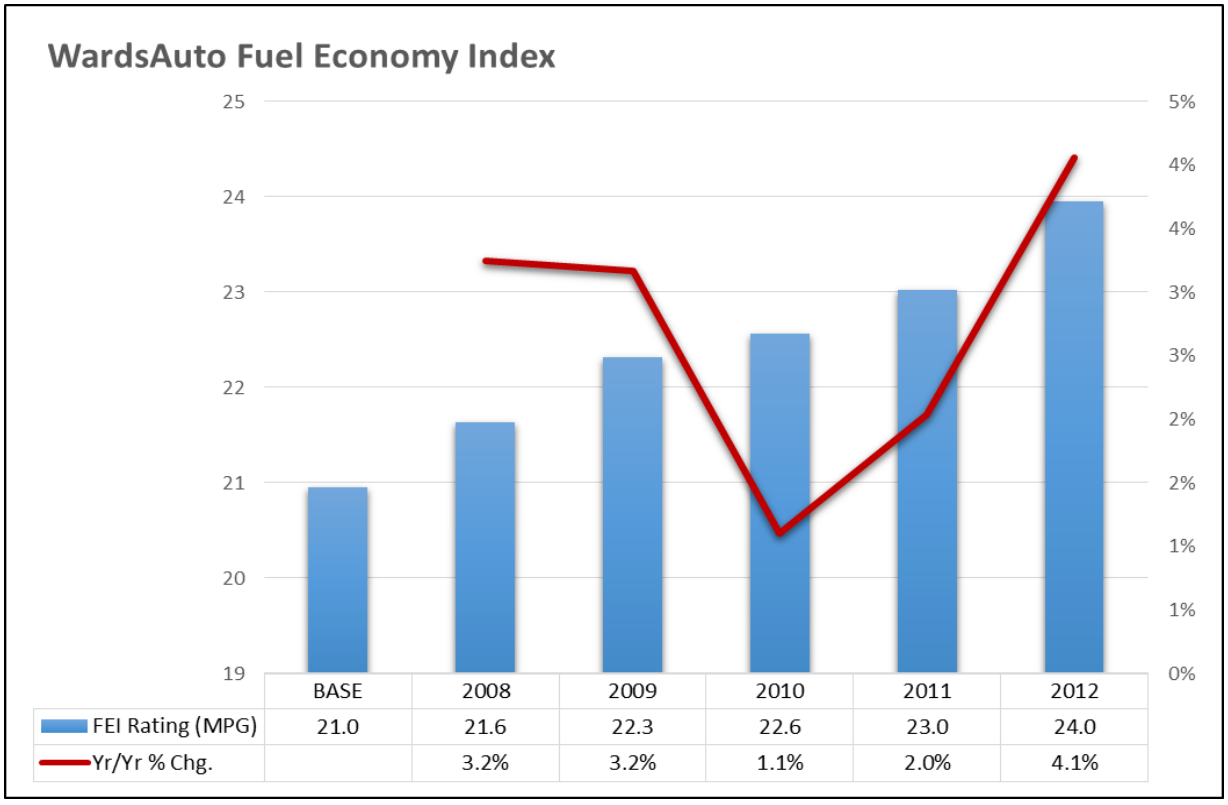
WardsAuto Fuel Economy Index
2012 State of the Industry

1 Overview



	BASE	2008	2009	2010	2011	2012
FEI Rating (MPG)	21.0	21.6	22.3	22.6	23.0	24.0
Yr/Yr % Chg.		3.2%	3.2%	1.1%	2.0%	4.1%

Average Fuel Economy of new U.S. Light Vehicles rose to a new high of 24 mpg in 2012, gaining a record 4.1% and rising a mile per gallon over the 2011 average. Source: WardsAuto Fuel Economy Index ©2013 WardsAuto, Penton.

New technologies and changes in consumer buying patterns lifted the average fuel economy of new light vehicles (LVs) sold in the U.S. to a record high 24 mpg (9.8 L/100 km) in 2012, a full mile-per-gallon improvement over the prior year average.

The data comes from the WardsAuto Fuel Economy Index (FEI)[1], which uses monthly model-line LV truck sales, annual engine installation rates and associated EPA fuel economy rankings to calculate the relative

[1] Government uses two different sets of numbers to describe vehicle fuel economy. One method, used by EPA, provides the city, highway and combined city/highway numbers that appear on new vehicle labels. There are separate regulations governing the test methods and procedures used to determine the fuel economy values under the Corporate Average Fuel Economy (CAFE) and greenhouse gas programs. Typically, the EPA label value is about 20 percent lower than the CAFE number.

average fuel economy of models, brands, segments and power types. (NOTE: Certain light trucks not included in the EPA fuel economy guide are excluded from the individual and aggregated index ratings.)

The 2012 gain in fuel economy was the largest year-to-year improvement in the history of the FEI, which has risen every year since its inception in 2008. The 4.3% gain eclipsed the 3.2% jump in 2009 that accompanied that year's government-sponsored "Cash-for-Clunkers" program, which incented consumers to trade in older LVs for more fuel-efficient models. The 2012 results also represents a 14.3% improvement over the index rating established in Q4 2007, the Index Base Period (IBP).

The U.S. market's two most fuel-efficient segments, small and midsize cars, captured larger shares of LV sales in 2012, spurring fuel-economy gains. But consumer preference for more efficient vehicles in all segments, paired with industry-wide manufacturer-driven gains in vehicle efficiency, led to record ratings in all eight LV segments tracked in the FEI.

While consumers moved to smaller vehicles relative to 2011, they also opted for more efficient powertrains across all segments.

Vehicles powered by four-cylinder engines grabbed a record share of car sales, while demand among light truck buyers for six-cylinder powertrains rose significantly as well – both at the expense of eight-cylinder engines, which fell to modern-era low penetration rate among LVs.

One factor in the increased penetration rate of smaller engines was the growing availability and consumer acceptance of turbocharged engines, which allow manufacturers to pair higher performance and fuel efficiency in smaller power trains. Turbocharged engines reached a record 9% installation rate on '12 model year vehicles.

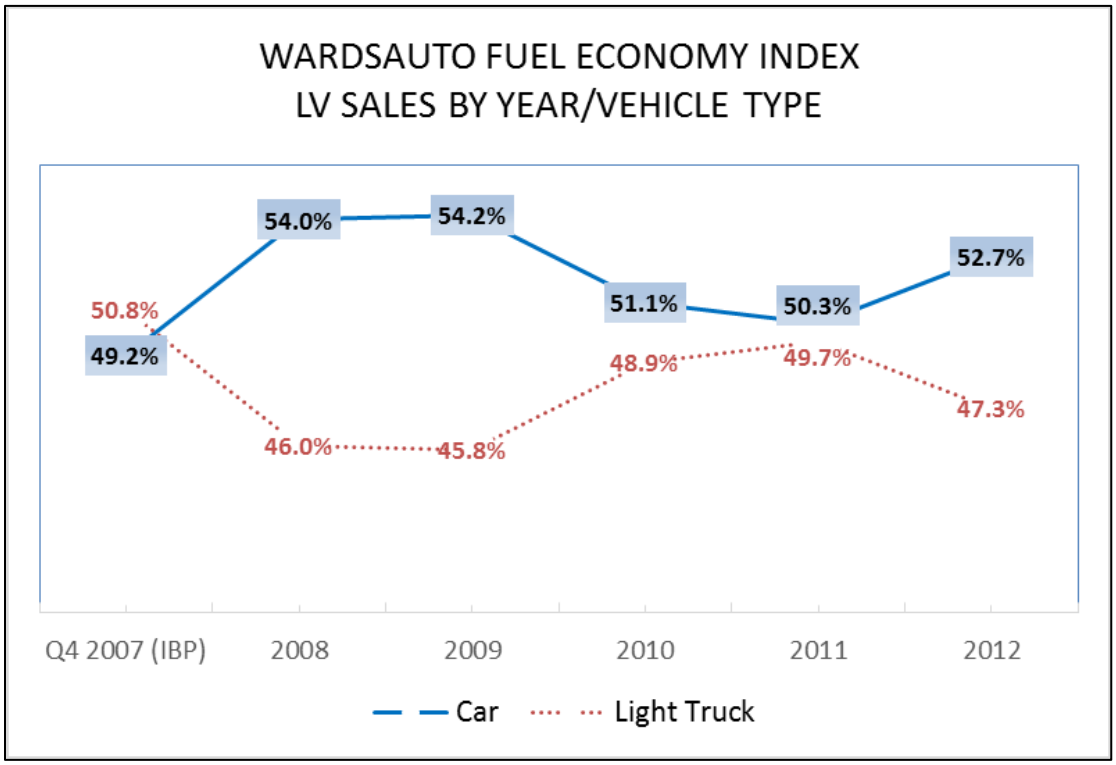
Additionally, more efficient six-speed transmissions increased their dominance of the industry compared to four- and five-speed technologies.

