdrive Sports Wagon
Cadillac CTS Wagon
Cadillac CTS Wagon AWD
Chevrolet HHR FWD
Chevrolet HHR Panel FWD
Chrysler Caliber
Honda Fit
Honda TSX Wagon
Hyundai Elantra Touring
Kia Soul
Mitsubishi Lancer Sportback
Nissan Cube
Nissan EX35
Nissan Juke
Saab 9-3 Sportcombi
Saab 9-3X Sportcombi AWD
Subaru Impreza Wagon-Outback Sport AWD
Suzuki SX4
Suzuki SX4 AWD
Toyota Corolla Matrix
Toyota Xb
Volkswagen A3
Volkswagen A3 Quattro
Volkswagen A4 Avant Quattro
Volkswagen Jetta Sportwagen
Volvo V50 FWD
Midsize wagon
Kia Rondo
Mercedes Benz E350 4MATIC
Volkswagen A6 Avant Quattro

Source:
U.S. Environmental Protection Agency, *Light-Duty Automotive Technology, Carbon Dioxide Emissions, and Fuel Economy Trends: 1975 Through 2011*, March 2012. (Additional resources: www.epa.gov/otaq/fetrends.htm)

A new vehicle classification was created to match the Corporate Average Fuel Economy (CAFE) methodology. Under CAFE, small, two-wheel drive SUVs will be considered cars. The vehicles below make up the category "non-truck SUV" on Tables 4.7 through 4.15.

Table 4.9
Definition of Non-Truck Sport Utility Vehicles in Model Year 2011

Midsize non-truck SUV	
Chrysler Compass 2WD	Mazda CX-7 2WD
Dodge Nitro 2WD	Mazda Tribute FWD
Ford Escape FWD	Mazda Tribute FWD FFV
Ford Escape FWD FFV	Mazda Tribute Hybrid 2WD
Ford Escape Hybrid FWD	Mercedes Benz GLK 350
Ford Mariner FWD	Mitsubishi Endeavor 2WD
Ford Mariner FWD FFV	Mitsubishi Outlander 2WD
Ford Mariner Hybrid FWD	Mitsubishi Outlander Sport 2WD
Honda CR-V 2WD	Nissan Rogue FWD
Honda Element 2WD	Nissan Xterra 2WD
Honda Pilot 2WD	Suzuki Grand Vitara
Honda RDX 2WD	Toyota 4Runner 2WD
Hyundai Santa Fe 2WD	Toyota RAV4 2WD
Hyundai Tucson 2WD	Toyota FJ Cruiser 2WD
Jeep Liberty 2WD	Toyota Highlander 2WD
Jeep Patriot 2WD	Toyota RX 350
Kia Sorento 2WD	Toyota Venza
Kia Sportage 2WD	Volkswagen Tiguan
	Volvo XC60 FWD
Large non-truck SUV	
Cadillac SRX 2WD	Jeep Grand Cherokee 2WD
Chevrolet Equinox FWD	Kia Borrego 2WD
Dodge Journey FWD	Lincoln MKX FWD
Ford Edge FWD	Mazda CX-9 2WD
Ford Explorer FWD	Nissan FX35 RWD
Ford Flex FWD	Nissan Murano FWD
General Motors Terrain FWD	Nissan Pathfinder 2WD
Honda Accord Crosstour 2WD	Saab 9-4X FWD
Hyundai Veracruze 2WD	Volvo XC70 FWD

Source:
U.S. Environmental Protection Agency, *Light-Duty Automotive Technology, Carbon Dioxide Emissions, and Fuel Economy Trends: 1975 Through 2011*, March 2012. (Additional resources: www.epa.gov/otaq/fetrends.htm)

Sales of light trucks in 2011 are more than twice that of 1975. Similar to the car trend, the sales-weighted fuel economy of light trucks increased substantially during the late '70's and '80's, but has increased slowly until the mid-2000's. From 2005 to 2011, fuel economy rose from 21.0 mpg to 23.6 mpg. Some two-wheel drive SUVs are now classified as cars.

Table 4.10
Period Sales, Market Shares, and Sales-Weighted Fuel Economies[a] of New Domestic and Import Light Trucks, Model Years 1975–2011
(thousands)

	Sales period								
	1975	1980	1985	1990	1995	2000	2005	2010	2011
PICKUPS									
Small									
Total sales, units	160	452	497	289	298	101	8	[b]	[b]
Market share, %	8.2%	24.3%	13.9%	7.7%	5.5%	1.5%	0.1%	[b]	[b]
Fuel economy, mpg	22.5	24.3	26.7	24.8	24.4	26.3	25.8	[b]	[b]
Midsize									
Total sales, units	56	98	617	600	700	766	216	153	80
Market share, %	2.9%	5.3%	17.3%	16.1%	12.9%	11.5%	3.2%	3.9%	1.7%
Fuel economy, mpg	21.1	25.9	25.7	24.7	24.7	22.8	23.6	24.9	27.5
Large									
Total sales, units	1,126	887	965	945	1,273	1,746	2,076	1,123	1,664
Market share, %	57.5%	47.7%	27.1%	25.3%	23.4%	26.2%	30.5%	28.3%	35.8%
Fuel economy, mpg	13.1	17.2	17.7	18.0	18.0	19.3	19.4	20.5	21.3
VANS									
Small									
Total sales, units	2	16	93	31	6	[b]	[b]	20	[b]
Market share, %	0.1%	0.8%	2.6%	0.8%	0.1%	[b]	[b]	0.5%	[b]
Fuel economy, mpg	20.6	19.0	25.5	23.9	26.5	[b]	[b]	30.7	[b]
Midsize									
Total sales, units	302	130	600	1,124	1,552	1,522	1,426	524	533
Market share, %	15.4%	7.0%	16.8%	30.1%	28.5%	22.8%	20.9%	13.2%	11.5%
Fuel economy, mpg	13.3	16.9	19.8	21.8	22.2	23.5	24.2	25.0	26.5
Large									
Total sales, units	153	96	162	107	104	170	55	15	18
Market share, %	7.8%	5.2%	4.6%	2.9%	1.9%	2.5%	0.8%	0.4%	0.4%
Fuel economy, mpg	12.6	16.0	16.1	16.5	17.1	18.0	19.4	20.1	18.4
TRUCK SUVS									
Small									
Total sales, units	47	61	115	163	164	269	170	95	93
Market share, %	2.4%	3.3%	3.2%	4.4%	3.0%	4.0%	2.5%	2.4%	2.0%
Fuel economy, mpg	16.8	18.8	22.1	23.4	23.6	22.2	23.2	21.8	21.8
Midsize									
Total sales, units	109	96	458	401	1,109	1,288	1,342	1,156	1,071
Market share, %	5.6%	5.2%	12.9%	10.7%	20.4%	19.3%	19.7%	29.2%	23.0%
Fuel economy, mpg	11.8	14.2	19.4	18.9	19.4	20.7	22.2	26.9	27.4
Large									
Total sales, units	3	24	57	72	230	814	1,512	877	1,193
Market share, %	0.2%	1.3%	1.6%	1.9%	4.2%	12.2%	22.2%	22.1%	25.6%
Fuel economy, mpg	10.4	14.3	16.9	16.7	16.6	17.6	19.4	22.6	23.3
TOTAL									
Total sales, units	1,959	1,859	3,564	3,733	5,436	6,675	6,806	3,964	4,652
Market share, %	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Fuel economy, mpg	13.7	18.6	20.56	20.7	20.5	20.7	21.0	23.4	23.6

Source:
U.S. Environmental Protection Agency, *Light-Duty Automotive Technology, Carbon Dioxide Emissions, and Fuel Economy Trends: 1975 Through 2011*, March 2012. (Additional resources: www.epa.gov/otaq/fetrends.htm)

Note: Includes light trucks of 8,500 lbs. or less.

[a] The fuel economy data on this table are EPA laboratory test values.
[b] No vehicles in this category were sold in this model year.

Back in 1975 only 19.2% of new light vehicle sales were light trucks. Because of the boom in sales of minivans, sport utility vehicles, and pick-up trucks, that number rose to over 40% in 2005. Cars made a comeback to account for 64.3% in 2010 and 62.4% in 2011.

Table 4.11
Light Vehicle Market Shares by Size Class, Model Years 1975–2011

	Model year								
	1975	1980	1985	1990	1995	2000	2005	2010	2011
Small car	40.0%	42.7%	38.2%	39.6%	34.3%	25.7%	20.0%	22.6%	17.7%
Midsize car	16.0%	26.4%	19.2%	18.6%	16.6%	17.5%	18.2%	20.4%	21.4%
Large car	15.2%	8.5%	10.5%	8.7%	8.6%	10.0%	7.8%	7.5%	9.9%
Small wagon	4.7%	2.7%	3.4%	1.3%	1.3%	0.4%	2.3%	4.0%	3.9%
Midsize wagon	2.8%	2.3%	2.4%	1.5%	1.2%	1.4%	1.5%	0.1%	0.0%
Large wagon	1.9%	0.9%	1.0%	0.2%	0.1%	[a]	0.7%	[a]	[a]
Small non-truck SUV	0.1%	[a]	[a]	0.2%	0.2%	0.8%	0.3%	0.0%	[a]
Midsize non-truck SUV	0.1%	0.0%	0.7%	0.4%	1.9%	3.5%	4.6%	6.2%	6.3%
Large non-truck SUV	0.1%	0.0%	[a]	[a]	[a]	0.4%	1.7%	3.6%	3.1%
Small pickup	1.6%	4.0%	3.4%	2.3%	2.0%	0.6%	0.1%	[a]	[a]
Midsize pickup	0.5%	0.9%	4.3%	4.8%	4.6%	4.6%	1.4%	1.4%	0.6%
Large pickup	11.0%	7.8%	6.7%	7.5%	8.4%	10.5%	13.1%	10.1%	13.5%
Small van	0.0%	0.1%	0.6%	0.2%	0.0%	[a]	[a]	0.2%	[a]
Midsize van	3.0%	1.1%	4.1%	8.9%	10.2%	9.2%	9.0%	4.7%	4.3%
Large van	1.5%	0.8%	1.1%	0.9%	0.7%	1.0%	0.3%	0.1%	0.1%
Small truck SUV	0.5%	0.5%	0.8%	1.3%	1.1%	1.6%	1.1%	0.9%	0.8%
Midsize truck SUV	1.1%	0.9%	3.2%	3.2%	7.3%	7.8%	8.4%	10.4%	8.7%
Large truck SUV	0.0%	0.2%	0.4%	0.6%	1.5%	4.9%	9.5%	7.9%	9.6%
Total light vehicles sold (thousands)	10,224	11,306	14,460	12,615	15,145	16,574	15,893	9,732	12,366
Cars	80.8%	83.6%	75.3%	70.4%	64.1%	59.7%	57.2%	64.3%	62.4%
Light trucks	19.2%	16.4%	24.7%	29.6%	35.9%	40.3%	42.8%	35.7%	37.6%

