

HYBRID AND ELECTRIC VEHICLES: A RENEWABLE GROWTH OPPORTUNITY?

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INTRODUCTION

Hybrids, or hybrid-electric vehicles (HEVs), have certainly received a lot of press over the last couple of years. The first thing most people think of when you mention a hybrid, is the Toyota Prius (unless you're a golfer...then "hybrid" means that new golf club – a "hybrid" wood/iron – that saved your golf game). The Prius has represented the lion's share of the HEVs that sell each year, essentially since it began production, although there is a rapidly growing list of new hybrid models coming to market each year. With last year's rapid climb in oil prices leading to \$4.00/gallon gasoline prices last summer, the outlook had never looked brighter for HEVs. However, the subsequent drop in oil prices from the peak of \$147 per barrel to the \$40 level, coupled with a global recession and collapsing U.S. and global automobile sales, took the wind out of the sails for continued uninterrupted hybrid vehicle growth. So, the questions today are: Will growth renew for this newest generation of vehicles? If so, how can investors take advantage of renewed growth?

INDUSTRY BACKGROUND AND STATE OF THE INDUSTRY

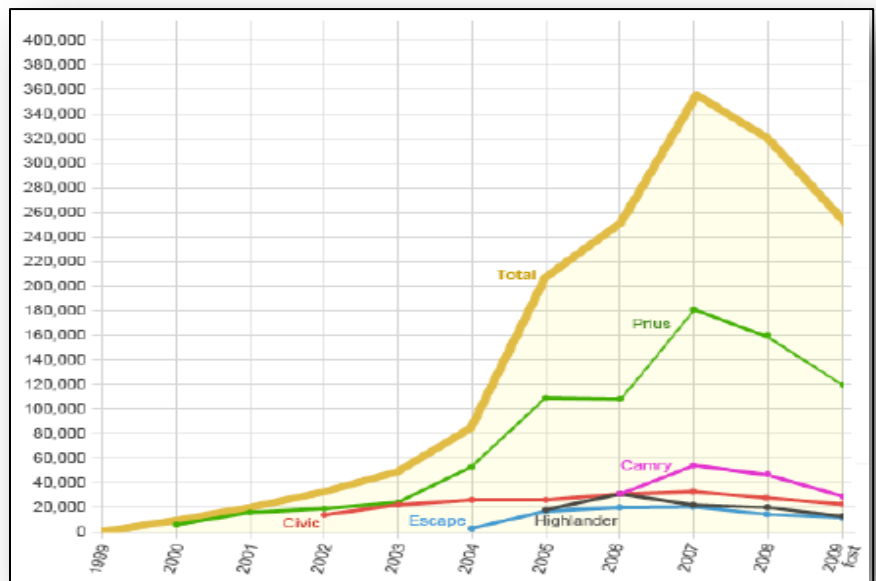
Hybrid electric vehicles (HEVs) effectively offer two propulsion systems in one car. HEVs have a traditional internal combustion gasoline engine and traditional drive train, and an additional electric-motor-driven system, such that the car can operate solely on electric (battery) power and switch over to gasoline-engine power when the battery runs out. The obvious benefit is that you use less gasoline in a hybrid, therefore saving on fuel costs, plus you get to enjoy the good feeling of helping to save the planet.

Today, there are multiple variations of HEVs that use a range of battery power – some of which offer higher efficiencies than others. For example, "mild hybrids" provide some (potentially modest) benefit and increase your gas mileage, but they are not as beneficial as a more aggressive HEV. "Full hybrids" incorporate a larger set of batteries, use electric power a larger portion of the time, and result in



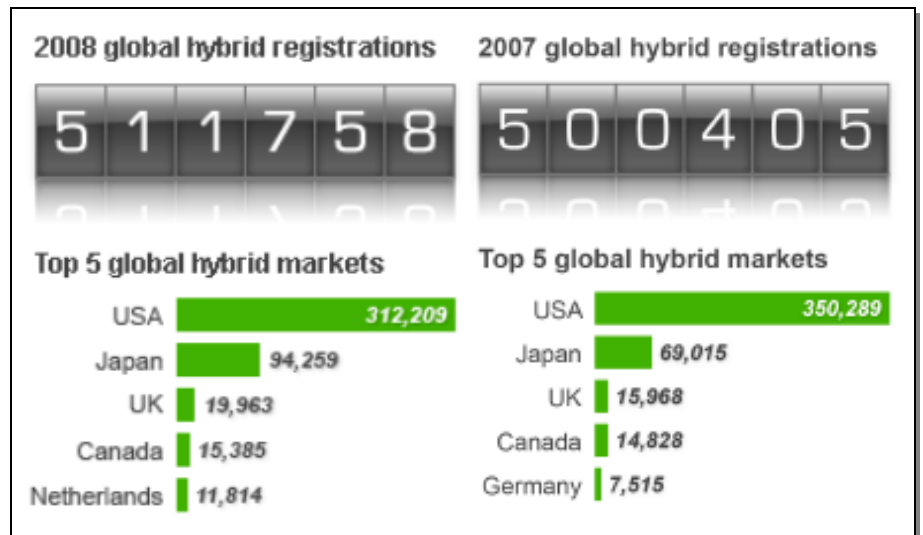
more significant efficiencies and fuel savings. In addition to today's HEVs, an emerging class of hybrids is beginning to go into production – “plug-in hybrid electric vehicles”, or PHEVs. PHEVs are different from today's hybrids because there is no traditional drive train powered by a gasoline engine. The car is propelled solely by the electric drive system. However, there is a small gasoline engine that operates only to charge the batteries for the electric drive. PHEVs have the potential to be significantly more efficient than today's hybrids. Finally, at the very end of the spectrum is the all-electric vehicle, or EV, which has no gasoline engine whatsoever, and is completely powered by batteries and an electric motor.