Further, the overall upward trend in gas prices since a gas price spike in 2008 continues to track closely to consumer demand for fuel-efficient vehicles. The record full-year FEI rating corresponded to a record average monthly cost of a gallon of gasoline in 2012 of $3.68.

Overall, some 76% of indexed 2012 new vehicle sales averaged 20 mpg or higher, compared to 70.4% in 2011 and 57.2% in the IBP, and vehicles with FEI ratings of 25 mpg (9.4 L/100 km) or higher comprised 38.9% of sales, compared to 32.4% the year-before and 19.4% during the IBP.

Increased sales of alternatives to gasoline-powered vehicles helped raise the industry's 2012 FEI rating but a 3% improvement in the average fuel economy for gasoline-powered vehicles (which made up 95.6% of 2012 sales) was the primary driver of industry gains on the FEI.

2 FUEL ECONOMY BY VEHICLE TYPE AND SEGMENT



After two years of declining share, Cars rose 2.4 share points, accounting for 52.7% of indexed sales while earning a record 27.4 mpg rating, compared to a Light Truck-rating, also a vehicle-type record, of 20.1 mpg.

WardsAuto Fuel Economy Index Rating By Vehicle Type and Segment: Base Period - 2012						
Segment	**Base**	**2008**	**2009**	**2010**	**2011**	**2012**
Small Car	27.1	27.4	27.7	28.2	28.6	29.7
Middle Car	24.6	24.6	25.2	25.9	26.2	27.4
Large Car	20.0	20.1	20.5	20.4	20.3	21.0
Luxury Car	20.0	20.0	20.5	21.0	22.4	23.4
Total Car	**24.2**	**24.6**	**25.2**	**25.6**	**26.2**	**27.4**
Cross Utility	20.1	20.3	20.8	21.5	21.8	22.1
Sport Utility	16.0	16.0	16.5	16.8	17.3	17.6
Van	18.6	18.7	18.8	19.3	20.4	20.6
Pickup	16.0	16.1	16.4	16.5	16.8	16.9
Total Light Truck	**17.8**	**18.1**	**18.9**	**19.4**	**19.8**	**20.1**
Industry Total	**21.0**	**21.6**	**22.3**	**22.6**	**23.0**	**24.0**

The 2012 rise in average fuel economy spanned the entire market. Both cars and light trucks set records for efficiency, as did all eight of the index segment groups. Interplay between fuel economy and market

share shaped each segment's effect on fuel economy: Segments with low FEI ratings, like pickups and sport-utility vehicles (SUVs) boosted industry fuel economy with modest gains on the FEI and significant reductions in market share, while midsize cars, the second-highest rated segment on the index, pushed the 2012 FEI rating by posting industry-leading gains in both efficiency and market share.

Cars made up 52.7% of LVs tracked on the Index, compared to 50.3% in 2011, and 49.2% during the Index Base Period. With a mix shift toward more fuel-efficient segments, and fuel economy gains across all segments, cars recorded a 4.6% rise on the index to 27.4 mpg (8.6 L/100 km), a 13.5% improvement over the IBP.

In addition, small and midsize cars, the most fuel-efficient market segments, were the only car segments to gain significant market share in 2012 — raising the overall FEI rating for the vehicle type and the industry. Bolstered by improved inventories, both segments benefitted from pent-up demand caused by production shortages, expansive recalls and delayed product launches in 2010 and 2011.

Small cars were the index's highest-rated market segment, scoring a best-ever 29.7 mpg (7.9 L/100 km) on the FEI. The segment accounted for more than one fifth of sales (20.6%) for the first time since 2008, up from 19.4% in 2011 and a 15.8% IBP share. Midsize car sales, meanwhile, had the largest impact on the FEI, improving fuel economy 4.5% — to 27.4 mpg (8.6 L/100 km — while accounting for 22.1% of indexed sales, compared to 20.3% in 2011).

Large cars, the lowest scoring car segment, on the other hand, boosted the industry score by virtue of declining market share. The segment achieved a segment-record 21 mpg (11.2 L/100 km), while taking a historically low 1.7% share of indexed sales. (By comparison, hybrid electric vehicles (HEVs), across all segments, had a 3.1% share.) Luxury car sales accounted for 8.3% of tracked sales, the segment's lowest share since 2009, but registered a mile-per-gallon increase on the FEI, with a segment-record 23.4 mpg (10.1 L/100 km).

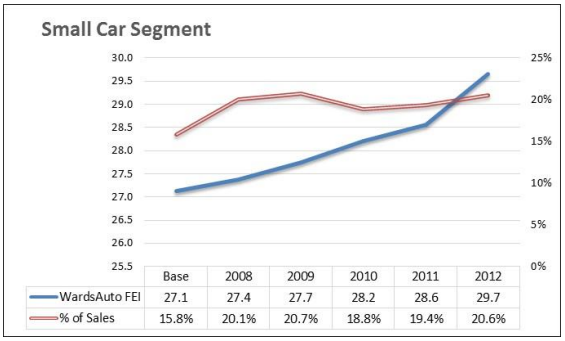
Light trucks, including traditional truck segments (Sport Utility vehicles, vans, pickups) as well as cross/utility vehicles, made up 47.3% of Index-tracked LV sales, while collectively surpassing the 20 mpg threshold on the FEI for the first time. The vehicle type had a 20.1 mpg (11.7 L/100 km) index rating, up 1.6% over 2011, and 12.6% over IBP.

The best-selling Cross/utility-vehicle (CUV) segment made up 25% of deliveries, averaging 22.2 mpg (10.6 L/100 km), a 2.9% improvement over prior year. CUV share of total LVs was the lowest since 2009, but the segment made up a larger portion of light truck sales than in any year since 2009, due to the declining share of total light truck sales during the period.

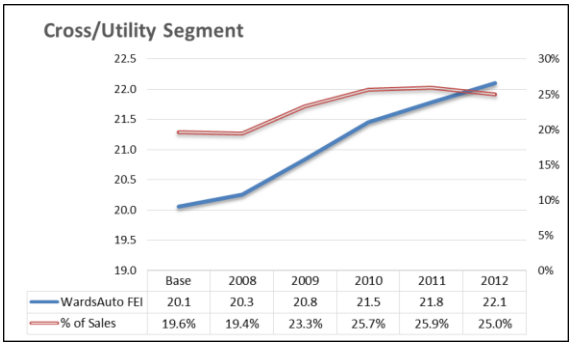
Light-duty pickups rose 0.9% on the index to 16.9 mpg (13.9 L/100 km) mpg - remaining the lowest rated segment on the index – while accounting for just 10.5% of 2012 index sales, compared to 11.3% in 2011. Similarly, SUVs -- the second-lowest rated segment – improved average fuel economy 1.6% to 17.6 mpg (13.4 L/100 km), while taking a 7.6% share of sales in 2012, down from 8.2% the prior year.

Van sales had a negligible effect on fuel economy, with market share nearly flat with 2011 and average fuel-economy for the segment rising just 0.8%, to 20.6 mpg (11.4 L/100 km).

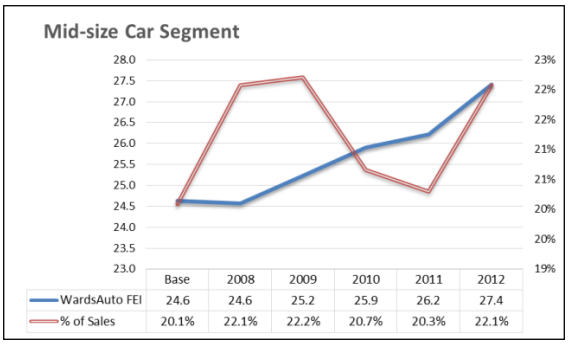
(Charts on the next page show segment fuel-economy and market share over time, and illustrate the nature of each segment's impact on industry fuel economy.)