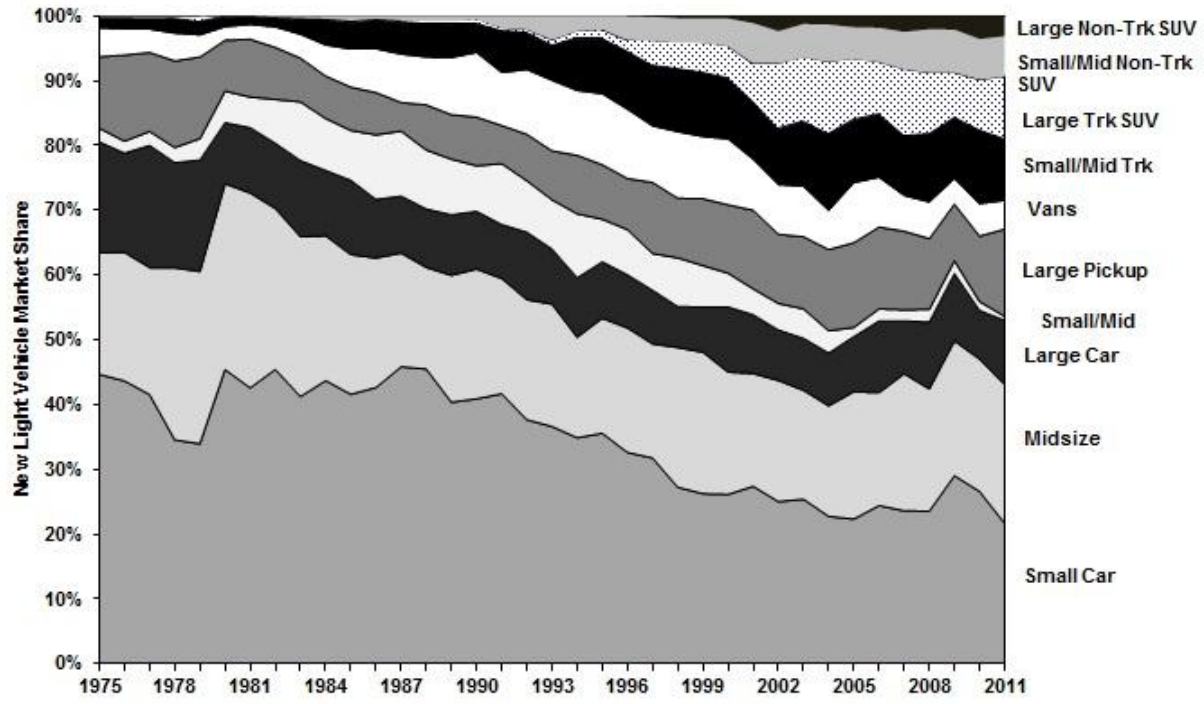
Source:
U.S. Environmental Protection Agency, *Light-Duty Automotive Technology, Carbon Dioxide Emissions, and Fuel Economy Trends: 1975 Through 2011*, March 2012. (Additional resources: www.epa.gov/otaq/fetrends.htm)

Note: Includes light trucks of 8,500 lbs. or less.

[a] No vehicles in this category were sold in this model year.

Light 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. A new category of SUVs has been added to the vehicle classification—non-truck SUVs. The non-truck SUVs are two-wheel drive SUVs that will be counted as cars in the Corporate Average Fuel Economy Standards for model years 2011-2016. A listing of the makes/models of non-truck SUVs is in Table 4.9.

Figure 4.1. Light Vehicle Market Shares, Model Years 1975–2011



Source:
See Table 4.11

The midsize and large cars and wagons sales-weighted engine sizes have decreased at an average of about 2% per year since 1975.

Table 4.12
Sales-Weighted Engine Size of New Domestic and Import Cars by Size Class, Model Years 1975–2011
(liters[a])

	Cars			Wagons			Non-truck SUVs		
Model year	Small	Midsize	Large	Small	Midsize	Large	Small	Midsize	Large
1975	3.67	5.79	6.71	2.09	5.92	6.73	4.21	5.37	5.72
1976	3.70	5.62	6.72	2.24	5.17	6.81	4.23	5.37	5.67
1977	3.67	5.45	6.01	2.20	4.86	5.98	4.23	5.31	5.61
1978	2.91	4.79	5.85	2.19	4.23	5.80	4.23	5.16	5.54
1979	2.72	4.46	5.56	2.02	4.08	5.46	2.66	5.15	0.00
1980	2.25	3.74	5.14	1.86	3.74	5.30	0.00	5.03	3.93
1981	2.12	3.60	4.99	1.78	3.17	5.12	0.00	4.79	0.00
1982	2.15	3.46	4.79	1.78	3.36	5.01	2.47	4.65	0.00
1983	2.24	3.48	4.80	1.72	3.28	5.03	2.47	2.91	0.00
1984	2.30	3.44	4.82	1.76	2.82	5.01	2.46	3.15	0.00
1985	2.26	3.35	4.58	1.75	2.79	4.99	0.00	3.20	0.00
1986	2.25	3.18	4.26	1.85	2.65	4.99	2.93	3.12	0.00
1987	2.19	3.09	4.25	1.90	2.83	4.99	2.93	3.21	0.00
1988	2.18	3.00	4.30	1.85	2.80	4.98	2.93	3.63	0.00
1989	2.15	2.97	4.29	1.83	2.88	4.98	2.87	4.16	0.00
1990	2.15	3.07	4.22	1.97	2.97	4.98	2.72	4.00	0.00
1991	2.14	3.12	4.33	1.97	2.96	4.99	2.23	3.85	0.00
1992	2.19	3.13	4.30	2.01	3.09	5.53	2.07	3.75	0.00
1993	2.18	3.14	4.20	1.93	3.08	5.57	2.09	4.08	0.00
1994	2.25	3.11	4.07	1.98	2.96	5.74	1.92	3.77	0.00
1995	2.25	3.10	4.06	1.94	2.74	5.74	1.56	3.73	0.00
1996	2.23	2.96	4.10	2.00	2.64	5.74	1.77	3.85	5.74
1997	2.18	3.01	3.97	2.04	2.62	[b]	2.19	3.73	4.95
1998	2.24	2.90	3.94	2.03	2.54	[b]	2.36	3.80	3.55
1999	2.31	2.87	3.85	2.05	2.58	[b]	2.13	3.62	5.20
2000	2.28	2.86	3.62	2.08	2.51	[b]	2.52	3.68	5.31
2001	2.29	2.87	3.63	2.38	2.54	[b]	2.08	3.49	3.87
2002	2.32	2.91	3.58	2.38	2.50	[b]	2.12	3.29	4.08
2003	2.35	2.85	3.67	2.08	2.48	[b]	2.05	3.24	4.13
2004	2.40	2.85	3.69	2.07	2.59	3.52	2.46	3.37	3.82
2005	2.36	2.76	3.68	2.00	2.99	3.56	2.37	3.13	3.61
2006	2.47	2.77	3.76	2.08	2.99	3.58	0.00	3.08	3.62
2007	2.39	2.71	3.75	2.08	2.63	3.88	3.80	2.96	3.64
2008	2.42	2.67	3.50	2.12	2.71	3.71	3.79	2.87	3.63
2009	2.29	2.57	3.28	2.05	2.51	3.43	3.79	2.81	3.42
2010	2.37	2.58	3.31	2.05	2.52	[b]	3.80	2.81	3.12
2011	2.37	2.51	3.12	2.01	3.35	[b]	0.00	2.78	3.25
				Average annual percentage change					
1975–2011	-1.2%	-2.3%	-2.1%	-0.1%	-1.6%	-2.0[c]	-0.3%[c]	-1.8%	-1.6%
2001–2011	0.3%	-1.3%	-1.5%	-1.7%	2.8%	[d]	6.9%[c]	-2.2%	-1.7%

Source:
U.S. Environmental Protection Agency, *Light-Duty Automotive Technology, Carbon Dioxide Emissions, and Fuel Economy Trends: 1975 Through 2011*, March 2012. (Additional resources: www.epa.gov/otaq/fetrends.htm)

[a] 1 liter = 61.02 cubic inches.
[b] No vehicles in this category were sold in this model year.
[c] Data are thru latest available year.
[d] Data are not available.

The engine size of large truck sport utility vehicles (SUVs) declined an average of 1.5% per year from 2000 to 2011, while the size of a small truck SUV engine increased by 3.2%.

Table 4.13
Sales-Weighted Engine Size of New Domestic and Import Light Trucks by Size Class, Model Years 1975–2011
(liters[a])

