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NADA Used Car Guide

PERSPECTIVE

Alternative Powertrains:

Analysis of Recent Market Trends & Value Retention

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Alternative Powertrains: Analysis of Recent Market Trends & Value Retention

Introduction

The Toyota Prius has long been the darling of alternative powertrains, but despite its run as a posterchild for environment-friendly cars approaching the two decade mark, the history of alternative vehicles goes back even farther. Considering the length of time such cars have been available in the marketplace and the high amount of media coverage they’ve received, it may seem logical to assume alternative powertrains have gained significant traction among today’s consumers.

This report reviews how powertrains powered solely by gas or diesel (products made from crude oil) have performed in the U.S. marketplace versus alternatives — such as hybrids, plug-in hybrids, electrics, natural gas and fuel cells — as well as how they’ve fared from a used vehicle value retention standpoint.

Looking at the past three calendar years, a whopping 47.7 million gasoline and diesel-powered vehicles were sold in the U.S., representing 96.6% of total sales over that period. By comparison, market share for alternative powertrains decreased from 3.8% in 2013 to just 2.8% in 2015, with sales last year falling below 500,000 units despite the industry achieving nearly 17.4 million new vehicle sales. Although hybrids, electrics and other “green cars” have been widely available for years, these vehicles have carved out a mere fraction of the market as the vast majority of car buyers remain hesitant or unwilling to forego the familiarity of gas and diesel vehicles for nontraditional powertrains.

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Hybrids are by far the most prevalent non-gasoline or non-diesel vehicle type with 1.32 million deliveries over the last three years. They account for 79.8% of the alternative powertrain market over the trio of years. However, hybrids as a percent of all alternative powertrain sales have decreased from 83.2% of the market in 2013 to 76.7% in 2015 as demand has steadily waned. What also stands out regarding hybrids is their high concentration of Toyota models, which made up over 60% of all hybrid sales last year. In fact, roughly 56% of total hybrid deliveries came from the Prius, Prius C, and Camry nameplates alone.

Combined with the sales tally from its Lexus brand, Toyota Motor Sales controlled exactly 70% of the hybrid market and almost 55% of the entire alternative powertrain market in America in 2015. Consequently, it is clear that Toyota is a very major player in the green vehicle landscape and the Japanese automaker’s performance greatly affects its competition, consumer behavior and even policymaking.

The next most significant powertrain type is electric, which in combination with hybrids has firmly maintained just over 90% of the alternative powertrain marketplace over the past few years (natural gas and fuel cell share has been negligible). When analyzing the sales distribution over time, however, we see that electric vehicle deliveries have risen by close to 50% between 2013 and 2015 while hybrid deliveries fell by just under 23%. Electric vehicles (EVs) accounted for 14.4% of all alternative powertrain sales in the last year, which was a 6.3-percentage point increase over 2013.

With the total market for hybrids and EVs basically unchanged in the past few years, the shift in alternative vehicle sales suggests electric vehicles are not necessarily helping green technologies attain a greater presence in the market. Instead, EVs appear to be growing at the expense of hybrids and are somewhat cannibalizing sales of their green vehicle counterparts.

An analysis of vehicle disposal — or consumer conquest — data reveals the true dynamics of the alternative powertrain marketplace and tells us more about what’s going on regarding new versus replacement sales¹. Looking at electric vehicles, we see

Total Automobile Industry Sales Comparison

Powertrain Type	CY2013	CY2014	CY2015
Gas / Diesel	14,943,436	15,861,813	16,893,088
Hybrid	489,413	452,507	378,402
Electric	47,595	64,772	70,823
Plug-in Hybrid	48,957	55,441	43,458
Natural Gas	2,198	751	486
Fuel Cell	10	2	74

Source: WardsAuto

Total Market Share Comparison

Gas / Diesel versus Alternative Powertrains

Powertrain Type	CY2013	CY2014	CY2015
Gas / Diesel	96.2%	96.5%	97.2%
Alternative Powertrains	3.8%	3.5%	2.8%

Source: WardsAuto

Alternative Powertrain Market Share Comparison

Powertrain Type	CY2013	CY2014	CY2015
Hybrid	83.2%	78.9%	76.7%
Electric	8.1%	11.3%	14.4%
Plug-in Hybrid	8.3%	9.7%	8.8%
Natural Gas	0.4%	0.1%	0.1%
Fuel Cell	0.0017%	0.0003%	0.015%

Source: WardsAuto

1 Conquest data was sourced from the J.D. Power Power Information Network® (PIN), which provides real-time automotive information and decision-support tools based on the collection and analysis of daily new- and used-vehicle retail transaction data from thousands of automotive franchises.

the percentage of disposals across powertrain types has been remarkably static over the past few years, with a marginal increase of diesel disposals exhibited in 2015.