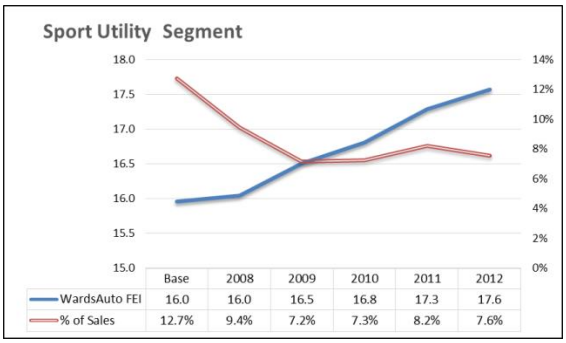
Small Cars: Paired significant rise in fuel economy with a second-consecutive gain in indexed LV market share.



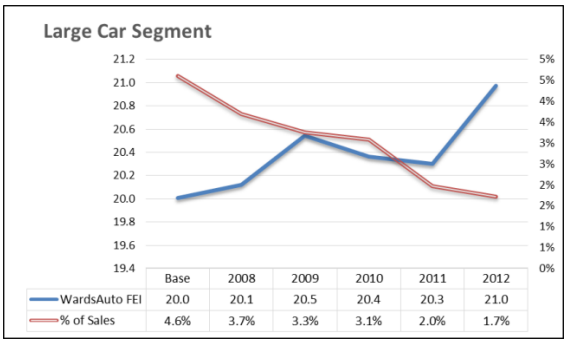
CUVs: Best-selling segment made up 25% of 2012 sales, while registering a slightly improved FEI rating.



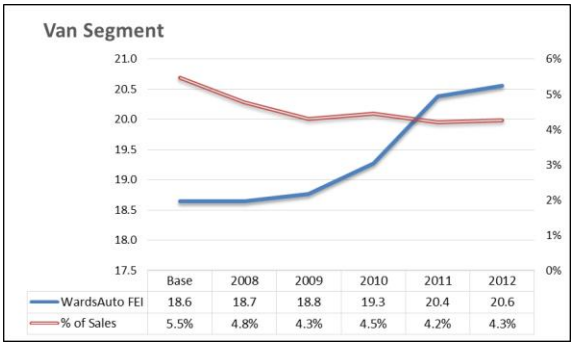
Midsize Cars: The segment helped lift the FEI in 2012, with the largest gains in both fuel economy and share vs. 2011.



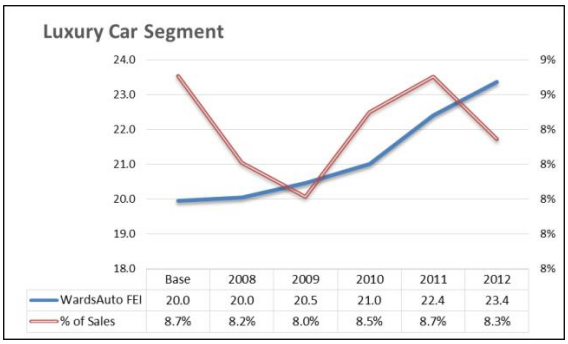
SUVs: Second-lowest rated segment, boosted Industry FEI with improved fuel economy and a dip in market share.



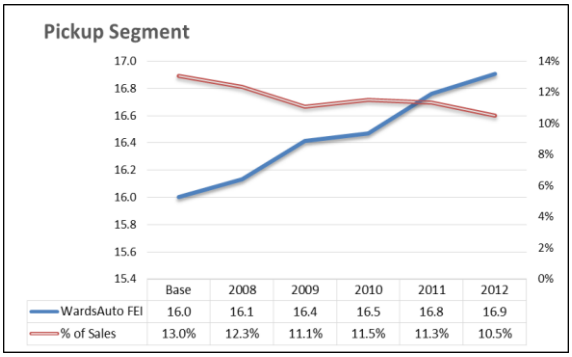
Large Cars: Lowest FEI rating among car segments, accounted for lowest share of LV sales ever.



Vans: The segment's effect on 2012 FEI was negligible as market share and fuel economy growth was flat vs. 2011.

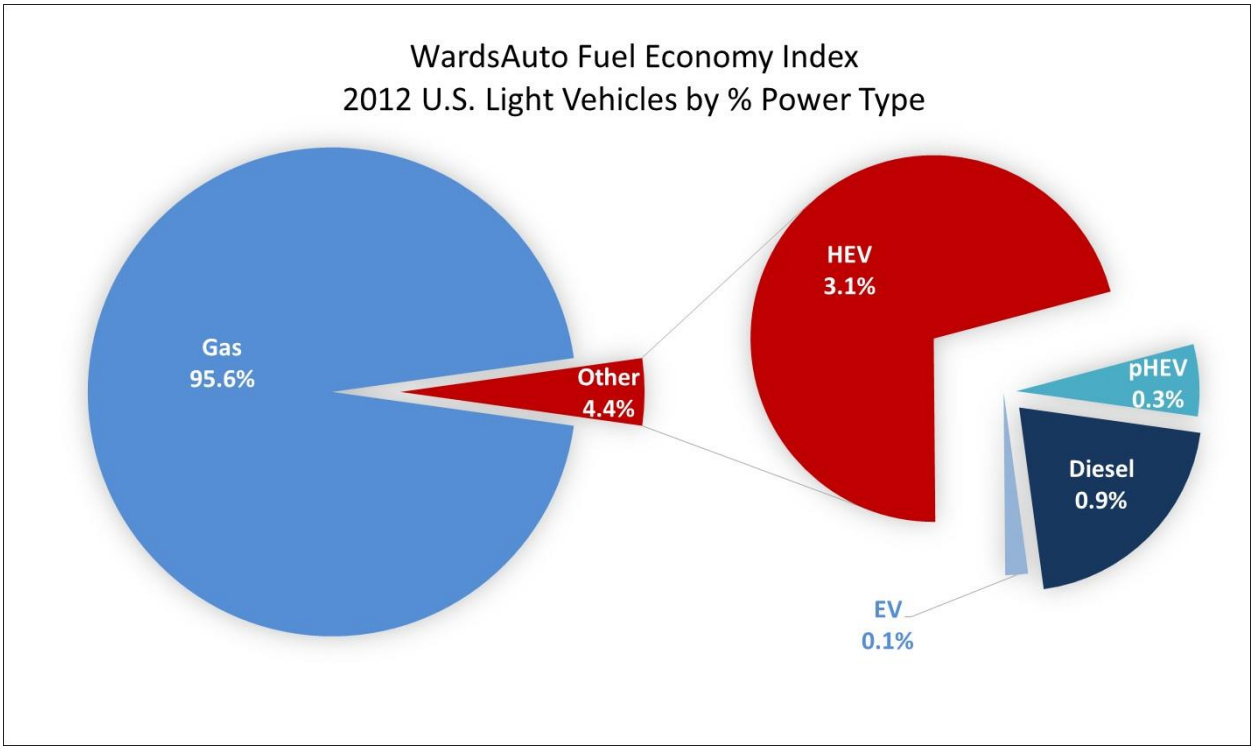


Luxury Cars showed steep fuel economy gains for second-straight year, but lost share for the first time since 2009.



Pickups: Lowest rated segment contributed to overall FEI growth, dropping share with slightly improved efficiency.

3 FUEL ECONOMY BY POWER TYPE



Non-gasoline power types earned FEI ratings between 30.4 mpg (7.7 L/100 km) and 100 MPGe (2.4 L/100 km) - compared to 23.1 mpg (10.2 L/100 km) for gas-powered vehicles - but made up just 4.4% of index sales.