	Pickups			Vans			Truck SUVs		
Model year	Small	Midsize	Large	Small	Midsize	Large	Small	Midsize	Large
1975	1.94	1.79	5.62	1.94	5.08	5.47	4.52	5.76	6.51
1976	1.95	1.79	5.64	1.97	5.20	5.50	4.52	5.84	6.58
1977	1.98	2.04	5.68	1.97	5.35	5.62	4.57	5.77	6.66
1978	1.96	2.03	5.55	1.97	5.36	5.49	4.56	5.91	6.55
1979	1.97	2.15	5.41	1.97	5.25	5.51	4.51	5.66	6.15
1980	2.00	2.18	5.00	1.97	4.72	5.17	3.72	5.33	5.58
1981	2.13	2.15	4.80	1.97	4.57	5.09	3.68	5.20	5.54
1982	2.25	2.49	4.91	1.82	4.66	5.14	3.71	5.29	5.64
1983	2.32	2.40	4.94	1.93	4.81	5.14	3.74	4.24	5.82
1984	2.32	2.43	4.93	1.97	4.06	5.14	3.06	3.80	5.76
1985	2.35	2.52	4.99	1.98	3.82	5.12	2.74	3.53	5.74
1986	2.38	2.41	4.88	2.15	3.68	5.01	2.74	3.39	5.74
1987	2.40	2.60	5.06	2.19	3.70	5.06	2.61	3.60	5.73
1988	2.43	2.71	5.22	2.20	3.65	5.07	2.52	3.86	5.75
1989	2.51	2.90	5.22	2.14	3.57	5.06	2.80	4.17	5.75
1990	2.51	2.87	5.25	2.29	3.59	5.14	2.65	3.98	5.75
1991	2.49	3.11	5.17	2.04	3.50	5.12	2.46	3.88	5.37
1992	2.50	3.20	5.11	2.11	3.57	5.16	2.58	3.84	5.42
1993	2.41	3.25	4.97	1.99	3.45	5.16	2.66	3.88	5.65
1994	2.48	3.23	5.17	2.21	3.59	5.21	2.45	3.94	5.62
1995	2.58	3.11	5.19	2.20	3.70	5.15	2.37	3.93	5.69
1996	2.60	3.06	5.16	2.33	3.47	5.33	1.75	4.18	5.64
1997	2.39	3.20	4.97	[b]	3.45	4.91	3.20	3.91	5.38
1998	2.62	3.14	5.04	[b]	3.43	4.87	2.77	3.91	5.27
1999	2.83	3.27	5.13	[b]	3.49	4.86	2.70	3.79	5.31
2000	2.43	3.15	4.74	[b]	3.40	4.85	2.94	3.79	5.10
2001	2.42	3.40	4.78	[b]	3.37	4.97	2.77	3.51	4.78
2002	2.89	3.70	4.83	[b]	3.44	4.80	2.77	3.38	4.66
2003	2.91	3.22	4.82	[b]	3.48	4.74	2.81	3.47	4.80
2004	3.02	3.59	4.94	[b]	3.50	4.79	3.09	3.59	4.85
2005	2.46	3.14	4.82	[b]	3.49	4.72	3.07	3.47	4.61
2006	2.46	3.23	4.75	[b]	3.47	4.65	3.28	3.49	4.39
2007	[b]	3.32	4.89	[b]	3.55	4.65	3.36	3.33	4.57
2008	[b]	3.29	4.95	2.29	3.60	4.63	3.51	3.25	4.39
2009	[b]	3.31	5.02	2.29	3.56	4.66	3.79	3.02	4.07
2010	[b]	3.27	5.01	2.29	3.52	4.73	3.80	3.04	4.01
2011	[b]	2.49	4.84	[b]	3.47	5.10	3.80	2.99	4.11
				Average annual percentage change					
1975-2011	[c]	0.9%	-0.4%	0.5%	-1.1%	-0.2%	-0.5%	-1.8%	-1.3%
2001-2011	[c]	-3.1%	0.1%	[c]	0.3%	0.3%	3.2%	-1.6%	-1.5%

Source:
U.S. Environmental Protection Agency, *Light-Duty Automotive Technology, Carbon Dioxide Emissions, and Fuel Economy Trends: 1975 Through 2011*, March 2012. (Additional resources: www.epa.gov/otaq/fetrends.htm)

Note: Includes light trucks of 8,500 lbs. or less.

[a] 1 liter = 61.02 cubic inches.
[b] No vehicles in this category were sold in this model year.
[c] Data are not available.

Table 4.14
Sales-Weighted Curb Weight of New Domestic and Import Cars by Size Class, Model Years 1975–2011
(pounds)

	Cars			Wagons			Non-truck SUVs		
Model year	Small	Midsize	Large	Small	Midsize	Large	Small	Midsize	Large
1975	3,440	4,630	5,142	2,834	4,791	5,453	4,000	4,362	4,500
1976	3,474	4,558	5,156	2,902	4,555	5,444	4,073	4,348	4,500
1977	3,486	4,474	4,482	2,801	4,410	4,713	4,000	4,405	4,500
1978	3,029	3,820	4,394	2,805	3,836	4,664	4,000	4,409	4,500
1979	2,936	3,710	4,210	2,711	3,758	4,467	3,127	4,385	[a]
1980	2,717	3,362	4,130	2,591	3,535	4,423	[a]	4,457	4,500
1981	2,648	3,346	4,108	2,531	3,285	4,394	[a]	4,458	[a]
1982	2,684	3,321	4,034	2,580	3,384	4,396	2,500	4,242	[a]
1983	2,734	3,316	4,041	2,565	3,348	4,380	2,500	3,550	[a]
1984	2,776	3,318	4,022	2,620	3,298	4,371	2,500	3,617	[a]
1985	2,771	3,319	3,841	2,579	3,356	4,354	[a]	3,633	[a]
1986	2,791	3,241	3,719	2,648	3,355	4,381	3,500	3,612	[a]
1987	2,803	3,247	3,696	2,795	3,434	4,348	3,500	3,606	[a]
1988	2,818	3,293	3,730	2,757	3,378	4,349	3,500	3,594	[a]
1989	2,841	3,314	3,721	2,766	3,436	4,334	3,500	3,613	[a]
1990	2,897	3,450	3,799	3,026	3,499	4,337	3,444	3,692	[a]
1991	2,886	3,412	3,893	3,005	3,506	4,403	3,241	3,873	[a]
1992	2,921	3,515	3,872	3,076	3,504	4,500	3,076	3,879	[a]
1993	2,903	3,515	3,831	2,882	3,498	4,500	3,088	3,937	[a]
1994	2,965	3,529	3,859	2,908	3,533	4,500	3,018	3,900	[a]
1995	2,988	3,546	3,830	2,859	3,482	4,500	2,617	4,049	[a]
1996	2,977	3,527	3,895	2,952	3,661	4,500	2,857	4,128	4,500
1997	2,977	3,551	3,821	2,901	3,666	[a]	2,989	4,136	4,500
1998	3,013	3,534	3,784	2,874	3,669	[a]	3,380	3,943	4,500
1999	3,085	3,540	3,854	2,923	3,691	[a]	3,214	3,953	4,461
2000	3,079	3,550	3,782	3,107	3,572	[a]	3,563	3,973	4,471
2001	3,101	3,566	3,774	3,470	3,775	[a]	3,281	4,026	4,272
2002	3,125	3,549	3,768	3,504	3,732	[a]	3,247	3,946	4,450
2003	3,169	3,567	3,841	3,262	3,745	[a]	3,056	3,941	4,403
2004	3,192	3,577	3,858	3,235	3,860	4,769	3,091	3,998	4,369
2005	3,163	3,545	3,933	3,160	3,839	4,791	3,049	3,959	4,220
2006	3,255	3,568	4,014	3,255	3,827	4,806	[a]	3,991	4,182
2007	3,238	3,581	4,026	3,264	3,727	4,785	4,408	3,908	4,289
2008	3,284	3,564	3,966	3,300	3,845	5,017	4,500	3,870	4,353
2009	3,251	3,541	3,883	3,263	3,653	5,500	4,500	3,844	4,289
2010	3,268	3,577	3,923	3,269	3,814	[a]	4,500	3,820	4,277
2011	3,304	3,601	3,833	3,281	4,409	[a]	[a]	3,807	4,293
				Average annual percentage change					
1975-2011	-0.1%	-0.7%	-0.8%	0.4%	-0.2%	0.0%[b]	0.3%[b]	-0.4%	-0.1%
2001-2011	0.6%	0.1%	0.2%	-0.6%	1.6%	[a]	3.6%[b]	-0.6%	0.0%

Source:
U.S. Environmental Protection Agency, *Light-Duty Automotive Technology, Carbon Dioxide Emissions, and Fuel Economy Trends: 1975 Through 2011*, March 2012. (Additional resources: www.epa.gov/otaq/fetrends.htm)

[a] No vehicles in this category were sold in this model year.
[b] 1996–2010.

The interior space of new small and midsize cars in 2010 was about the same as in the late 1990's; large cars, however, had smaller interior space.

Table 4.15
Sales-Weighted Interior Space of New Domestic and Import Cars by Size Class, Model Years 1977–2011
(cubic feet)

	Cars			Wagons			Non-truck SUVs		
Model year	Small	Midsize	Large	Small	Midsize	Large	Small	Midsize	Large
1975	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1976	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1977	95.4	112.9	128.1	108.0	143.6	163.1	100.0	125.0	150.0
1978	90.9	113.0	128.5	108.0	140.0	162.4	100.0	125.0	150.0
1979	89.2	113.1	130.0	105.1	139.7	162.5	100.0	125.0	[a]
1980	90.0	113.2	130.9	108.2	139.7	161.5	[a]	125.0	150.0
1981	91.6	113.9	131.0	110.6	136.2	161.4	[a]	125.0	[a]
1982	92.2	113.9	131.0	112.2	136.1	161.3	100.0	125.0	[a]
1983	95.1	113.8	131.3	108.2	136.2	161.6	100.0	125.0	[a]
1984	95.2	113.7	130.9	116.5	135.9	161.7	100.0	125.0	[a]
1985	95.8	113.6	129.3	117.7	134.8	161.7	[a]	125.0	[a]
1986	96.7	113.8	127.4	118.4	137.8	161.4	100.0	125.0	[a]
1987	96.9	113.7	127.0	120.0	140.2	161.8	100.0	125.0	[a]
1988	98.5	113.4	128.1	118.7	139.4	161.7	100.0	125.0	[a]
1989	98.3	113.6	127.4	118.6	139.9	161.8	100.0	125.0	[a]
1990	97.6	113.7	126.7	122.2	141.6	161.6	100.0	125.0	[a]
1991	97.6	113.5	129.0	123.3	142.3	169.1	100.0	125.0	[a]
1992	97.9	113.9	129.6	123.7	142.6	170.3	100.0	125.0	[a]
1993	98.3	113.9	128.9	123.0	137.7	169.3	100.0	125.0	[a]
1994	98.7	113.5	128.3	122.9	137.4	169.2	100.0	125.0	[a]
1995	99.6	114.3	127.9	122.1	135.9	169.3	100.0	125.0	[a]
1996	99.9	114.1	128.1	118.0	136.9	170.2	100.0	125.0	150.0
1997	99.2	114.5	127.4	119.5	136.5	[a]	100.0	125.0	150.0
1998	98.8	114.0	127.4	116.9	135.3	[a]	100.0	125.0	150.0
1999	98.9	114.0	127.0	117.9	136.4	[a]	100.0	125.0	150.0
2000	99.4	113.6	124.9	119.7	134.0	[a]	100.0	125.0	150.0
2001	99.2	113.7	124.8	119.6	133.6	[a]	100.0	125.0	150.0
2002	99.9	114.8	124.3	118.2	133.6	[a]	100.0	125.0	150.0
2003	99.4	114.6	124.8	115.2	133.5	[a]	100.0	125.0	150.0
2004	99.0	114.0	124.7	117.5	135.0	165.0	100.0	125.0	150.0
2005	99.1	114.5	125.0	115.9	133.3	165.0	100.0	125.0	150.0
2006	98.8	114.0	124.7	118.4	135.6	164.4	[a]	125.0	150.0
2007	99.3	113.8	123.8	112.0	135.4	159.2	100.0	125.0	150.0
2008	98.3	113.3	123.2	115.0	134.6	160.1	100.0	125.0	150.0
2009	99.8	113.8	122.6	114.8	133.7	161.7	100.0	125.0	150.0
2010	101.6	114.3	122.8	117.9	135.1	[a]	100.0	125.1	141.1
2011	98.9	113.5	121.9	116.5	136.2	[a]	[a]	125.1	150.0
				Average annual percentage change					
1975–2011	0.1%	0.0%	-0.1%	0.2%	-0.2%	0.0%	0.0%	0.0%	0.0%
2001–2011	0.0%	0.0%	-0.2%	-0.3%	0.2%	[a]	0.0%	0.0%	0.0%

Source:
U.S. Environmental Protection Agency, *Light-Duty Automotive Technology, Carbon Dioxide Emissions, and Fuel Economy Trends: 1975 Through 2011*, March 2012. (Additional resources: www.epa.gov/otaq/fetrends.htm)

[a] No vehicles in this category were sold in this model year.

