

## Support from the Top

"With more research and incentives, we can break our dependence on oil with biofuels, and become the first country to have 1 million electric vehicles on the road by 2015."<sup>1</sup> Those were the words delivered by President Barack Obama during his January 27, 2011 State of the Union address, as he reiterated his commitment to the U.S. development and implementation of green technologies. This is a somewhat ambitious goal, especially in relation to electric vehicles. A recent report by J.D. Power & Associates forecast that the combined global sales of hybrid electric vehicles (HEVs) and battery electric vehicles (BEVs) will total 5.2 million units by 2020. This figure would account for only 7.3 percent of the 70.9 million passenger vehicles expected to be sold worldwide by that year. Part of President Obama's plan to reach this goal involves 90 percent budget increases to funding for vehicle technologies (to around \$590 million), as well as enhancing existing tax incentives and developing extensive electric vehicle infrastructure. The development of electric and alternative energy vehicle infrastructure will be increasingly important, as more all-electric and extended-range electric vehicles are expected to be launched in the near future. Having an adequate amount of charging stations/hydrogen stations will be major hurdle to overcome in making electric and fuel cell powered vehicles viable, both in terms of practicality and in overcoming what GM has termed consumer 'range anxiety.'



## No Longer a Single Player Market

In 1997, Toyota introduced the first full hybrid-electric mid-sized car with the Prius. Since its worldwide introduction in 2001, the Prius has dominated the hybrid vehicle market; especially in the United States. With several new models, including an all electric plug-in Prius, slated to be released in the coming years, all indications point to Toyota continuing to be a driving force within the hybrid vehicle market. However, things are beginning to get much more crowded as most major automotive and several start-up companies

begin to enter the market. J.D. Power & Associates forecast that all domestic auto manufacturers to have hybrid and plug-in vehicles by the end of 2011, and that there will be over 100 HEV and PHEV models offered by 2013.<sup>2</sup>

A recent entrant to the market that many anticipate to make a major splash with consumers is the 2011 Chevy Volt. Though it is priced higher than the 2011 Toyota Prius (\$32,780 vs. \$23,050), the Volt is an extended-range electric vehicle powered by a 16-kWh lithium-ion (Li-ion) battery that allows it to run on pure electricity for an EPA estimated 35 miles. If an individual needs to travel beyond that initial distance, the gasoline powered extended-range mode kicks in, allowing for up to another 375 miles of travel before needing to recharge the battery or refill the gas tank.<sup>3</sup>

Another highly anticipated launch has been that of the Nissan LEAF. Unlike the Volt, the LEAF is a pure electric vehicle that is powered solely by a rechargeable Li-ion battery pack and never requires a drop of gasoline. The U.S. government is encouraging the purchase of 100% electric vehicles such as this, offering various federal tax savings programs that can shave up to \$7,500 off the MSRP \$32,780. The LEAF is designed to travel a 100 miles on a single charge, though the actual range is highly dependent on driving conditions and other factors such as heating and AC levels.<sup>4</sup> Though the 100 mile range is more than enough for the 70% of the population who drive less than 40 miles a day, it becomes an issue when longer trips or unexpected travel needs arise, and can generate the aforementioned 'range anxiety' amongst consumers.

<sup>1</sup> <http://www.ibtimes.com/articles/105662/20110127/obama-electric-vehicles.htm>

<sup>2</sup> [http://www.dcba.com/chinaforum2010/presentation/5\\_Mike.pdf](http://www.dcba.com/chinaforum2010/presentation/5_Mike.pdf)

<sup>3</sup> <http://www.chevrolet.com/volt/>

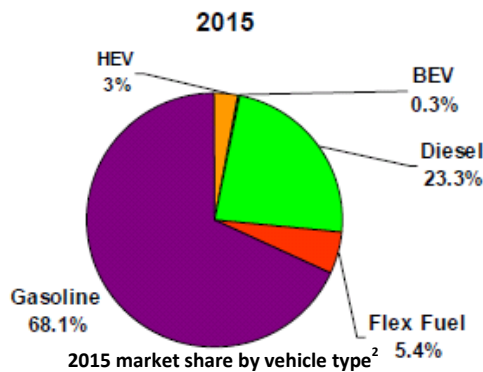
<sup>4</sup> <http://www.nissanusa.com/leaf-electric-car/index#/leaf-electric-car/specs-features/index>