WardsAuto Fuel Economy Index Rating By Power Type: IBP - 2012						
	Q4 2007	**2008**	**2009**	**2010**	**2011**	**2012**
Gas	20.5	21.2	21.7	22.0	22.4	23.1
Diesel	22.2	26.9	29.9	30.1	29.5	30.4
Electric	0.0	0.0	0.0	99.0	99.1	100.0
Fuel Cell	0.0	74.0	74.0	74.0	74.0	74.0
Hybrid	39.3	39.1	39.9	42.5	43.2	43.8
Plug-in Hybrid	0.0	0.0	0.0	37.0	37.0	45.2
Industry Total	**21.0**	**21.6**	**22.3**	**22.6**	**23.0**	**24.0**

Hybrid and electric vehicles sold in 2012 averaged 45.3 MPGe (miles per gallon equivalent) (5.2 L/100 km), nearly twice the average rating for gas vehicles, while taking a record 3.5% of indexed sales. Diesel-powered vehicles, which made up almost 1% of FEI sales, averaged 30.4 mpg (7.7 L/100 km), up from 29.5 mpg (8 L/100 km).

While hybrid, electric and diesel-powered vehicles play a statistically outsized role per vehicle in lifting overall economy, collectively raising the industry total from 23.1 mpg to 24 mpg, the industry's improved fuel economy was primarily a result of the efficiency gains of gasoline-powered vehicles.

3.1 GASOLINE

Gasoline-powered vehicles made up 95.6% of all index sales in 2012, down from 96.9% in 2011, and 97.4% in the Index Base Period. Gas-powered LVs raised their average FEI score to 23.1 mpg (10.2 L/100 km), a 3% improvement over a year ago, and a 12.8% jump from the IBP rating of 20.5 mpg (11.5 L/100 km). In fact, the 2012 FEI rating for gas-powered vehicles alone represented a 10.3% improvement over the rating for all vehicles in the base period, including hybrid and electric vehicles.

3.2 ALTERNATIVE-POWER

Hybrid, Plug-in Hybrid, and Electric Vehicles (EVs) earned a collective FEI rating of 46.7 MPGe (5 L/100 km), up slightly from a year ago, making up a record 3.5% of LVs tracked on the Index, compared to 2.3% in 2011 and 2.5% IBP. The combined fuel economy for alternative-powered vehicles was more than twice the rest-of-industry average, and raised the total industry score 3.4% from 23.2 mpg to 24 mpg.

Hybrid vehicles on the index averaged 43.8 MPGe (5.4 L/100 km), up 1.4% from 2011, and 12.8% from the IBP, and accounted for 3.1% of all LV sales, up from 2.1% the prior year and 2.5% in the IBP.

Plug-in hybrids earned a 45.2 MPGe (5.2 L/100 km) FEI rating, while contributing 0.3% of sales, compare to .01% in 2011, and 0% in the IBP. The industry offered 46 hybrid and plug-in hybrid models for sale in 2012, compared to 34 in 2011 and 13 during the IBP.

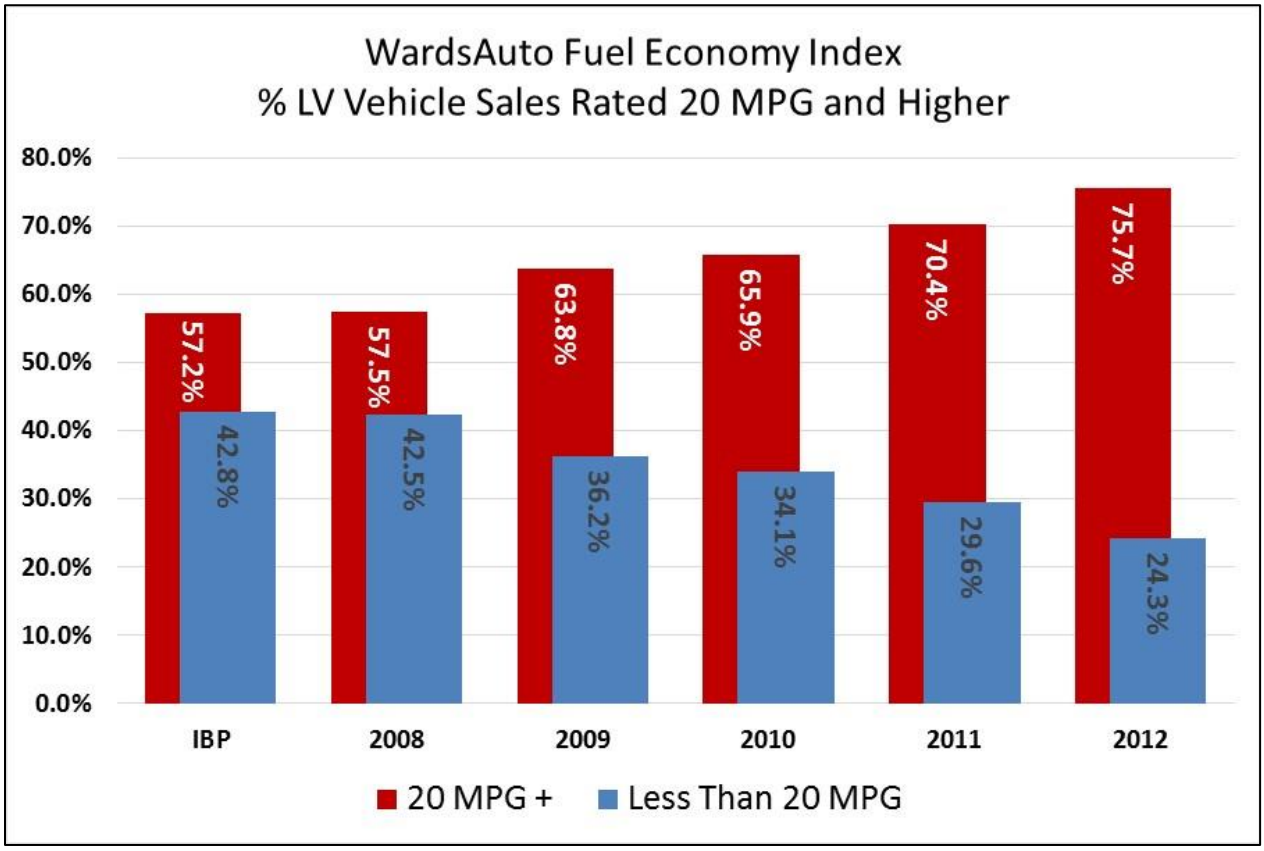
Electric vehicles earned the highest FEI rating of any power type, but accounted for the fewest sales. Relatively high cost, and general concerns about battery-range and reliability limited general consumer acceptance. However, electric vehicles did gain market share in parts of the country where public policy and local driving habits supported wider-spread adoption. EVs had an average fuel economy of 100 MPGe (2.4 L/100 km), up from 99.1 MPGe (2.4 L/100 km) in 2011. EV sales lifted the industry FEI rating .03%, from 23.9 mpg (excluding EVs) to 24 mpg.

3.3 DIESEL

Diesel engine share of index sales has risen 846% in the past five years, but remains below 1%. Still, as the power type, which until recently was almost exclusively a truck option in the U.S., makes inroads within passenger car segments, its effect on industry FEI is growing.

Diesel-powered vehicles averaged 30.4 mpg (7.7 L/100 km), up 1.7% over year-ago and 32.7% versus IBP. Sixteen non-excluded diesel LV models were available in 2012, compared to 13 in 2011 and six in the IBP. Diesel models tracked by the index had roughly the same effect on industry fuel economy as EVs in 2012, lifting FEI rating from 23.9 mpg (excluding diesels) to 24 mpg.

4 MPG GROUPINGS



Vehicles rated 20 mpg or higher on the WardsAuto FEI accounted for more than three quarters of all sales in 2012.

4.1 DEMAND BY FUEL ECONOMY RATING

Nearly 76% of 2012 new vehicles earned 20 mpg or higher, compared to 70.4% in 2011 and 57.2% in the base period. Vehicles rated 25 mpg (9.4 L/100 km) or higher accounted for 38.9% of indexed sales, up from 32.4% in 2011 and double the 19.4% share of sales in the IBP.