However, we know based off sales data that electrics have gained a greater share of the green vehicle market in recent years, which indicates the uptick in EV purchases reflect an increase in all-new sales as opposed to higher loyalty or conquest from other powertrain types. Among hybrids, the percentage of traditional gas-powered vehicles being traded in for hybrids has decreased over the past few years while hybrid loyalty has increased. This suggests a combination of lower gasoline conquests and all-new hybrid sales has contributed to the shrinking of the hybrid market in favor of electric vehicles.

Finally, more plug-in hybrid and electric vehicle drivers are beginning to turn in their vehicles for newer plug-in hybrids or EVs, especially in 2015 when the percentage of disposals reached 6.4% compared to a 3-year average of 3.4%. Hybrid conquests, however, gradually represent a smaller share of disposals among plug-in hybrid electric sales, which is further evidence of diminishing demand for hybrids versus electric vehicle alternatives.

Vehicle Disposal Comparison by Powertrain Purchase Type

Powertrain Type Purchased	Disposal Type	CY2013	CY2014	CY2015	3-Year Avg.
Electric	Gas	84.1%	87.7%	83.0%	85.3%
	Hybrid	8.9%	7.6%	8.7%	8.3%
	Electric	4.2%	3.1%	3.4%	3.5%
	Diesel	1.6%	1.2%	3.7%	2.2%
	Electric/Hybrid	1.0%	0.3%	0.9%	0.7%

Powertrain Type Purchased	Disposal Type	CY2013	CY2014	CY2015	3-Year Avg.
Electric/Hybrid	Gas	75.8%	78.2%	75.2%	76.6%
	Hybrid	20.1%	16.9%	15.4%	17.5%
	Electric/Hybrid	1.8%	2.5%	6.4%	3.4%
	Diesel	1.4%	1.6%	2.0%	1.6%
	Electric	0.8%	0.6%	0.8%	0.7%
	Natural Gas	0.1%	0.1%	0.2%	0.1%

Powertrain Type Purchased	Disposal Type	CY2013	CY2014	CY2015	3-Year Avg.
Hybrid	Gas	78.1%	74.7%	69.8%	74.4%
	Hybrid	21.1%	24.4%	29.4%	24.8%
	Diesel	0.8%	0.7%	0.7%	0.7%
	Electric/Hybrid	0.0%	0.1%	0.1%	0.1%
	Electric	0.0%	0.0%	0.0%	0.0%
	Natural Gas	0.0%	0.0%	0.0%	0.0%

Source: J.D. Power

Technology Advancements Narrow the “Green” Gap

From a fuel economy perspective, it is worth mentioning gasoline-powered vehicles have made significant strides in their own right and have done much to impede the progress of alternative powertrain vehicles — whose main selling point is their smaller carbon footprint. In fact, improvements in light-duty automotive technology — as well as more widespread application of these advancements — have begun to have a tremendous impact on the progress of adjusted fuel economy (MPG) and adjusted CO₂ emissions over the last decade.

As seen in the “Technology Production Share” chart on page 5, by model year 2013, the majority of vehicles produced were configured with a six-speed transmission, but just five years earlier only about a fifth of the vehicles manufactured were built with that

transmission type. Regarding powertrain enhancements, variable valve timing and multi-valve engine design are now seen in nearly every car and truck produced. Gasoline direct injection and turbocharging technologies have become more commonplace as a means of providing both greater fuel economy and lower emissions without sacrificing performance .