Sales of HEVs began in the 1999-2000 time frame and began to represent “meaningful” U.S. volume in the 2003-2004 period – reaching 50,000 in 2003 and 80,000 vehicles in 2004. Growth then essentially exploded in a three-year span and reached more than 350,000 vehicles in 2007 in the United States – rising sevenfold from 2003 to 2007. At that point, the growth curve looked rosy, and expectations were in place for this exceptional growth to continue. However, as noted above, the issues of 2008 resulted in a dramatic decline in auto sales in the second half of 2008 and these substantially reduced industry volumes continue today – although there are now signs of hope for improvement in the coming months. Not unexpectedly, considering the challenges of the economic environment, sales of HEVs in the U.S. declined 10% to about 320,000 in 2008, comparing favorably to the 18% decline in total auto sales. When put in context of the broader auto industry, the 10% decline in hybrid volumes is not surprising, and one could argue hybrids fared quite well. U.S. 2009 HEV volumes are estimated to decline once again by about 18% (per HybridCars.com). The following chart shows the impressive growth of hybrids in the U.S. and the subsequent declines in 2008 and 2009 (estimated).



Source: www.hybridcars.com

On a global basis, hybrid volumes totaled about 512,000 in 2008 – actually up 2% from 2007. While the U.S. was down 10% as noted above, the Japanese market grew 37% to about 94,000 units. As the chart below shows, while the U.S. is the dominant market today for hybrids, representing roughly 60% of the total (versus 70% in 2007), Japan remains the second largest market and is growing significantly. Japan grew as a percentage of the total in 2008, moving up to 18% from 14% in 2007. In the first quarter of 2009, the Japanese market has continued to take share of the hybrid market, with sales of 26,650 – roughly half of the units sold in the U.S. At the Q1 rate, the U.S.-to-Japan volume ratio is 2:1, versus 5:1 in 2007 – demonstrating the growing traction in Japan. More than anything, this global data shows that the market is currently dominated by the U.S. and Japan (~80% of total units, combined), although as more government incentives are put in place globally, the composition of the market for hybrid vehicles is likely to change.



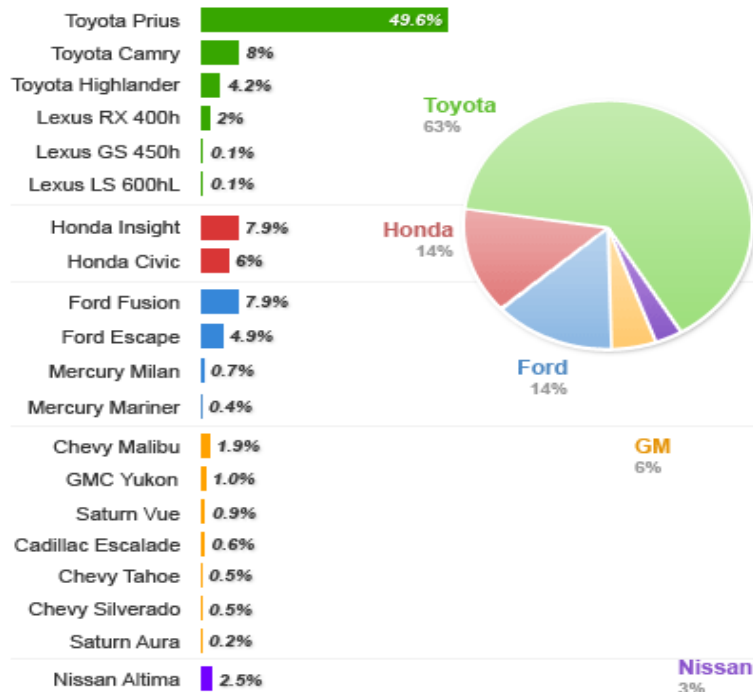
Source: www.hybridcars.com

On a model-by-model basis, the U.S. market continues to be dominated by the Toyota Prius, which represents nearly 50% of all hybrids sold in June 2009 (up from about 40% in May). The Prius has been in the 40%-50% range over the last year or so. However, it is important to note that the number of models introduced continues to grow, and some models are beginning to build significant traction. Specifically, the new Honda Insight was launched this year to much fanfare, and the model has quickly garnered between 8% and 11% of the market on a unit basis in the May-June time frame.