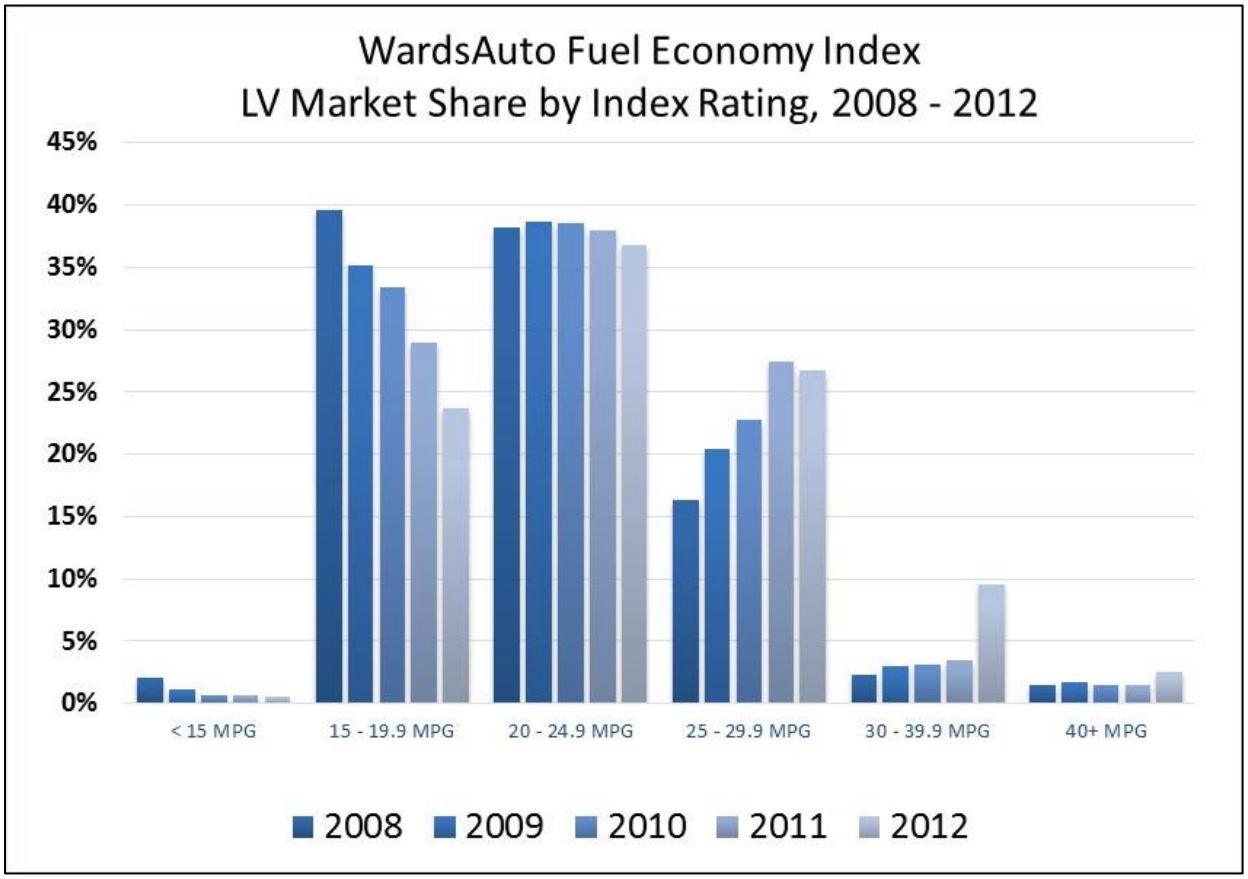
Vehicles with middle-of-the-pack fuel-economy crowded the FEI but lost share to a small but quickly increasing share of vehicles rated 30 mpg and higher in 2012, while the lowest-rated vehicles grabbed a record-low lost sales share.

LVs rated 30 mpg (7.8 L/100 km) to 39.9 mpg grabbed more than six additional share points in 2012, with a 9.6% share of indexed sales compared to 3.5% in 2011, and just 1.6% in the IBP. Vehicles rated 40 mpg (5.9 L/100 km) or higher, meanwhile, accounted for a record 2.6% of sales, up more than a share point from 1.5% the prior year.

On the other end of the spectrum, vehicles achieving less than 15 mpg (15.7 L/100 km) on the WardsAuto index had a record-low penetration of the market, falling to 0.6% of LV sales, from 0.7% in 2011, and 2.5% in the IBP. And for the first time, vehicles achieving 15 mpg to 19.9 mpg (11.8 L/100 km)

made up less than 25% of LV sales, accounting for 23.7% of indexed deliveries in 2012, compared to nearly 29% in 2011, and 44.3% in the IBP.

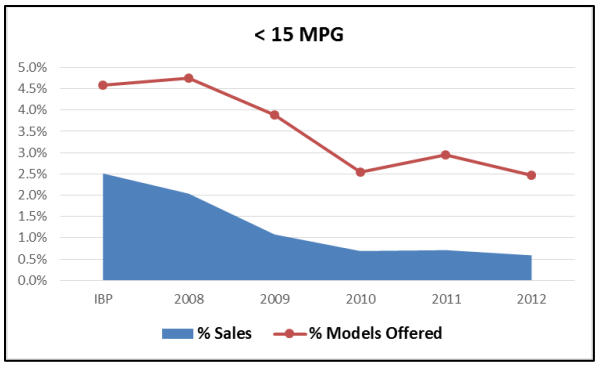
Vehicles in the 20 mpg (11.8 L/100 km) to 24.9 mpg range lost market share for the third consecutive year, dropping to 36.8% of index sales compared to 38% in 2011 and 37.1 in the IBP. Sales share of cars and light trucks rated 25 mpg (9.4 L/100 km) to 29.9 mpg, meanwhile, slipped to 26.8% from a record 27.4% cut in 2011, but still more than twice the Index Base Period share of 13%.



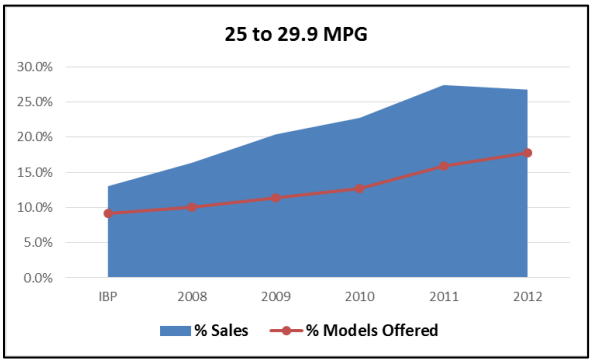
Vehicles rated 30 mpg or higher on the FEI increased their combined market share to 12.1% compared from 5% in 2011.

4.2 Consumer Demand Compared to Share of Model Offerings

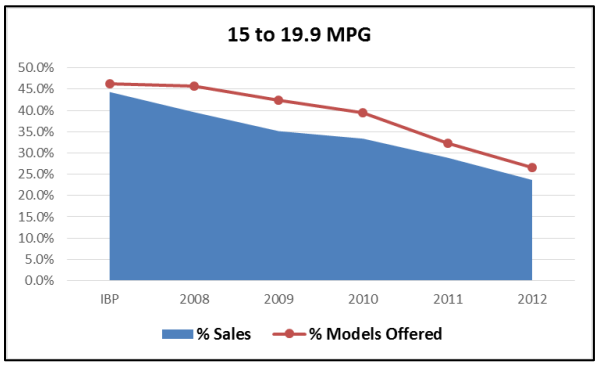
The charts below show sales market share by fuel economy range compared to the percentage of models available in the market rated within a given range. The charts illustrate directional change in the interaction between consumer preference and manufacturer offerings over time.



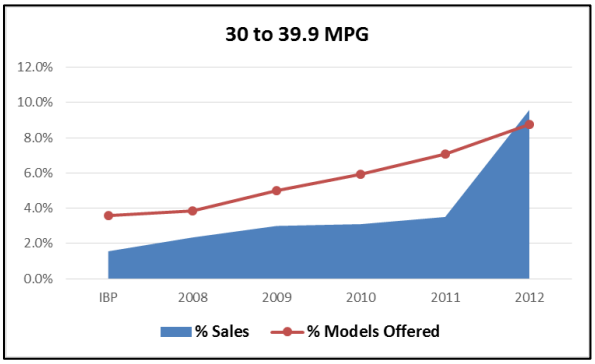
Vehicles in the lowest-rated fuel-economy ranges were primarily expensive luxury-segment vehicles, accounting for the consistent, but low, relationship between market-share and industry offerings in this category.