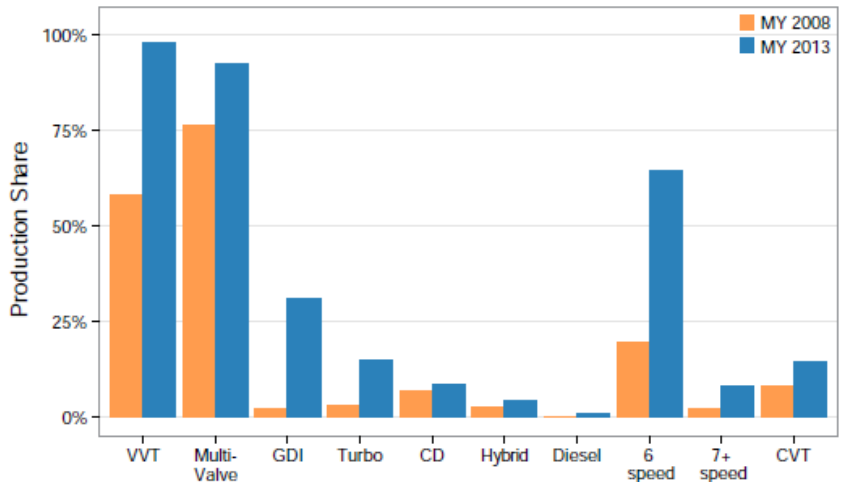
It must be noted that many of the advances in gas powertrains translate into improvements for alternative fuel powertrains as well.

However, due to significant gains made by gas-powered vehicles in the last decade or so, the gap between traditional and alternative powertrain vehicles has undoubtedly

decreased. As a result, many traditional gas-powered vehicles are now also able to market themselves as being “green,” a message that works against hybrids since they are no longer able to claim as much environmental superiority as they once did.

In the long-run, it is expected that alternative powertrains will ultimately supplant gas and diesel-powered vehicles as technology continues to evolve. For the time being, it would not be a surprise to see the trends observed in recent years persist over the short run.

Technology Production Share for MY 2008 and MY 2013

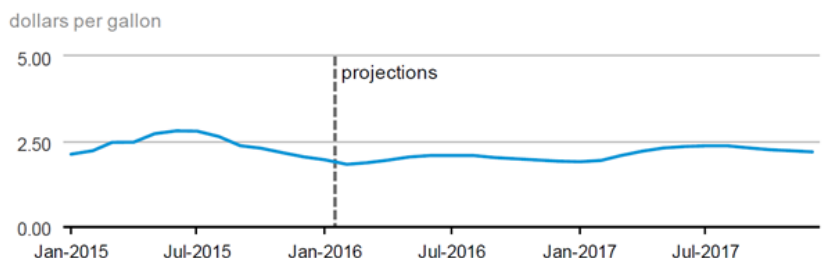


Source: U.S. EPA “Light-Duty Automotive Technology, Carbon Dioxide Emissions, and Fuel Economy Trends: 1975 Through 2013”

Low Fuel Prices to Work against Alternative Demand

According to the U.S. Energy Information Administration (EIA) forecast for “Gasoline Regular Grade Retail Price Including Taxes, U.S. Average,” which is published in the organization’s “Short-Term Energy Outlook,” gasoline prices are projected to be relatively static between now and the end of 2017. With average regular grade gas prices expected to remain well under \$2.50 per gallon in the United States over the short-term, there is little reason to believe that buyers who are sensitive to high gasoline expenses will be inclined to choose an alternative powertrain vehicle over a

Gasoline Regular Grade Retail Price Incl Taxes, U.S. Average



Source: Short-Term Energy Outlook

traditional gas-powered automobile due to the cost of fuel. Nevertheless, it's entirely possible that even with low gas prices expected to remain for a few years, some environmentally-conscious consumers will continue to actively purchase EVs or plug-in hybrids to complement their daily drive.

Used EV Value Retention Continues to Lag

With depreciation representing another major factor in a vehicle's cost of ownership aside from fuel expenses, we will examine how well alternative powertrains — namely hybrids, plug-in hybrids and electrics — perform from a value retention standpoint.

By and large, weak demand and high new vehicle incentives mean prices of used EVs and plug-in hybrids fall at a much higher rate than they do for gasoline or traditional hybrid models. For example, in 2015, gasoline-powered models depreciated by an average of roughly 15% to 16% while hybrid model prices fell by 17% – 18%. By comparison, prices of used plug-in hybrids fell by an average of 25%, while most EV models experienced losses exceeding 30%.