The average light vehicle in 2009 contained more than 2,000 pounds of steel, most of it conventional steel. High and medium strength steel, however, made up more than 10% of the vehicle. The use of aluminum grew from 1995 to 2009, while the use of iron castings declined.

Table 4.16
Average Material Consumption for a Domestic Light Vehicle, Model Years 1995, 2000, and 2010

	1995		2000		2010	
Material	Pounds	Percentage	Pounds	Percentage	Pounds	Percentage
Regular steel	1,630.0	44.1%	1,655.0	42.4%	1,542.0	39.4%
High and medium strength steel	324.0	8.8%	408.0	10.5%	559.0	14.3%
Stainless steel	51.0	1.4%	62.0	1.6%	73.0	1.9%
Other steels	46.0	1.2%	26.0	0.7%	33.0	0.8%
Iron castings	466.0	12.6%	432.0	11.1%	237.0	6.1%
Aluminum	231.0	6.3%	268.0	6.9%	344.0	8.8%
Magnesium castings	4.0	0.1%	8.0	0.2%	13.0	0.3%
Copper and brass	50.0	1.4%	52.0	1.3%	65.0	1.7%
Lead	33.0	0.9%	36.0	0.9%	40.0	1.0%
Zinc castings	19.0	0.5%	13.0	0.3%	9.0	0.2%
Powder metal parts	29.0	0.8%	36.0	0.9%	41.0	1.0%
Other metals	4.0	0.1%	4.0	0.1%	6.0	0.2%
Plastics and plastic composites	240.0	6.5%	286.0	7.3%	378.0	9.7%
Rubber	149.0	4.0%	166.0	4.3%	200.0	5.1%
Coatings	23.0	0.6%	25.0	0.6%	34.0	0.9%
Textiles	42.0	1.10%	44.0	1.10%	54.0	1.4%
Fluids and lubricants	192.0	5.20%	207.0	5.30%	226.0	5.8%
Glass	97.0	2.60%	103.0	2.60%	94.0	2.4%
Other materials	64.0	1.70%	71.0	1.80%	92.0	2.3%
Total	3,694.0	100.0%	3,902.0	100.0%	4,040.0	100.0%

Source:
Ward's Communications, *Ward's Motor Vehicle Facts and Figures, 2010*, Detroit, MI, 2010, p. 65 and updates.

The number of franchised dealerships which sell new light-duty vehicles (cars and light trucks) has declined about 40% since 1970. The average number of vehicles sold per dealer in 2010 was 638 vehicles per dealer, down from a high of 779 vehicles per dealer in 2004.

Table 4.17
New Light Vehicle Dealerships and Sales, 1970–2010

Calendar year	Number of franchised new light vehicle dealerships[a]	New light vehicle sales (thousands)	Light vehicle sales per dealer
1970	30,800	9,862	320
1975	29,600	10,905	368
1976	29,300	13,066	446
1977	29,100	14,613	502
1978	29,000	15,122	521
1979	28,500	13,984	491
1980	27,900	11,389	408
1981	26,350	10,678	405
1982	25,700	10,426	406
1983	24,725	12,132	491
1984	24,725	14,187	574
1985	24,725	15,437	624
1986	24,825	15,998	644
1987	25,150	14,802	589
1988	25,025	15,347	613
1989	25,000	14,389	576
1990	24,825	13,851	558
1991	24,200	12,312	509
1992	23,500	12,842	546
1993	22,950	13,869	604
1994	22,850	15,024	658
1995	22,800	14,688	644
1996	22,750	15,046	661
1997	22,700	15,069	664
1998	22,600	15,441	683
1999	22,400	16,771	749
2000	22,250	17,234	775
2001	22,150	17,472	789
2002	21,800	17,139	786
2003	21,725	16,967	781
2004	21,650	17,299	799
2005	21,640	17,444	806
2006	21,495	17,049	793
2007	21,200	16,460	776
2008	20,770	13,493	650
2009	20,010	10,601	530
2010	18,460	11,772	638
	Average annual percentage change		
1970–2010	-1.3%	0.4%	1.7%
2000–2010	-1.9%	-3.7%	-1.9%

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

[a] As of the beginning of the year.

The number of conventional refueling stations fell below 160,000 for the first time in the series history. The number of vehicles fueling at those stations fell in 2009 for the first time in several years but rose slightly in 2010. In 2010, there were 0.66 fueling stations per thousand vehicles or 1.51 thousand vehicles per station.

Table 4.18
Conventional Refueling Stations, 1993-2010

Year	Number of retail outlets	Vehicles in operation (thousands)	Stations per thousand vehicles	Thousand vehicles per station
	Conventional fuels			
1993	207,416	186,315	1.11	0.90
1994	202,878	188,714	1.08	0.93
1995	195,455	193,441	1.01	0.99
1996	190,246	198,294	0.96	1.04
1997	187,892	201,071	0.93	1.07
1998	182,596	205,043	0.89	1.12
1999	180,567	209,509	0.86	1.16
2000	175,941	213,299	0.82	1.21
2001	172,169	216,683	0.79	1.26
2002	170,018	221,027	0.77	1.30
2003	167,571	225,882	0.74	1.35
2004	167,346	232,167	0.72	1.39
2005	168,987	238,384	0.71	1.41
2006	167,476	244,643	0.69	1.46
2007	164,292	248,701	0.66	1.51
2008	161,068	250,239	0.64	1.55
2009	162,350	239,062	0.68	1.47
2010	159,006	239,812	0.66	1.51

Sources:
Conventional refueling stations: National Petroleum News Survey, 2011.
Conventional vehicles: The Polk Company, Detroit, MI, **FURTHER REPRODUCTION PROHIBITED**.

Notes: The County Business Patterns (CBP) data published by the Bureau of the Census tells the number of establishments by North American Industry Classification System (NAICS). NAICS is an industry classification system that groups establishments into industries based on the activities in which they are primarily engaged. NAICS 447 represents gasoline stations. However, the CBP gasoline station data differ from the National Petroleum News Survey data by as much as 30% (117,189 stations in 2005); the CBP may not include every gasoline retail outlet due to the classification of the primary activity of the business.

Alternative Fuel Refueling Stations are listed in Chapter 6.

The National Highway Traffic Safety Administration and the Environmental Protection Agency issued joint rulemaking to establish a new National Program to regulate fuel economy and greenhouse gas emissions for model year 2012-2016 cars and light trucks.

Table 4.19
Fuel Economy and Carbon Dioxide Emissions Standards, MY 2012-2016

Year	Cars	Light trucks	Combined cars and light trucks
	Average required fuel economy (miles per gallon)		
2012	33.3	25.4	29.7
2013	34.2	26.0	30.5
2014	34.9	26.6	31.3
2015	36.2	27.5	32.6
2016	37.8	28.8	34.1
	Average projected emissions compliance levels under the footprint-based carbon dioxide standards (grams per mile)		
2012	263	346	295
2013	256	337	286
2014	247	326	276
2015	236	312	263
2016	225	298	250

Source:
Federal Register, Vol. 75, No. 88, May 7, 2010. (Additional resources: www.nhtsa.dot.gov/fuel-economy)

Note: The required fuel economy, along with projections of CO_2 emissions, are shown here.

The target levels for the proposed fuel economy and carbon dioxide emission standards for vehicles manufactured in model years 2012-2016 are assigned based on a vehicle's "footprint." Each footprint has a different target. The vehicle footprint is calculated as:

$$footprint = track\ width \times wheelbase,$$

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 4.20
Fuel Economy and Carbon Dioxide Targets for Model Year 2016

Vehicle type	Example models	Example model footprint (square feet)	CO_2 emissions target (grams per mile)	Fuel economy target (miles per gallon)
		Example Passenger Cars		
Compact car	Honda Fit	40	214	41.4
Midsize car	Ford Fusion	46	237	37.3
Fullsize car	Chrysler 300	53	270	32.8
		Example Light-Duty Trucks		
Small SUV	4WD Ford Escape	44	269	32.8
Midsize crossover	Nissan Murano	49	289	30.6
Minivan	Toyota Sienna	55	313	28.2
Large pickup truck	Chevy Silverado	67	358	24.7

Source:
Federal Register, Vol. 75, No. 88, May 7, 2010. (Additional resources: www.nhtsa.gov/fuel-economy)

Note: Examples use model year 2008 vehicle specifications.

The Corporate Average Fuel Economy standards were established by the U.S. Energy Policy and Conservation Act of 1975 (PL94-163). These standards must be met at the manufacturer level. Some manufacturers fall short of meeting the standards while others exceed them. Legislation passed in December 2007 changed the CAFE standards beginning in the 2011 model year (MY). Some two-wheel drive sport utility vehicles are classified as cars under the final standards for MY 2011-2016.