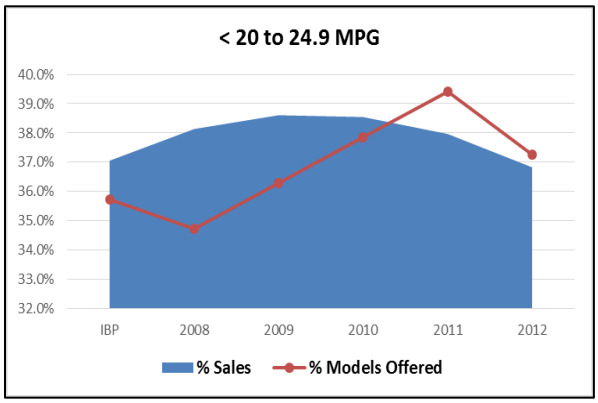
Among high-volume categories, vehicles in the 25 – 29.9 mpg range, which include popular models in both the small- and midsize-car segments, have the highest sales-to-model ratio.



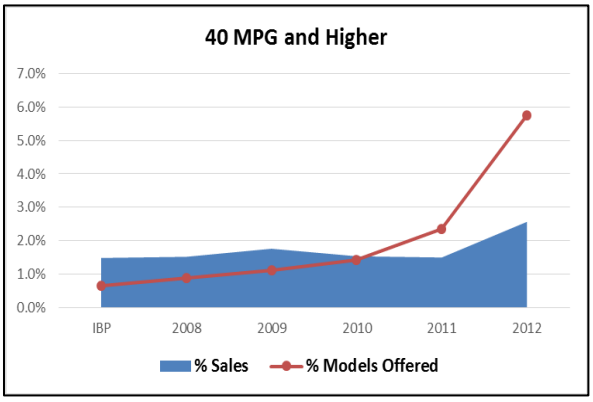
Large car and light trucks dominate this category. As gains in fuel economy moved many of these models into higher-rated categories, market share followed.



In 2012, demand for vehicles in the 30 to 39.9 mpg range – dominated by small cars and alternative-powered vehicles – matched the % of industry models in the category.



The 20 to 24.9 mpg range is home to a number of volume leading models, reflected by the consistently high demand-to-model ratio. However, the ratio has declined as consumers move toward higher-rated categories.



While the number of models offered with 40 mpg or higher has grown by 877% since the FEI IBP -- demand for the vehicles (including battery-only electric vehicles) has grown at a slower rate – rising from 1.5% in 2008 to 2.6% in 2012.

5 '12 Model Year Engine, Transmission, Turbocharger Penetration Rates

This section highlights powertrain trends that have affected industry ratings on the WardsAuto Fuel Economy Index. The data comes from WardsAuto annual engine and transmission factory-installation reports. While the underlying granular data is used in calculating FEI ratings, the installation reports encompass all LVs, including those *excluded* from the WardsAuto Fuel Economy Index, and refers to vehicle Model Years, as opposed to Calendar Years.

US LV Engine Installations by Cylinder, Vehicle Type & Model Yr.							
		% 4-Cyl.	**% 5-Cyl.**	**% 6-Cyl.**	**% 8-Cyl.**	**% 10-Cyl.**	**% 12-Cyl.**
Cars	'12	69.7	5.3	21.5	3.4	0.0	0.0
	'11	64.5	5.3	24.4	5.6	0.0	0.0
	'10	64.5	3.8	25.4	6.1	0.0	0.1
	’09	62.2	7.0	25.2	5.5	0.0	0.1
	’08	56.2	6.2	31.4	6.2	0.0	0.1
Lt. Trucks	'12	22.3	0.4	51.8	25.4	0.1	0.0
	'11	21.5	0.4	46.5	31.6	0.1	0.0
	'10	21.6	0.7	47.1	30.4	0.2	0.0
	’09	18.6	0.8	45.4	35.0	0.3	0.0
	’08	14.3	1.1	47.7	36.5	0.4	0.0
Lt. Vehicles	'12	44.6	2.7	37.5	15.0	0.0	0.0
	'11	40.7	2.6	36.6	20.0	0.1	0.0
	’10	43.4	2.3	36.1	18.1	0.1	0.0
	’09	41.8	4.1	34.7	19.3	0.1	0.0
	’08	35.2	3.6	39.5	21.3	0.2	0.0

The use of 4-cylinder engines climbed sharply in the ’12 model year to 44.6% of all U.S. new LVs from the prior year when 4-cylinder penetration slipped to 40.7% from 43.3% in ’10. Compared with 35.2% in ’08, 4-cylinder engines gained 9.4 share percentage points over the past 5 years.

The 4-cylinder’s rise reflected a modern-day record 69.7% penetration rate in combined domestic and imported cars that came at the expense of V-8 engines, which dwindled to 3.4% of U.S.-market cars in’12, down from 5.6% in ’11 and 6.2% in ’08.

Overall, V-8s powered 15.0% of all ’12-model U.S. LVs, down from 20.0% in ’11 and 21.3% in ’08. Although 6-cylinder engine use slipped in cars, its penetration rate increased sharply in light trucks thanks to new technology that made the smaller engine a popular alternative to V-8s in large pickups.

In addition to declining cylinder count, other changes in ’12-model year engine use include:

- Hybrid models reached an all-time high penetration rate of 2.5%, up from 2.0% in ’11, continuing a 7-year climb beginning at just 0.6% in ’05. Although hybrids accounted for a record 1.8% of import models, domestics remained on a 0.7% plateau after peaking at 0.9% in ’10.

- Turbo diesels were installed in 4.1% of LVs, up from prior-year's 3.8% and the highest figure since 4.6% in the '06 model run. Domestic models included a record 3.9% diesels.
- The 52,600 supercharged engines used in '12 models more than double the prior year's 19,818 units and bested '05's peak of 51,654 by 1.8%.
- Sequential Fuel Injected engines fell to 69.7% of domestic-make LVs and 13.2% of imports Direct Injection powertrains increased to a record 12.1% and 4.4%, respectively.
- Engines of 2.0L displacement or less accounted for a record 9.7% of '12-model domestic-make LVs compared with 8.4% the year before and a 10-year average of just 7.4%.
- Engines in the 4.0L-4.9L range took the biggest hit, falling to just 3.6% of the market from 6.1% in '11 and an average 10-year rate 14.5%.
- Engines with a displacement of 5.0L or more powered 16.2% of domestic LVs, below the '11 model year's 19.9% and a 10-year average of 19.2%.

US LV Transmission Installation Rates

		Manual			Automatic					
		5-Spd.	6-Spd.	Tot. Man.	4-Spd.	5-Spd.	6-Spd.	7-Spd.	CVT	Tot. Auto.
Cars	'12	4.1	6.9	11.0	7.4	14.6	50.5	6.0	10.2	88.8
	'11	4.1	6.5	10.6	18.7	17.4	38.7	4.9	9.6	89.3
	'10	5.1	5.9	11.0	27.9	17.4	27.5	3.5	12.7	89.0
	'09	7.6	4.0	11.5	30.6	24.2	20.6	2.7	10.4	88.5
	'08	7.9	3.6	11.5	37.1	23.4	17.3	2.1	8.6	88.5
Lt. Trucks	'12	0.3	1.0	1.3	7.7	20.6	62.8	2.4	5.2	98.7
	'11	0.6	0.6	1.2	10.9	20.1	59.0	3.8	5.1	98.8
	'10	1.2	0.9	2.1	15.4	40.5	34.8	2.2	5.1	97.9
	'09	0.9	0.7	1.6	22.7	32.1	37.9	0.0	5.7	98.4
	'08	1.1	1.0	2.1	37.3	33.3	24.6	0.0	2.6	97.9
Lt. Vehicles	'12	2.1	3.7	5.8	7.6	17.8	57.0	4.1	7.6	94.1
	'11	2.2	3.2	5.4	14.4	18.9	49.9	4.3	7.1	94.6
	'10	3.2	3.4	6.6	21.7	28.7	31.1	2.9	9.0	93.4
	'09	4.4	2.4	6.9	26.9	27.9	28.7	1.5	8.2	93.1
	'08	4.5	2.3	6.8	37.2	28.4	21.0	1.0	5.6	93.2

The 6-speed transmission, automatic and manual, has experienced a meteoritic rise in popularity in the U.S., rising to a dominant 60.8% of domestic and import LVs from 23.3% in just four years. The automatic variant alone was installed in 57% of '12-model LVs, up from 21% in '08, largely replacing the once-dominant 4-speed automatic gearbox that dropped from to 7.6% from 37.2% in that same time period.