The higher rate of depreciation means that EV and plug-in hybrid retained value is frequently inferior to that of competitive gas and hybrid models. For example, three-year-old gas powered compact cars retained an average of 49.5% of their original, equipped Manufacturer Suggested Retail Price (MSRP) over the first quarter of 2016. Meanwhile, retained value of three-year-old plug-in hybrid compact cars ranged from approximately 31% to 38%, while retention for the all-electric Nissan Leaf and Ford Focus stood at just 27% and 22%, respectively.

It should be noted that while the relative softness in plug-in vehicle retention is nearly universal, Tesla's Model S bucks the trend by retaining just over 56% of its original value — a more than 10-percentage point advantage versus the 45.4% average of competitive gas engine luxury large cars.

The following tables (on page 7) provide a complete summary of three-year-old model (2013) hybrid, plug-in hybrid and electric vehicle retained value by vehicle segment. Gasoline engine segment averages are also included to provide additional context. All calculations are a function of the Q1 2016 average of NADA Used Car Guide's average trade-in value divided by a vehicle's typically-equipped MSRP. Please note a vehicle's rate of depreciation — and ultimately retention — is in part a product of the level of discounts when new. As such, MSRPs do not include any incentives or rebates available at the time of purchase.

2013 Model Year 3-Year Vehicle Value Retention by Segment

Subcompact Car

Fuel Type	Make	Model	Retained Value
Hybrid	Honda	CR-Z	47.9%
Electric	Fiat	500	26.7%
Electric	Smart	FORTWO	22.2%
Gasoline	Segment Average		44.1%

Compact Car

Fuel Type	Make	Model	Retained Value
Hybrid	Toyota	Prius	53.9%
Hybrid	Honda	Civic	46.1%
Hybrid	Honda	Insight	45.9%
Hybrid	Lexus	CT	44.9%
Hybrid	Volkswagen	Jetta	40.6%
Hybrid	Ford	C-Max	39.1%
Electric/Hybrid	Toyota	Prius	38.4%
Electric/Hybrid	Ford	C-Max	33.6%
Electric/Hybrid	Chevrolet	Volt	31.0%
Electric	Nissan	Leaf	26.9%
Electric	Ford	Focus	21.7%
Gasoline	Segment Average		49.5%

Mid-Size Car

Fuel Type	Make	Model	Retained Value
Hybrid	Toyota	Camry	51.9%
Hybrid	Ford	Fusion	50.1%
Hybrid	Kia	Optima	44.7%
Hybrid	Hyundai	Sonata	43.3%
Hybrid	Chevrolet	Malibu	42.8%
Hybrid	Buick	Lacrosse	40.5%
Hybrid	Buick	Regal	37.9%
Electric/Hybrid	Ford	Fusion	35.1%
Gasoline	Segment Average		47.4%

Large Car

Fuel Type	Make	Model	Retained Value
Hybrid	Toyota	Avalon	53.4%
Gasoline	Segment Average		46.6%

Compact Utility

Fuel Type	Make	Model	Retained Value
Electric	Toyota	RAV4	42.5%
Gasoline	Segment Average		55.7%

Mid-Size Utility

Fuel Type	Make	Model	Retained Value
Hybrid	Toyota	Highlander	60.8%
Gasoline	Segment Average		57.9%

Large Utility

Fuel Type	Make	Model	Retained Value
Hybrid	GMC	Denali	55.8%
Hybrid	GMC	Yukon	54.3%
Hybrid	Chevrolet	Tahoe	52.9%
Gasoline	Segment Average		56.8%

Luxury Subcompact Car

Fuel Type	Make	Model	Retained Value
Hybrid	Acura	ILX	50.0%
Gasoline	Segment Average		50.8%

Luxury Compact Car

Fuel Type	Make	Model	Retained Value
Hybrid	Lexus	ES	52.9%
Hybrid	Lincoln	MKZ	44.8%
Hybrid	BMW	3 Series	44.3%
Gasoline	Segment Average		47.7%

Luxury Mid-Size Car

Fuel Type	Make	Model	Retained Value
Hybrid	Infiniti	M	44.0%
Hybrid	Lexus	GS	43.8%
Hybrid	BMW	5 Series	40.3%
Hybrid	Mercedes-Benz	E Class	39.8%
Gasoline	Segment Average		46.3%

Luxury Large Car

Fuel Type	Make	Model	Retained Value
Electric	Tesla	Model S	56.2%
Hybrid	Lexus	LS	51.4%
Hybrid	Porsche	Panamera	46.5%
Hybrid	Mercedes-Benz	S Class	42.0%
Hybrid	BMW	7 Series	40.5%
Gasoline	Segment Average		45.4%