Table 4.21
Car Corporate Average Fuel Economy (CAFE) Standards versus Sales-Weighted Fuel Economy Estimates, 1978–2011[a]
(miles per gallon)

Model year[b]	Cars				CAFE estimates
	CAFE standards	CAFE estimates[c]			Cars and light trucks combined
		Domestic	Import	Combined	
1978	18.0	18.7	27.3	19.9	19.9
1979	19.0	19.3	26.1	20.3	20.1
1980	20.0	22.6	29.6	24.3	23.1
1981	22.0	24.2	31.5	25.9	24.6
1982	24.0	25.0	31.1	26.6	25.1
1983	26.0	24.4	32.4	26.4	24.8
1984	27.0	25.5	32.0	26.9	25.0
1985	27.5	26.3	31.5	27.6	25.4
1986	26.0	26.9	31.6	28.2	25.9
1987	26.0	27.0	31.2	28.5	26.2
1988	26.0	27.4	31.5	28.8	26.0
1989	26.5	27.2	30.8	28.4	25.6
1990	27.5	26.9	29.9	28.0	25.4
1991	27.5	27.3	30.1	28.4	25.6
1992	27.5	27.0	29.2	27.9	25.1
1993	27.5	27.8	29.6	28.4	25.2
1994	27.5	27.5	29.6	28.3	24.7
1995	27.5	27.7	30.3	28.6	24.9
1996	27.5	28.1	29.6	28.5	24.9
1997	27.5	27.8	30.1	28.7	24.6
1998	27.5	28.6	29.2	28.8	24.7
1999	27.5	28.0	29.0	28.3	24.5
2000	27.5	28.7	28.3	28.5	24.8
2001	27.5	28.7	29.0	28.8	24.5
2002	27.5	29.1	28.8	29.0	24.7
2003	27.5	29.1	29.9	29.5	25.1
2004	27.5	29.9	28.7	29.5	24.6
2005	27.5	30.5	29.9	30.3	25.4
2006	27.5	30.3	29.7	30.1	25.8
2007	27.5	30.6	32.2	31.2	26.6
2008	27.5	31.2	31.8	31.5	27.1
2009	27.5	32.1	33.8	32.9	29.0
2010	27.5	33.1	35.2	33.9	29.3
2011	30.1[d]	32.5	35.3	33.8	29.6

Source:
U.S. Department of Transportation, NHTSA, "Summary of Fuel Economy Performance," Washington, DC, October 2011. (Additional resources: www.nhtsa.dot.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] Projected 2011 required average fuel economy standards value based on pre-model year reports.

The Corporate Average Fuel Economy standards for light trucks are lower than the car standards. Light trucks include pickups, minivans, sport utility vehicles and vans. New legislation passed in December 2007 changed the CAFE standards beginning in the 2011 model year (MY). Some two-wheel drive sport utility vehicles are classified as cars under the final standards for MY 2011-2016.

Table 4.22
Light Truck Corporate Average Fuel Economy (CAFE) Standards versus Sales-Weighted Fuel Economy Estimates, 1978–2011[a]
(miles per gallon)

Model year[c]	Light trucks[b]				CAFE estimates
	CAFE standards	CAFE estimates[d]			Cars and light 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
1986	20.0	20.0	25.9	21.5	25.9
1987	20.5	20.5	25.2	21.7	26.2
1988	20.5	20.6	24.6	21.3	26.0
1989	20.5	20.4	23.5	21.0	25.6
1990	20.0	20.3	23.0	20.8	25.4
1991	20.2	20.9	23.0	21.3	25.6
1992	20.2	20.5	22.7	20.8	25.1
1993	20.4	20.7	22.8	21.0	25.2
1994	20.5	20.5	22.1	20.8	24.7
1995	20.6	20.3	21.5	20.5	24.9
1996	20.7	20.5	22.2	20.8	24.9
1997	20.7	20.1	22.1	20.6	24.6
1998	20.7	20.5	23.0	21.0	24.7
1999	20.7	20.4	22.5	20.9	24.5
2000	20.7	21.1	19.7	21.3	24.8
2001	20.7	20.6	21.8	20.9	24.5
2002	20.7	20.6	21.9	21.4	24.7
2003	20.7	21.8	22.4	21.8	25.1
2004	20.7	20.7	22.3	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	22.5[g]	[f]	[f]	23.6	27.1
2009	23.1[g]	[f]	[f]	24.8	29.0
2010	23.5[g]	[f]	[f]	25.2	29.3
2011	24.2[h]	[f]	[f]	24.5	29.6

Source:
U.S. Department of Transportation, NHTSA, "Summary of Fuel Economy Performance," Washington, DC, October 2011. (Additional resources: www.nhtsa.dot.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 trucks, but no combined standard was set in this year.

[f] Data are not available.

[g] Unreformed standards. See Table 4.18 for reformed standards.

[h] Projected 2011 required average fuel economy standards value based on pre-model year reports.

Manufacturers of cars and light trucks whose vehicles do not meet the CAFE standards are fined. Data from the National Highway Traffic Safety Administration show CAFE fine collection dropped under $25 million in 2002 and 2003; this was due to several factors, including the CAFE credit system, manufacturer mergers, and fines not being paid in the same year they were assessed. Fines for recent model years are still being collected.

Table 4.23
Corporate Average Fuel Economy (CAFE) Fines Collected, 1983-2010[a]
(thousands)

Model year	Current dollars	2010 constant dollars[b]
1983	$58	$126,915
1984	$5,958	$12,504,158
1985	$15,565	$31,542,206
1986	$29,872	$59,431,829
1987	$31,261	$60,004,807
1988	$43,471	$80,126,908
1989	$48,549	$85,374,938
1990	$48,309	$80,596,659
1991	$42,243	$67,631,029
1992	$38,287	$59,505,454
1993	$28,688	$43,291,857
1994	$31,499	$46,345,831
1995	$40,787	$58,359,309
1996	$19,302	$26,825,377
1997	$36,212	$49,197,577
1998	$21,740	$29,082,749
1999	$27,516	$36,015,169
2000	$51,067	$64,665,935
2001	$35,507	$43,718,826
2002	$20,042	$24,292,254
2003	$15,225	$18,043,445
2004	$30,412	$35,105,961
2005	$25,057	$27,976,736
2006	$40,934	$44,275,269
2007	$37,386	$39,317,788
2008	$11,620	$11,768,273
2009	$9,148	$9,298,484
2010	$23,803	$23,803,412

Source:
U.S. Department of Transportation, National Highway Traffic Safety Administration, Office of Vehicle Safety Compliance, Washington, DC, January 2012. (Additional resources: www.nhtsa.dot.gov)

[a] These are fines which are actually collected. 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 trucks such as pickups, minivans, sport utility vehicles, and vans.

Table 4.24
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. 10-05), "Gas Guzzler Tax." (Additional resources: www.irs.ustreas.gov)

Consumers who purchased these 2011 model year vehicles paid the Gas Guzzler tax.

Table 4.25
List of Model Year 2011 Cars with Gas Guzzler Taxes

Make	Model(s)	Size class	Combined city/highway fuel economy[a]
Aston Martin	DB9	Minicompact cars	13
Aston Martin	DBS	Minicompact cars	13
Aston Martin	Rapide	Subcompact cars	15
Aston Martin	V8 Vantage	Two seaters	15
Aston Martin	V12 Vantage	Two seaters	13
Audi	R8/R8 Spyder	Two seaters	15
Audi	R8/R8 Spyder	Two seaters	14
Audi	S5	Subcompact cars	17
Audi	S6	Midsize cars	16
Bentley	Continental Flying Spur	Midsize cars	13
Bentley	Continental GTC	Subcompact cars	13
Bentley	Continental Supersports/Supersports Convertible	Two seaters	14
Bentley	Mulsanne	Midsize cars	13
BMW	550i Gran Turismo	Large cars	18
BMW	750i/Li xDrive	Large cars	17
BMW	750Li	Large cars	17
BMW	760 Li	Large cars	15
BMW	Alpina B7 SWB/LWB x Drive	Large cars	16
BMW	Alpina B7 SWB/LWB	Large cars	17
BMW	M3 Sedan/Coupe/Convertible	Subcompact cars	16
Bugatti	Veyron	Two seaters	10
Cadillac	CTS/CTS Wagon	Midsize cars	16
Cadillac	Funeral Coach/Hearse	Large cars	14
Cadillac	Limousine	Large cars	14
Chevrolet	Corvette	Two seaters	16
Dodge	Challenger SRT8	Compact cars	17
Lamborghini	Gallardo Coupe/Spyder	Two seaters	16
Maserati	Gran Turismo/Gran Turismo Convertible	Subcompact cars	15
Maserati	Quattroporte	Large cars	14
Mercedes-Benz	C63 AMG	Compact cars	15
Mercedes-Benz	CL600	Compact cars	14
Mercedes-Benz	CL63/CL65 AMG	Compact cars	17
Mercedes-Benz	CLS550	Compact cars	16
Mercedes-Benz	E63 AMG	Midsize cars	15
Mercedes-Benz	S550 4matic	Large cars	17
Mercedes-Benz	S600	Large cars	14
Mercedes-Benz	S65 AMG	Large cars	14
Mercedes-Benz	SL550	Two seaters	17
Mercedes-Benz	SL63/SL65 AMG	Two seaters	14
Mercedes-Benz	SLS AMG	Two seaters	16
Porsche	911 GT3/GT3 RS	Two seaters	16
Rolls-Royce	Ghost	Large cars	15
Rolls-Royce	Phantom Coupe/Phantom Drophead Coupe	Compact cars	14
Rolls-Royce	Phantom/Phantom EWB	Large cars	14

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

[a] Tax based on unadjusted combined fuel economy; data shown here are adjusted combined fuel economy.

Consumers continue to demand gas guzzling cars though fewer gas guzzlers were bought in model year 2010 than in the previous seven years. The IRS collected over $85 million in 2010 from those buying cars with combined city/highway fuel economy less than 22.5 miles per gallon. This tax does not apply to light trucks such as pickups, minivans, sport utility vehicles, and vans. It is worthy to note that total revenue from fines paid by consumers to purchase gas-guzzling vehicles greatly exceeds the overall fines paid by manufacturers whose vehicles fail to meet CAFE standards (see Table 4.23).

Table 4.26
Tax Receipts from the Sale of Gas Guzzlers, 1980–2010
(thousands)

Model year	Current dollars	2010 constant dollars[a]
1980	740	1,958
1981	780	1,871
1982	1,720	3,887
1983	4,020	8,801
1984	8,820	18,511
1985	39,790	80,636
1986	147,660	293,779
1987	145,900	280,056
1988	116,780	215,254
1989	109,640	192,804
1990	103,200	172,176
1991	118,400	189,558
1992	144,200	224,117
1993	111,600	168,409
1994	64,100	94,314
1995	73,500	105,165
1996	52,600	73,102
1997	48,200	65,485
1998	47,700	63,811
1999	68,300	89,395
2000	70,800	89,654
2001	78,200	96,284
2002	79,700	96,604
2003	126,700	150,151
2004	140,800	162,532
2005	163,800	182,886
2006	200,200	216,542
2007	178,700	187,934
2008	172,428	174,633
2009	99,300	100,929
2010	85,226	85,226

Source:
Ward's Communications, Detroit, MI, 2012. Original data source: Internal Revenue Service. (Additional resources: www.epa.gov/fueleconomy/guzzler)

[a] Adjusted using the Consumer Price Inflation Index.

The Powertrain System Analysis Toolkit (PSAT) provides vehicle simulations for a variety of research purposes. It is used by the Department of Energy to evaluate the fuel efficiency potential of advanced powertrain configurations for different driving conditions. Recently, PSAT was used to develop data on the relationship between speed and fuel economy.