Manual transmissions, once revered for their fuel-economy prowess, have increasingly fallen out of favor as the automatic has been developed to the point that it generally is the more fuel-efficient of the two, relegating the manual to cost-conscious and performance applications, especially in cars where they were installed in 11.0% of '12-model cars (6.9% 6-speed), only slightly less than the 11.5% rate in '08 when 3.6% were 6-speeds.

The continuously variable transmission, maintains a small, but stable group of adherents, being installed in 7.6% of LV's in the '12-model LVs compared with 5.6% in '08, while the 7-speed automatic has grown from just 1% in '08 to 4.1% in '12.

U.S. LV Turbocharger Installation Rates					
	'08 MY	**'09 MY**	**'10 MY**	**'11 MY**	**'12 MY**
Car	3.7	4.1	4.2	8.6	9.8
Light Truck	1.0	1.5	1.5	5.6	8.2
Total LV	2.4	2.9	2.8	6.9	9.0
% Chg. vs. Prior Model Year	--	22.0	-0.9	143.8	29.2

Amid the push for improved fuel economy and continued demands for performance, the use of light-vehicle turbocharged gasoline engines in American-market light vehicles more than tripled in three years, rising to a record 9.0% in model year '12 from just 2.8% in '10.

First introduced as a factory-installed performance option on some smaller cars in the 1960s, turbos gained more widespread acceptance in the wake of fuel shortages in the 1970s, enabling automakers to provide fuel economy figures well above average fuel economy with 4- and 6-cylinder engines, while giving buyers the performance usually associated with larger displacement engines.

After losing ground in the wake of plentiful and less costly gasoline, turbocharged engines have recently experienced increasing acceptance from consumers. The 9.0% penetration of '12 model vehicles represents a 281% increase in the installation rate of turbochargers compared to the 2.4% penetration-rate among '08 model vehicles.

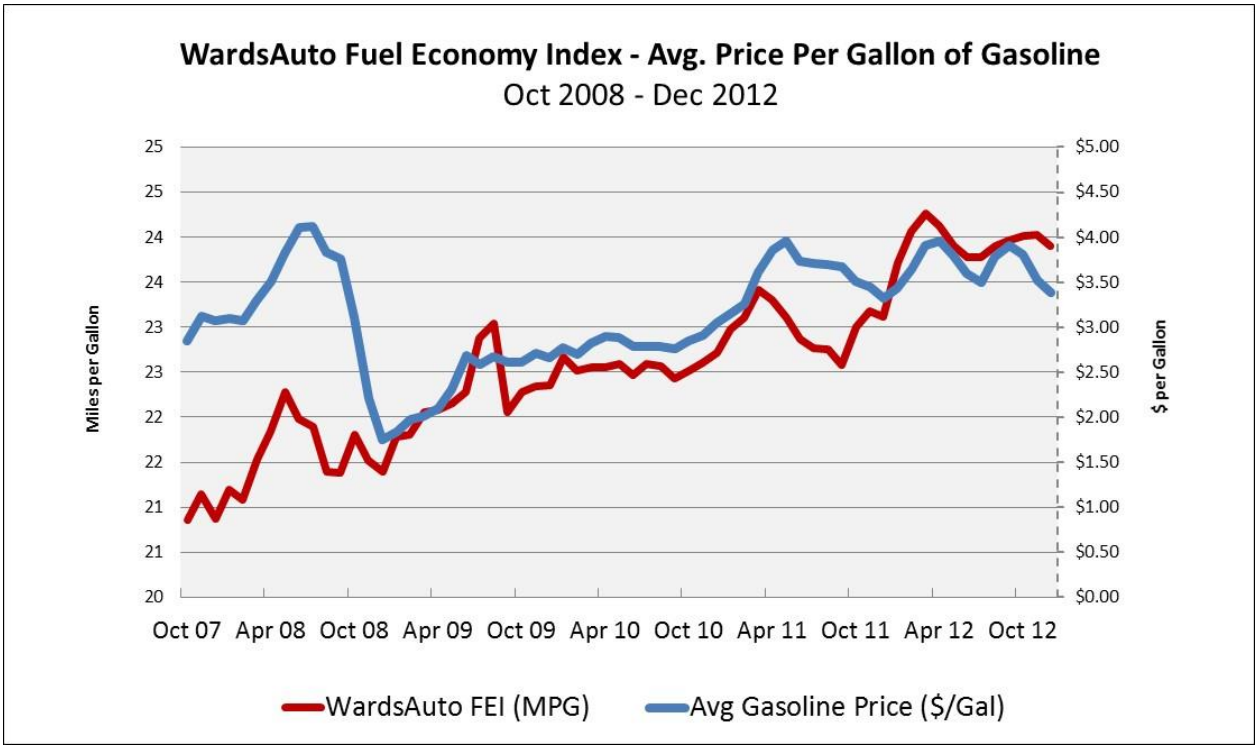
The adoption of turbocharged engines reflects increased availability and acceptance across vehicle types.

Car installations jumped 164.4% from 3.7% in '08 to 9.8% in '12. The installation rate on light trucks, reflecting new technologies and changes in consumer attitudes, grew 724.4%% during the same period, rising from 1.0% in '08 to 8.2% in '12.

The availability of smaller turbocharged engines on cars and light trucks seems to have played a key role in the growing acceptance of 4-cylinder-powered cars, and six-cylinder-powered light trucks in particular.

Turbo engines powered a record 6.0% of '12-model LVs built in North America, and use in North-American built light trucks reached an all-time high of 7.6%, up from 1.3% in '09.

6 Fuel Economy and Fuel Costs



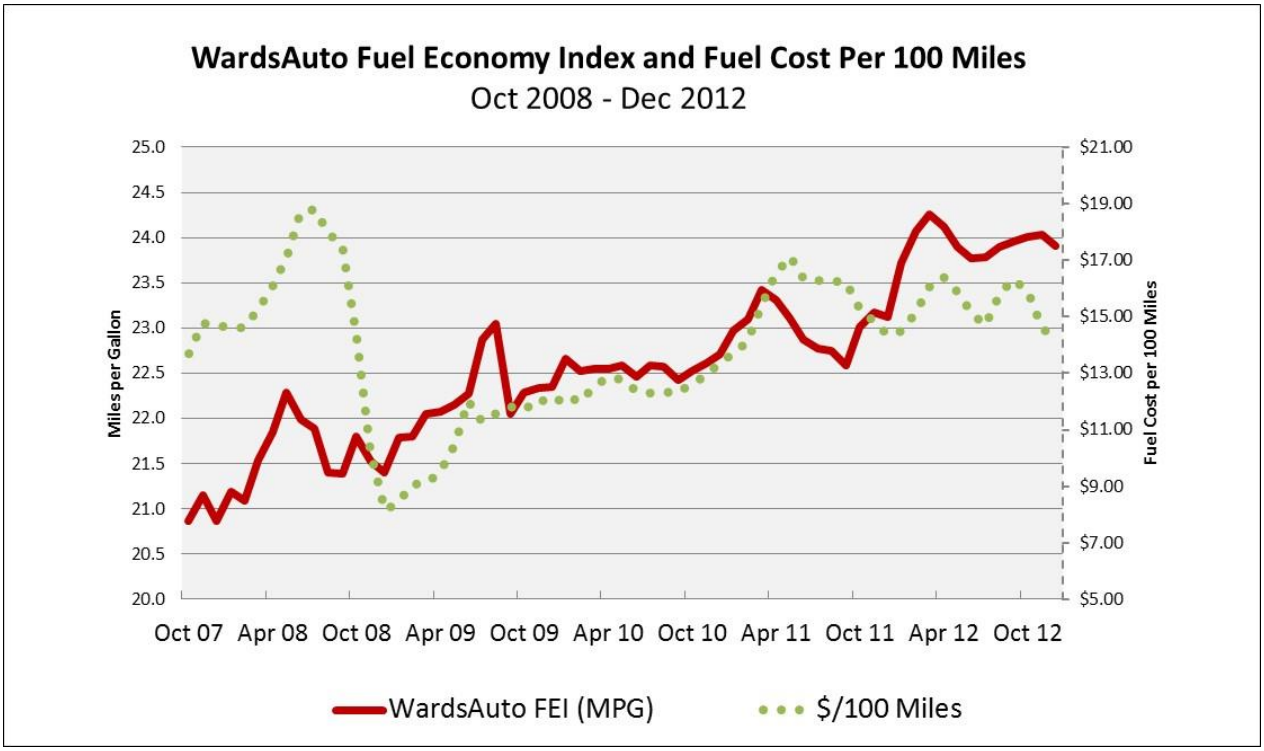
WardsAuto Fuel Economy Index - Industry rating (in miles per gallon) – versus average price per gallon of gasoline, by month over the indexed period.