Luxury Compact Utility

Fuel Type	Make	Model	Retained Value
Hybrid	Audi	Q5	60.5%
Gasoline	Segment Average		55.1%

Luxury Mid-Size Utility

Fuel Type	Make	Model	Retained Value
Hybrid	Lexus	RX	54.8%
Hybrid	Porsche	Cayenne	52.1%
Hybrid	Volkswagen	Touareg	44.0%
Gasoline	Segment Average		53.6%

Luxury Large Utility

Fuel Type	Make	Model	Retained Value
Hybrid	Cadillac	Escalade	51.5%
Gasoline	Segment Average		56.9%

Large Pickup - 1/2 Ton

Fuel Type	Make	Model	Retained Value
Hybrid	Chevrolet	Silverado 1500	56.3%
Hybrid	GMC	Sierra 1500	55.8%
Gasoline	Segment Average		59.9%

AT NADA USED CAR GUIDE

What's New

The new NADA Values Online introduces New Vehicle Values, a range of values that provide new vehicle pricing guidance based on actual market transactions and market influencers. It also includes inventory valuation, vehicle valuation trends and a custom reporting tool to help you see vehicle values from every angle.

With NADA Values Online, you have the data and insight you need to make better business decisions and see better outcomes.

See how we can help your business >> Go to nada.com/valuesonline.

On the Road

Learn the latest developments in the used vehicle market and get an industry forecast from Jonathan Banks during the Automotive News Power Training Webinar on April 28. Registration is free at [https://vts.inxpo.com/Launch/QReg.htm?ShowKey=31517&AffiliateData=\[NADAUCG\]](https://vts.inxpo.com/Launch/QReg.htm?ShowKey=31517&AffiliateData=[NADAUCG])

Larry Dixon will speak in the educational session named, "Collateral Values: How Much Will Valuations Drop?" on May 10 (3:45pm) during the 2016 Auto Finance & Compliance Summit.

Come see Jonathan Banks speak about the current state of the used vehicle market and what is in store for the second half of the year at DRIVE '16: CU Direct's Marketing and Lending Conference, May 17 in San Diego.

Bring your questions for Larry Dixon on June 2 at the 20th Annual Non-Prime Auto Financing Conference in Plano, Texas. Mr. Dixon will be featured on a panel about factors contributing to risk in pricing used vehicle values.

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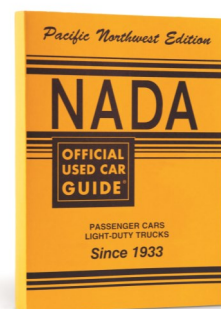
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NADA USED CAR GUIDE CONSULTING SERVICES

NADA Used Car Guide’s market intelligence team leverages a database of nearly 200 million automotive transactions and more than 100 economic and automotive market-related series to describe the factors driving current trends to help industry stakeholders make more informed decisions. Analyzing data at both wholesale and retail levels, the team continuously provides content that is both useful and usable to the automotive industry, financial institutions, businesses and consumers.

Complemented by NADA Used Car Guide’s analytics team, which maintains and advances its internal forecasting models and develops customized forecasting solutions for automotive clients, the market intelligence team is responsible for publishing white papers, special reports and the Used Car & Truck Blog. Throughout every piece of content, the team strives to go beyond what is happening in the automotive industry to confidently answer why it is happening and how it will impact the market in the future.

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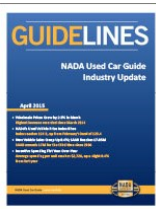
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Guidelines

Updated monthly with a robust data set from various industry sources and NADA Used Car Guide’s proprietary analysis, *Guidelines* provides the insight needed to make decisions in today’s market.



White Papers

NADA Used Car Guide’s white papers and special reports aim to inform industry stakeholders on current and expected used vehicle price movement to better maximize today’s opportunities and manage tomorrow’s risk.



Perspective

Leveraging data from various industry sources and NADA Used Car Guide’s analysts, *Perspective* takes a deep dive into a range of industry trends to determine why they are happening and what to expect in the future.



Used Car & Truck Blog

Written and managed by the Market Intelligence team, the Used Car & Truck Blog analyzes market data, lends insight into industry trends and highlights relevant events.

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