Table 4.27
Fuel Economy by Speed, PSAT Model Results

	Gasoline conventional			Diesel conventional			Hybrid vehicles			
Speed (mph)	Midsize car	Small SUV	Large SUV	Midsize car	Small SUV	Large SUV	2000 Insight[a]	2004 Prius	2007 Camry[a]	2008 Tahoe[a]
45	39.1	32.5	29.5	56.4	47.7	43.6	101.3	72.0	52.2	32.2
55	41.7	34.3	30.0	57.0	46.0	39.9	94.3	66.0	46.8	27.1
65	36.9	29.1	23.0	47.9	37.6	32.5	80.0	57.0	40.9	23.7
75	31.9	24.5	19.8	40.2	30.8	26.9	60.6	42.0	35.0	21.1
				Fuel economy loss						
55 - 65 mph	11.5%	15.2%	23.5%	16.0%	18.3%	18.5%	15.2%	13.6%	12.6%	12.4%
65 - 75 mph	13.6%	15.8%	13.8%	16.2%	18.1%	17.2%	24.3%	26.3%	14.5%	11.1%
55 - 75 mph	23.5%	28.6%	34.0%	29.6%	33.1%	32.6%	35.8%	36.4%	25.3%	22.1%

Source:
Argonne National Laboratory, Powertrain System Analysis Toolkit, July 16, 2009, www.transportation.anl.gov/modeling_simulation/PSAT/. (Additional resources: www.transportation.anl.gov)

[a] From Argonne National Laboratory Advanced Powertrain Research Facility (Vehicle Test Data).

The two earlier studies by the Federal Highway Administration (FHWA) indicate maximum fuel efficiency was achieved at speeds of 35 to 40 mph. The recent FHWA study indicates greater fuel efficiency at higher speeds. Note that the 1973 study did not include light trucks.

Table 4.28
Fuel Economy by Speed, 1973, 1984, and 1997 Studies
(miles per gallon)

Speed (miles per hour)	1973[a] (13 vehicles)	1984[b] (15 vehicles)	1997[c] (9 vehicles)
15	[d]	21.1	24.4
20	[d]	25.5	27.9
25	[d]	30.0	30.5
30	21.1	31.8	31.7
35	21.1	33.6	31.2
40	21.1	33.6	31.0
45	20.3	33.5	31.6
50	19.5	31.9	32.4
55	18.5	30.3	32.4
60	17.5	27.6	31.4
65	16.2	24.9	29.2
70	14.9	22.5	26.8
75	[d]	20.0	24.8
	Fuel economy loss		
55–65 mph	12.4%	17.8%	9.7%
65–70 mph	8.0%	9.6%	8.2%
55–70 mph	19.5%	25.7%	17.1%

Sources:

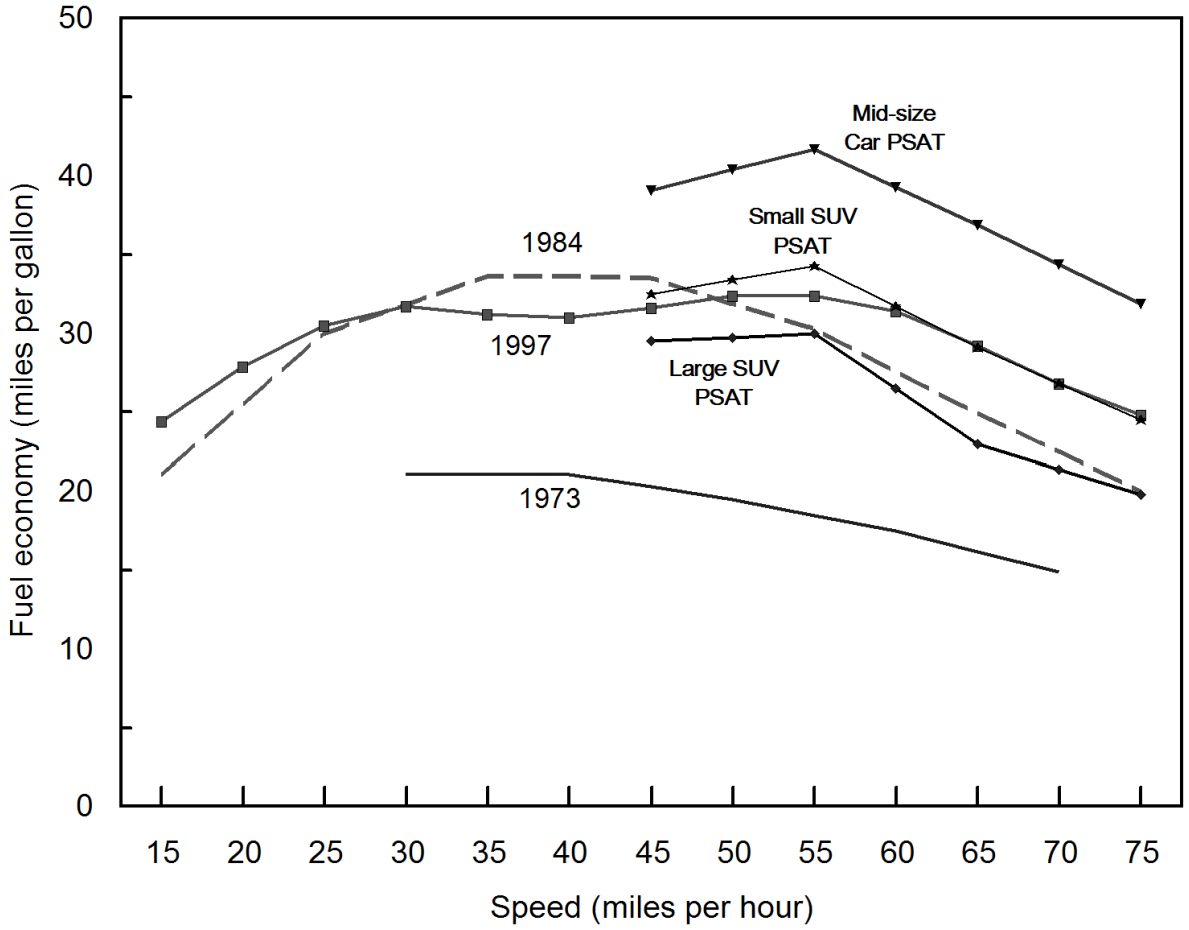
1973- U.S. Department of Transportation, Federal Highway Administration, Office of Highway Planning, *The Effect of Speed on Automobile Gasoline Consumption Rates*, Washington, DC, October 1973.

1984 - U.S. Department of Transportation, Federal Highway Administration, *Fuel Consumption and Emission Values for Traffic Models*, Washington, DC, May 1985.

1997 - West, B.H., R.N. McGill, J.W. Hodgson, S.S. Sluder, and D.E. Smith, *Development and Verification of Light-Duty Modal Emissions and Fuel Consumption Values for Traffic Models*, FHWA-RD-99-068, U.S. Department of Transportation, Federal Highway Administration, Washington, DC, March 1999.

[a] Model years 1970 and earlier cars.
[b] Model years 1981–84 cars and light trucks.
[c] Model years 1988–97 cars and light trucks as shown in Table 4.29.
[d] Data are not available.

Figure 4.2. Fuel Economy by Speed, 1973, 1984, and 1997 Studies



Source:
See Tables 4.27 and 4.28.

Of the tested vehicles, the 1994 Oldsmobile Olds 88 had the greatest fuel economy loss from 55 mph to 75 mpg. The 1997 Toyota Celica tested fuel economy was slightly better at 65 mph than at 55 mph.

Table 4.29
Steady Speed Fuel Economy for Vehicles Tested in the 1997 Study
(miles per gallon)

Speed (mph)	1988 Chevrolet Corsica	1993 Subaru Legacy	1994 Oldsmobile Olds 88	1994 Oldsmobile Cutlass	1994 Chevrolet Pickup	1994 Jeep Grand Cherokee	1994 Mercury Villager	1995 Geo Prizm	1997 Toyota Celica
5	10.0	14.5	10.5	5.1	7.9	8.2	12.3	18.1	19.1
10	16.8	24.7	14.9	7.9	16.0	11.2	19.0	23.1	34.1
15	17.7	31.9	22.2	11.4	16.3	17.5	22.4	38.9	41.7
20	21.7	34.4	26.3	12.5	19.9	24.7	25.8	39.4	46.0
25	23.9	37.4	28.3	15.6	22.7	21.8	30.8	41.7	52.6
30	28.7	39.7	29.0	19.0	26.3	21.6	30.3	40.0	50.8
35	28.6	38.0	30.9	21.2	24.3	25.0	26.1	39.1	47.6
40	29.2	37.0	33.2	23.0	26.7	25.5	29.0	38.9	36.2
45	28.8	33.7	32.4	23.0	27.3	25.4	27.8	42.3	44.1
50	31.2	33.7	34.2	27.3	26.3	24.8	30.1	39.1	44.8
55	29.1	37.7	34.6	29.1	25.1	24.0	31.7	37.7	42.5
60	28.2	35.9	32.5	28.2	22.6	23.2	27.3	36.7	48.4
65	28.7	33.4	30.0	25.0	21.8	21.3	25.3	34.1	43.5
70	26.1	31.0	26.7	22.9	20.1	20.0	23.9	31.7	39.2
75	23.7	28.8	24.0	21.6	18.1	19.1	22.4	28.3	36.8
				Fuel economy loss					
55–65 mph	1.4%	11.4%	13.3%	14.1%	13.1%	11.3%	20.2%	9.5%	-2.4%
65–75 mph	17.4%	13.8%	20.0%	13.6%	17.0%	10.3%	11.5%	17.0%	15.4%
55–75 mph	18.6%	23.6%	30.6%	25.8%	27.9%	20.4%	29.3%	24.9%	13.4%

Source:
B.H. West, R.N. McGill, J.W. Hodgson, S.S. Sluder, D.E. Smith, *Development and Verification of Light-Duty Modal Emissions and Fuel Consumption Values for Traffic Models*, Washington, DC, April 1997, and additional project data, April 1998.

Note: For specifications of the tested vehicles, please see Table 4.28.

This table shows 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 4.30
Driving Cycle Attributes

	Test schedule				
	City	Highway	High speed	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	20 mph	48 mph	48 mph	22 mph	20 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 mi.	8 mi.	3.6 mi.	11 mi.
Time	31 min.	12.5 min.	10 min.	9.9 min.	31 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 Web site, www.fueleconomy.gov.

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

These driving cycles simulate the performance of an engine while driving in the city and on the highway. Once the city cycle is completed, the engine is stopped, and then started again for the 8.5 minute hot start cycle. Three additional cycles also influence new vehicle fuel economy ratings beginning with the 2008 model year.