The rise in the average annual fuel economy of new vehicles sold in the U.S. is a function of both growing consumer preference for fuel efficient vehicles and year-to-year improvements in the fuel efficiency of the new vehicles available for purchase.

Changes in monthly WardsAuto FEI ratings are less reflective of technological and equipment changes than annual comparisons, and help illustrate how consumer behavior affects the average fuel economy of new vehicles within a context of the overall improving fuel economy of available new vehicles.

The chart above shows the monthly WardsAuto FEI rating for the industry as a whole versus the average price of a gallon of gasoline (all grades, including taxes) as reported by the U.S. Energy Information Administration (EIA).

At the start of 2008, rising gas prices, culminating in July's record $4.11 average price per gallon, spurred a steep increase in the FEI rating. After a dramatic decline in fuel prices over the final months of 2008, accompanied by a slightly less drastic decline in fuel economy, the FEI and average gas prices trended upward along similar paths, with fluctuations in fuel economy often mirroring changes in fuel costs.



WardsAuto Fuel Economy Index -Industry rating (in mles per gallon - versus average cost of fuel per 100 miles.

The graph above tracks the WardsAuto FEI against the average cost of fuel per 100 miles ($/100 Miles), using EIA gasoline price information and the FEI rating for each month. The graph illustrates the dynamic between rising fuel costs and rising fuel economy.

After the 2008 gasoline price spike, which led to a July cost per 100 Miles of $18.80, the monthly FEI tracks, not surprisingly, very similarly against the cost $/100 Miles and the cost per gallon of gasoline. However, while gas prices neared $4.00/gallon several times in both 2011 and 2012, the average fuel cost per 100 miles, reflecting a rising FEI, has remained well below the July 2008 level, staying below $17.00/100 miles in all but two months since.

7 APPENDIX: HYBRID AND ELECTRIC NEW LV REGISTRATION BY STATE

State	2011 %	2012 %	% Chg.	State	2011 %	2012 %	% Chg.
Alabama	1.2	2.2	79.3	Montana	1.4	2.0	38.7
Alaska	1.3	1.7	33.6	Nebraska	1.3	2.2	68.8
Arizona	2.5	3.6	42.9	Nevada	2.0	3.1	48.9
Arkansas	1.3	2.2	64.8	New Hampshire	2.3	3.1	34.3
California	5.2	7.5	45.0	New Jersey	1.7	2.1	22.1
Colorado	2.0	2.9	49.2	New Mexico	2.0	3.0	45.0
Connecticut	2.1	3.0	42.2	New York	1.9	2.6	37.6
Delaware	2.1	3.0	46.0	North Carolina	2.2	3.6	64.1
Dist. Of Columbia	5.0	6.2	23.4	North Dakota	0.7	1.0	57.7
Florida	1.9	3.0	57.1	Ohio	1.3	2.1	59.8
Georgia	1.6	2.6	62.0	Oklahoma	0.5	0.9	78.9
Hawaii	3.9	5.6	46.6	Oregon	4.6	6.3	38.4
Idaho	2.3	3.3	43.7	Pennsylvania	1.5	2.3	53.1
Illinois	1.9	3.0	55.2	Rhode Island	2.0	2.9	46.4
Indiana	1.7	2.7	55.9	South Carolina	1.8	2.7	54.4
Iowa	1.5	2.7	75.4	South Dakota	1.0	1.7	65.3
Kansas	1.9	3.0	62.4	Tennessee	1.6	2.4	50.0
Kentucky	1.7	2.4	45.6	Texas	1.3	1.9	49.1
Louisiana	0.7	1.1	59.0	Utah	1.5	2.7	77.9
Maine	2.5	3.8	52.7	Vermont	2.1	3.2	53.8
Maryland	2.5	3.6	41.5	Virginia	2.8	3.9	38.8
Massachusetts	2.6	3.5	36.0	Washington	4.6	6.1	31.5
Michigan	1.0	1.9	93.2	West Virginia	1.0	1.7	72.6
Minnesota	1.8	2.9	61.4	Wisconsin	1.8	3.0	61.5
Mississippi	0.9	1.4	62.4	Wyoming	1.0	1.6	57.7
Missouri	1.0	1.6	60.8	**Grand Total**	**2.1**	**3.1**	**51.4**

Source: Experian Automotive.

Hybrid and electric vehicles accounted for 3.5% of 2012 index sales, a 52% market-share uptick from the 2011 penetration rate of 2.3%. State registrations of new vehicles show that the adoption rate of alternate-powered vehicles varied widely from state to state. California's 7.5% alt-vehicle share led all states. Oregon's 6.3% penetration rate was next, followed by the District of Columbia (6.2%) and Washington (6.1%). States with the highest adoption rates for electric vehicles provided a variety of incentives such as tax credits, reduced license and registration fees, purchase rebates, home charging rebates, insurance discounts, single occupancy HOV lane access, and free metered parking.

Oklahoma, Louisiana and North Dakota had the lowest adoption rate – less than 1%. In Michigan, where several new alternative powered vehicles recently began production, alt-power vehicle share of new registrations rose 93.2% in 2012 to almost 2%. Hawaii's 1% electric-vehicle market share led all states.

WardsAuto Fuel Economy Index: Methodology

WardsAuto Fuel Economy Index is derived by calculating average fuel economy for each vehicle model tracked by the Index, using annual installation rates of engine variants for each model and the corresponding EPA-published combined city/highway window sticker fuel-economy ratings to weight monthly sales of each vehicle. Weighted model-line sales for segments, brands and other groupings of LV sales - for any given time period - are summed for the entire period and divided by actual unit volume sales to arrive at the corresponding average fuel economy rating for the grouping and/or time period.

The Index uses monthly U.S. Light Vehicle sales and annual Model Year Engine Installation rates as reported by WardsAuto.

Vehicle EPA ratings are updated each model year in September and again in March, and an algorithm is applied to calculate sales mix between current and prior model-year vehicles during the fourth quarter of each year, except where more precise sales information is available. For vehicles sold after the end of their final year of production, the vehicle's last EPA window-sticker fuel economy is used for all remaining sales.

Segment groupings in this report follow WardsAuto segmentation definitions. However, commercial grade light trucks not included in the published EPA fuel economy guide are excluded from the index.

As footnoted above, the government uses two different sets of numbers to describe vehicle fuel economy. One method, used by EPA, provides the city, highway and combined city/highway numbers that appear on new vehicle labels. (See Figure S - sample EPA vehicle sticker.) There are separate regulations governing the test methods and procedures used to determine the fuel economy values under the Corporate Average Fuel Economy (CAFE) and greenhouse gas programs. Typically, the EPA label value is about 20 percent lower than the CAFE number. EPA changed its label calculation methodology in 2008. All data in this report reflects the adjusted values.

Figure S: Sample EPA vehicle window-sticker.

The WardsAuto Fuel Economy Index is intended to show directional change in fuel economy over time, and to offer comparative views of fuel economy across segmentations and other vehicle groupings within the U.S. LV market.

ABOUT WARDSAUTO

WARDSAUTO has been a trusted source of automotive information for over 80 years. The WardsAuto data group, analysts and reporters provide global automotive intelligence to OEMs, suppliers, government agencies and professional observers of the automotive industry through a variety of platforms, including the WardsAuto.com website, WardsAuto InfoBank databases, WardsAuto Forecasts, and numerous publications, including Ward's Automotive Reports and the Ward's Automotive Yearbook.

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