## Powering the Future?

The Chevy Volt and the Nissan LEAF are just two of the many new hybrid and electric vehicles hitting the market. Auto industry mainstays such as Ford, Honda, Volkswagen, Volvo, Buick, Infiniti, Hyundai, Kia, Saab, Jaguar, BMW, Mercedes, and Audi plan to release hybrid/electric vehicle offerings over the next one to three years. Smaller start-ups such as Coda, Wheego, and Tango will also enter the market with pure electric vehicle releases next few years. All of these manufacturers use variations of hybrid-electric systems to power their vehicles, but one trend that seems to be developing industry wide is the shift toward the use of Li-ion batteries. Nickel-metal hydride batteries have been the OEM standard for most HEVs to date, but manufacturers are increasingly looking to Li-ion batteries of various chemistries that have been more traditionally used in consumer electronics. Li-ion batteries offer a higher energy density, enabling them to be smaller and lighter, output a higher voltage, and hold a charge much longer than nickel-metal batteries. These factors are especially important for pure electric vehicles such as the LEAF, which are powered by electricity alone.



Though this technology shows great promise for the automotive industry, it is about 40% more expensive to manufacture than nickel-metal batteries, is more conducive to fire risks, and technology associated with lithium-ion is still maturing and changing on a continuous basis.<sup>5</sup> Despite these and other issues, many battery giants such as Panasonic, Sanyo, A123, Automotive Energy Supply, GS Yuasa, Compact Power, Johnson Controls-Saft, etc, are investing in the technology and developing their own, closely guarded lithium-ion battery chemistries for automotive applications. These companies may be racing against the clock, as a massive consolidation within the batter industry is forecast over the next five to seven years.<sup>6</sup> They must contend with the need to perfect the technology for automotive use, while also bringing costs down to a price point where it can be both profitable for themselves and auto manufacturers, and affordable for consumers. Finding the right balance between performance and price will be crucial to capturing a substantial portion of the market beyond the wealthy, technology buffs, and the highly environmentally conscious. The companies that are able to achieve this first are likely those that will remain viable within the industry moving forward.



Beyond the competition within the industry, these battery companies and auto manufacturers in the hybrid/electric vehicle space will continue to face competition from gasoline, diesel, fuel cell, and flex fuel powered vehicles; most of which are forecast to maintain much higher market share for the foreseeable future.<sup>2</sup> Of the 816,653 vehicles sold during January 2011 in the U.S., only 19,463 were hybrids. Furthermore, only 408 of those 816,653 were electric vehicles.<sup>7</sup> At that pace, it would take the U.S. over 200 years to reach President Obama's goal of 1 million electric vehicles on the road. Needless to say, there is a long way to go to reach that number by 2015.

## FCSI Insights

Even with the uncertainty facing the HEV/PHEV/EV markets, and ancillary industries, there is great promise and need for alternative energy vehicles to succeed going forward. As gas prices continue to rise, new technologies are developed, and the cost to implement these technologies falls, hybrid vehicles are likely to gain much higher market penetration and become an increasingly more profitable for all parties involved. The importance of monitoring emerging and ongoing trends, major players, market conditions, innovations, new technologies, and state and federal regulations is imperative to success. Keeping up on all these factors requires accurate, timely information and insights in order for companies to develop competitive strategies and responses to the market that will allow them to get ahead. Fletcher/CSI's General Practice Group monitors and conducts extensive reviews and analysis of major players within the automotive, energy, and transportation industries, and is well equipped to provide the competitive edge needed for success.

<sup>5</sup> [http://batteryuniversity.com/learn/article/is\\_lithium\\_ion\\_the\\_ideal\\_battery](http://batteryuniversity.com/learn/article/is_lithium_ion_the_ideal_battery)

<sup>6</sup> [http://www.rolandberger.com/media/pdf/Roland\\_Berger\\_Li-Ion\\_batteries\\_20100222.pdf](http://www.rolandberger.com/media/pdf/Roland_Berger_Li-Ion_batteries_20100222.pdf)

<sup>7</sup> <http://www.hybridcars.com/hybrid-clean-diesel-sales-dashboard/january-2011.html>