Figure 4.3. City Driving Cycle

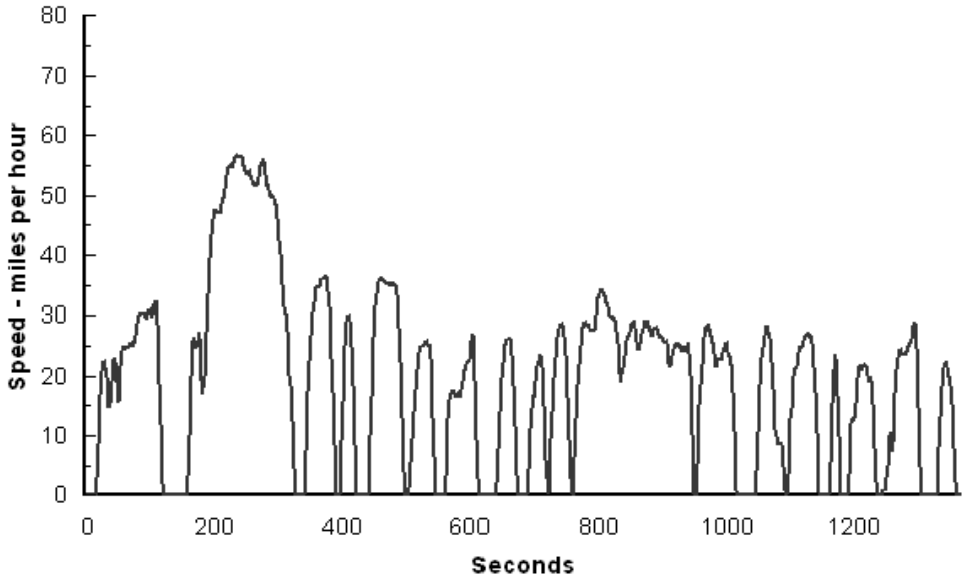
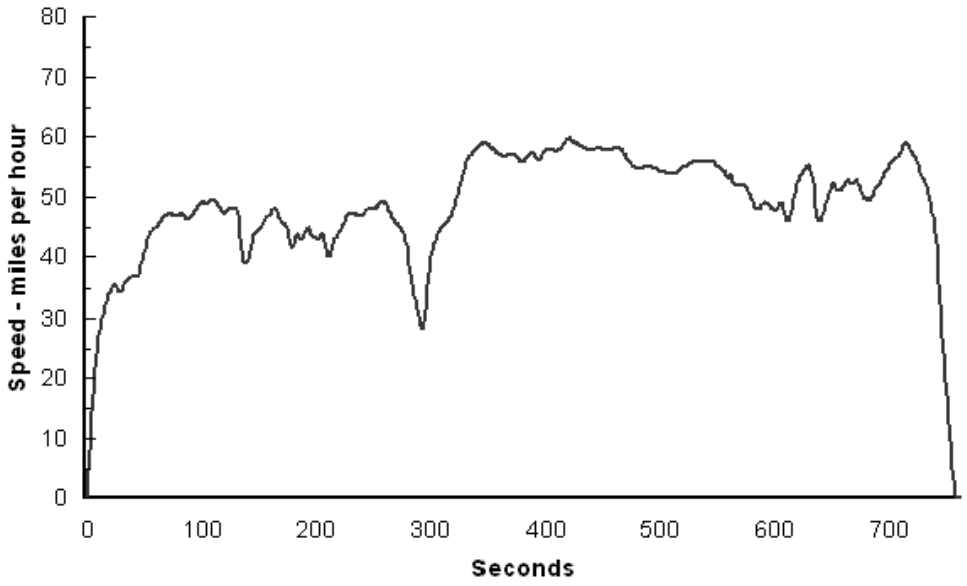


Figure 4.4. Highway Driving Cycle

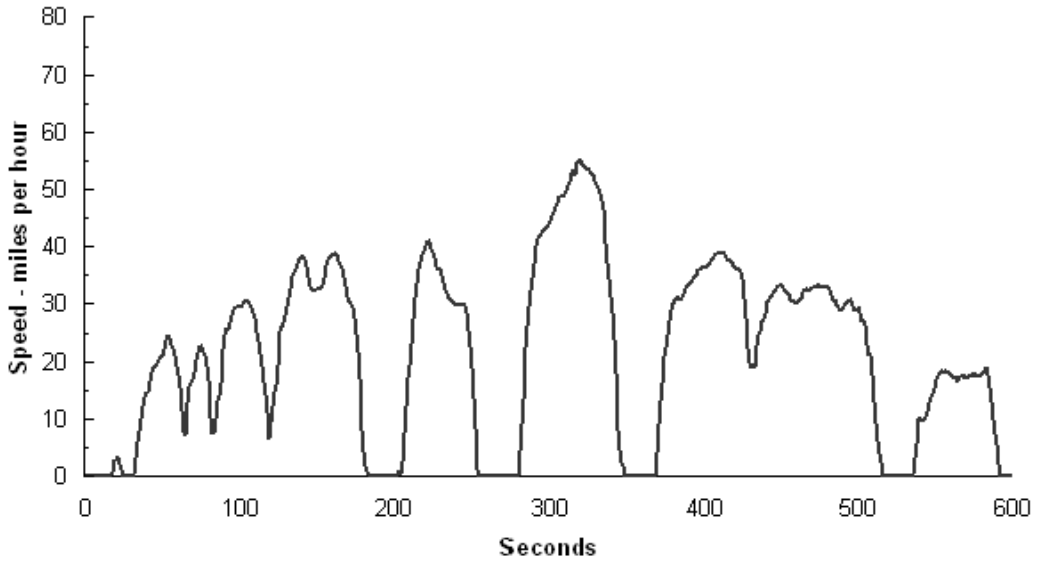


Source:

Code of Federal Regulations, 40CFR, "Subpart B - Fuel Economy Regulations for 1978 and Later Model Year Automobiles - Test Procedures," July 1, 1988 edition, p. 676.

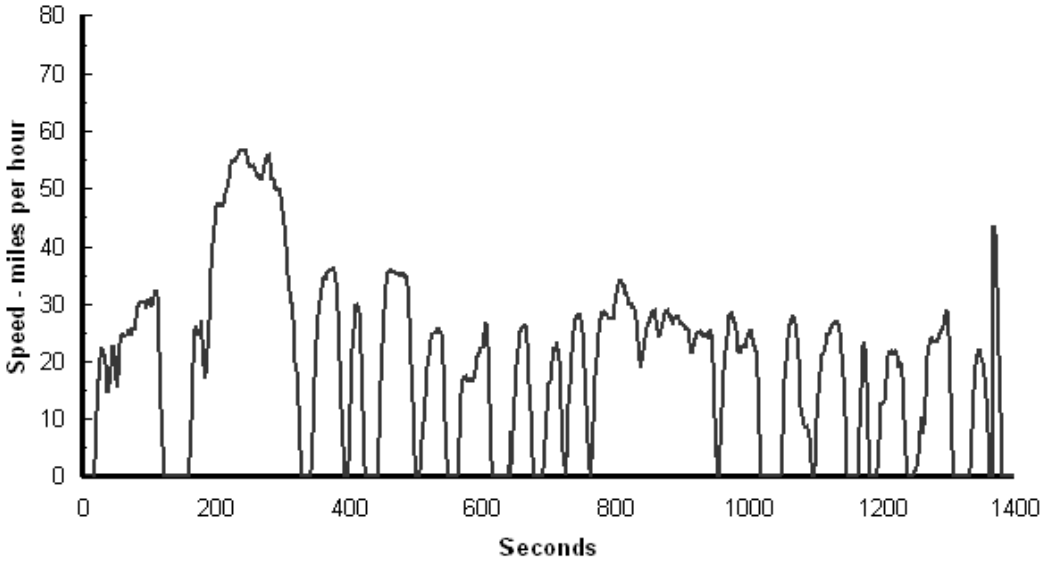
Beginning with the 2008 model year, these cycles influence the new vehicle fuel economy ratings.

Figure 4.5. Air Conditioning (SC03) Driving Cycle



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

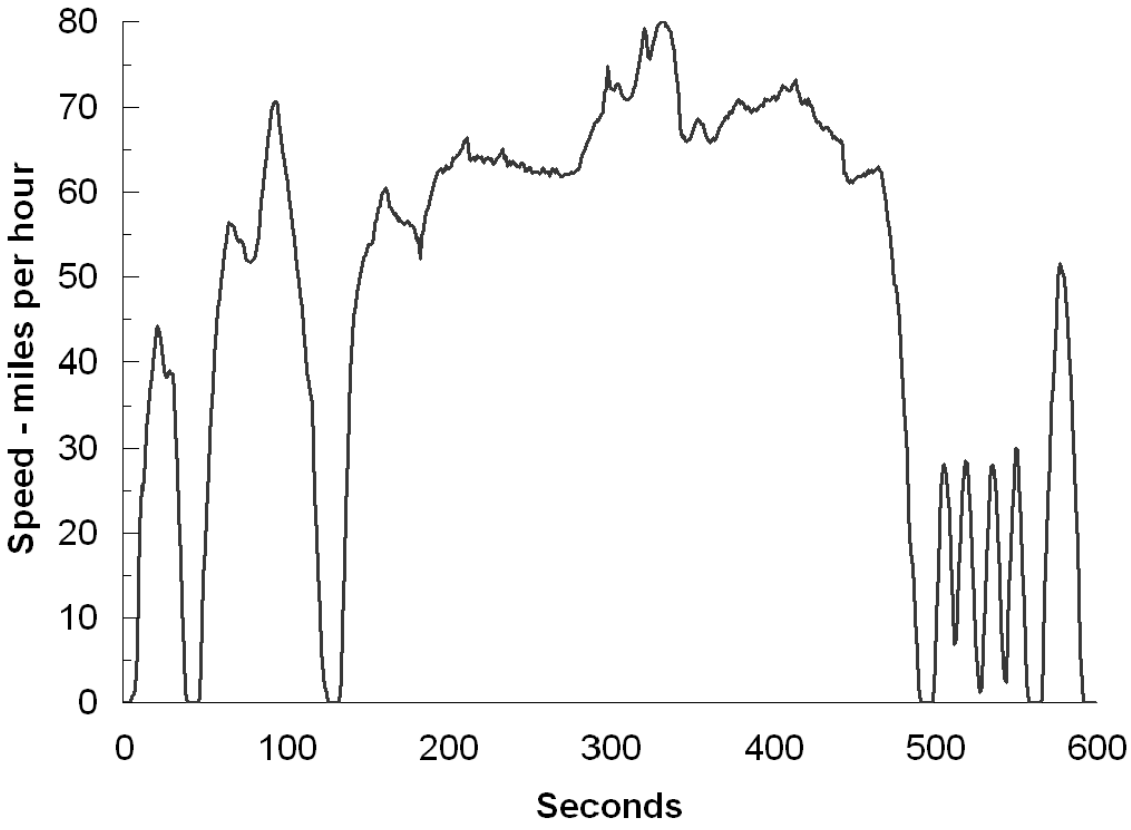
Figure 4.6. Cold Temperature (Cold FTP) Driving Cycle



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

Beginning with the 2008 model year, this cycle influences the new vehicle fuel economy ratings. The US06 driving cycle was originally developed as a supplement to the Federal Test Procedure. It is a short-duration cycle (600 seconds) which represents hard-acceleration driving.