US hybrid sales for July 2009

Model	Units	vs. last month	vs. June 2008	CYTD	vs. CYTD 2008
Prius	19,173	↑47.5%	↑29.7%	74,924	↓29.5%
Insight	2,295	↑10.4%	n/a	9,819	n/a
Camry	2,509	↑19.9%	↓5.1%	15,516	↓-53.2%
Fusion	2,589	↑25.8%	n/a	7,999	n/a
Civic	969	↓-38.8%	↓-71.8%	13,297	↓-40.8%
Escape	2,329	↑79.8%	↑130.4%	9,511	↓-14.6%
Highlander	1,171	↑6.6%	↓-14.6%	7,530	↓-47.8%
Altima	1,030	↑54.7%	↓44.1%	4,204	↓33.2%
RX400h	1,369	↑159.8%	↓-4.9%	7,167	↓-31.6%
Malibu	476	↓-2.7%	↓36.4%	3,107	↑382.5%
Tahoe	254	↑0.4%	↑22.7%	1,964	↑68.5%
Vue	269	↑12.6%	↓-25.7%	1,776	↑49.6%
Milan	221	↑18.8%	n/a	750	n/a
Escalade	167	↑7.7%	n/a	1,050	n/a
Yukon	117	↓-15.8%	↓-18.8%	1,076	↑20.9%
Silverado	180	↑46.3%	n/a	650	n/a
Mariner	214	↑94.5%	↓-15.7%	923	↓-40.4%
Aura	24	↓-57.1%	↓-17.2%	214	↑67.2%
GS450h	45	↑66.7%	↑12.5%	253	↓-49.3%
LS600hL	28	↓-9.7%	↓-66.3%	185	↓-74.3
All hybrids	35,429	↑35.2%	↑31.8%	161,956	↓-23.3%
All vehicles	996,890	↑15.9%	↓-12.3%	5,807,035	↓-32.2%

US hybrid sales for June 2009 by manufacturer and model



Source: www.hybridcars.com

WHAT IS THE OPPORTUNITY GOING FORWARD?

As we look forward, the question is whether the market for hybrids, plug-in hybrids, and electric vehicles offers meaningful growth and investment opportunity. Clearly, the global auto industry has suffered through an excruciating period of time, and it will likely remain challenged for quite some time. With that said the monthly auto data are beginning to show signs of improvement from a very low level (the “Cash for Clunkers” program certainly helped). Whether the industry remains near its lows for a long period of time, or begins a strong recovery process is up for debate.

From a hybrid vehicle perspective, the opportunity may be ripe for a return to growth in either case. As the July 2009 data shows (above), hybrids accounted for only 3.5% of the total units sold in the U.S. With such a low penetration rate, picking up an additional percentage point or two of market share would represent a sizable growth opportunity. To that end, the potential market for hybrid/electric vehicles includes a meaningful roster of drivers who only drive short distances on a daily basis. For this segment of drivers, hybrids could enable people to substantially reduce and/or nearly eliminate their gasoline consumption. Should this driver population decide that hybrid/electric is the way to go; this emerging class of vehicles could garner a material share of the overall automobile market in the coming years.

In looking for investment opportunities in the potential growth of the hybrid vehicle market, there may be opportunities throughout the supply chain. The first beneficiary would be the car manufacturers themselves – and those with the most exposure to a faster-growing hybrid market could benefit the most. Secondarily, the suppliers into the auto industry could benefit by supplying hybrid-specific parts, or by supplying the right (hybrid focused) manufacturers.

An important facet in the hybrid vehicle opportunity and the growth of the market is battery technology. Perhaps the most significant technological hurdle in bringing HEVs, PHEVs, and EVs to market in substantial volumes is a cost-effective, high-power, small, light and safe battery. Today’s hybrid batteries are mostly based on nickel metal-hydride (NiMH) technology, but as the market moves toward PHEVs and EVs, there appears to be general agreement that new, lighter, smaller lithium-ion (Li-ion) batteries will be the best solution. There is currently a substantial effort (or race...) in the battery industry today to develop and produce – in volume – viable, cost-effective production hybrid batteries to take advantage of this emerging industry.

With substantial U.S. government funding helping the process, this new-generation battery industry is another potential way to benefit from a growing hybrid and electric vehicle market.

In conclusion, the hybrid vehicle market is still in its infancy, globally. Should the auto industry begin to turn itself around, should energy prices remain reasonably high, and should the relative technological hurdles be overcome, hybrids and electric vehicles could represent a long-term growth and investment opportunity in the coming years. While there are certainly risks, as there are in any investment opportunity, the hybrid vehicle industry may be an exciting place to be.

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