Figure 4.7. High-Speed (US06) Driving Cycle



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

The Environmental Protection Agency also uses other driving cycles to test new vehicles (although these do not affect the fuel economy ratings). The New York Test Cycle was developed in the 1970's in order to simulate driving in downtown congested areas. The Representative Number Five Test Cycle was developed in the 1990's to better represent actual on-road driving by combining modern city and freeway driving.

Figure 4.8. New York City Driving Cycle

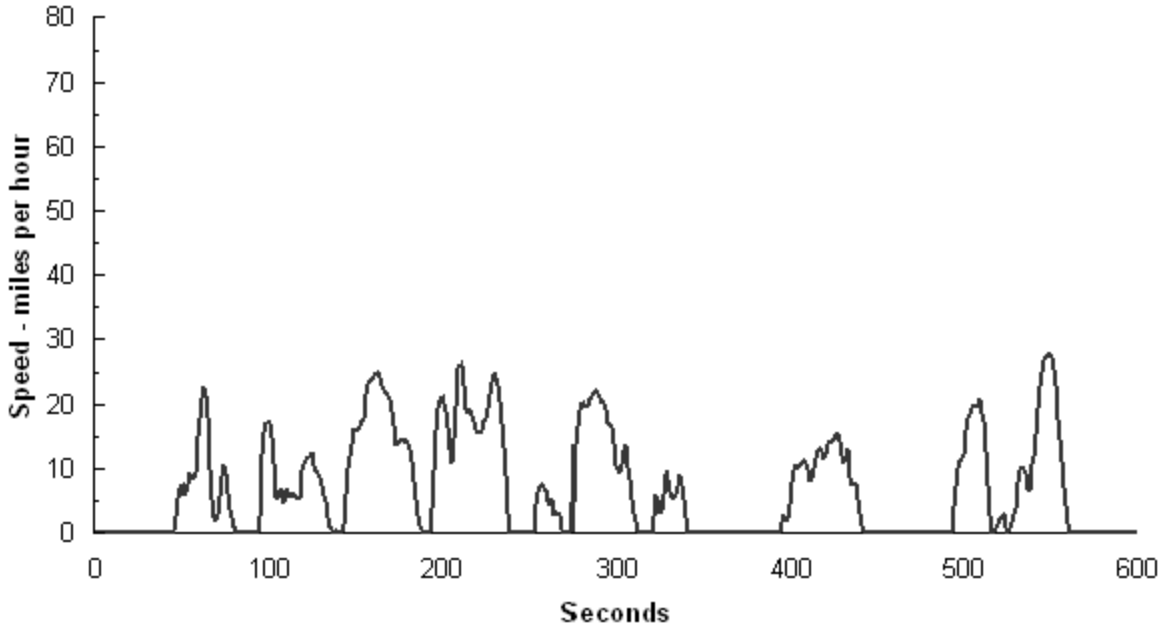
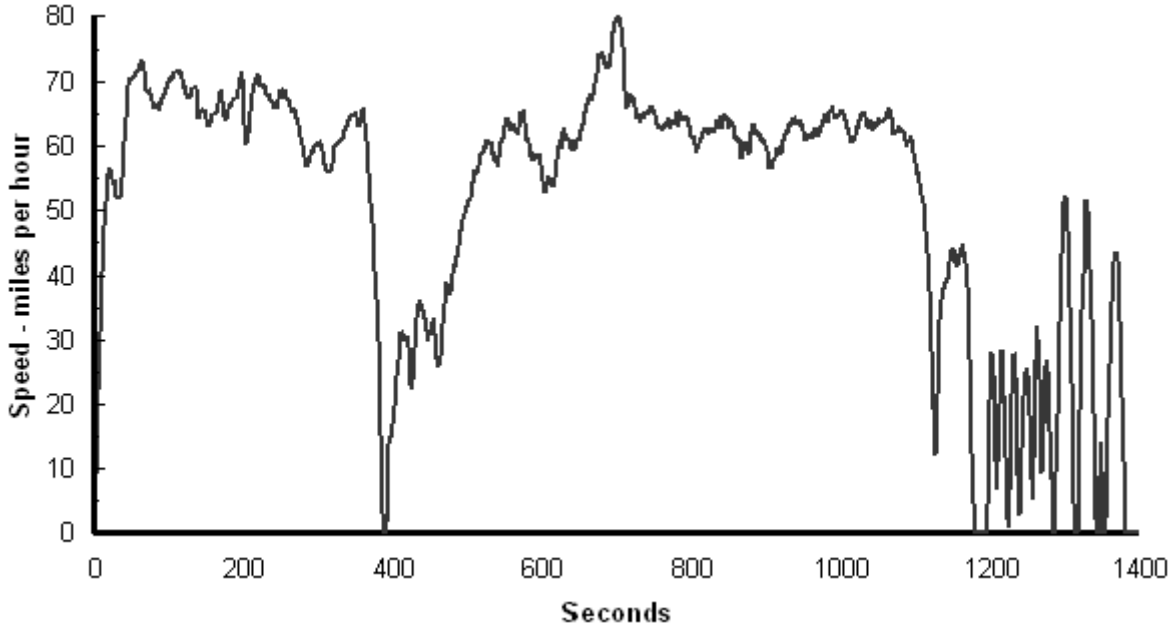


Figure 4.9. Representative Number Five Driving Cycle



Source:
Data obtained from Michael Wang, Argonne National Laboratory, Argonne, IL, 1997.

Researchers at Argonne National Laboratory have estimated the fuel economy of a midsize car using driving cycles from different countries. These results illustrate the difference in fuel economy which can be obtained from the same vehicle using different test cycles.

Table 4.31
Projected Fuel Economies from U.S., European, and Japanese Driving Cycles

Driving cycle	Projected fuel economy for a 1995 composite midsize vehicle[a]
Japanese 10/15 mode test cycle	17.5 mpg
New European Driving Cycle (NEDC)	22.0 mpg
U.S. EPA city cycle (LA4)	19.8 mpg
U.S. EPA highway cycle	32.1 mpg
U.S. Corporate Average Fuel Economy cycle	23.9 mpg

Source:
Santini, D., A. Vyas, J. Anderson, and F. An, *Estimating Trade-Offs along the Path to the PNGV 3X Goal*, presented at the Transportation Research Board 80th Annual Meeting, Washington, DC, January 2001.

Note: China and India both use the European Driving Cycle, though India uses a modified version called the Modified Indian Driving Cycle which accounts for lower maximum speeds that better represent driving conditions in India.

[a] The 1995 composite midsize vehicle is an average of a Chevrolet Lumina, Chrysler Concord, and Ford Taurus. The fuel economies were projected using the National Renewable Energy Laboratory's Advanced Vehicle Simulator (ADVISOR) model.

When comparing data between countries, one must realize that different countries have different testing cycles to determine fuel economy and emissions. This table compares various statistics on the European, Japanese, and U.S. testing cycles [for fuel economy measurements, the United States uses the formula, 1/fuel economy = (0.55/city fuel economy) + (0.45/highway fuel economy)]. Most vehicles will achieve higher fuel economy on the U.S. test cycle than on the European or Japanese cycles.

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

	Time (seconds)	Percent of time stopped or decelerating	Distance (miles)	Average speed (mph)	Maximum speed (mph)	Maximum acceleration (mph/s)
Japanese 10/15 mode test cycle	631	52.3	2.6	14.8	43.5	1.8
New European Driving Cycle (NEDC)	1,181	24.9	6.84	20.9	74.6	2.4
U.S. EPA city cycle (LA4)[a]	1,372	43.2	7.5	19.5	56.7	3.3
U.S. EPA highway cycle	765	9.3	17.8	48.2	59.9	3.3
U.S. Corporate Average Fuel Economy cycle	2,137	27.9	10.3	29.9	59.9	3.3

Source:
Santini, D., A. Vyas, J. Anderson, and F. An, *Estimating Trade-Offs along the Path to the PNGV 3X Goal*, presented at the Transportation Research Board 80th Annual Meeting, Washington, DC, January 2001.

Note: China and India both use the European Driving Cycle, though India uses a modified version called The Modified Indian Driving Cycle which accounts for lower maximum speeds that better represent driving conditions in India.

[a] The actual Federal Procedure (FTP), which is also the test for emissions certification, repeats the first 505 seconds of the Federal Urban Driving Simulation cycle, hot started, after a 10 minute hot soak. Starting with Model Year 2001, the emissions test-but not the fuel economy test-incorporates a supplemental cycle that simulates aggressive urban driving, coupled with an added air conditioning load.

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 4.33
Summary Statistics on Demand Response Vehicles, 1994–2010

Year	Number of agencies	Number of active vehicles	Vehicle-miles (millions)	Average miles per vehicle	Passenger-miles (millions)	Energy use (trillion Btu)	
1994	5,214	28,729	463.7	16.14	577	9.5	
1995	5,214	29,352	506.5	17.26	607	9.2	
1996	5,214	30,804	548.3	17.80	656	9.9	
1997	5,214	32,509	585.3	18.00	754	9.8	
1998	5,214	29,646	670.9	22.63	735	10.4	
1999	5,252	31,884	718.4	22.53	813	10.6	
2000	5,252	33,080	758.9	22.94	839	10.8	
2001	5,251	34,661	789.3	22.77	855	11.3	
2002	5,251	34,699	802.6	23.13	853	11.6	
2003	5,346	35,954	864.0	24.03	930	12.9	
2004	5,960	37,078	889.5	23.99	962	13.3	
2005	5,960	41,958	978.3	23.32	1,058	14.8	
2006	5,960	43,509	1,013.0	23.28	1,078	15.5	[a]
2007	7,300	64,865	1,471.4	22.68	1,502	24.7	
2008	7,200	65,799	1,495.2	22.72	1,412	24.7	
2009	6,700	68,957	1,529.2	22.18	1,477	23.1	
2010	6,741	68,621	1,693.6	24.68	1,494	22.8	

Source:
American Public Transportation Association, *2012 Public Transportation Fact Book*, Washington, DC, April 2012. (Additional resources: www.apta.com)

Note: See Glossary for detailed definitions of demand response.

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