



The Hybrid Vehicle and Alternative Fuel Report

October 15, 2016

The fine print: This report is a summary of articles appearing in popular, business, and technical media referring to the impact of fuel costs and fuel efficiency on vehicle technology, development, and markets. At the end of the report is a list of all articles summarized, with hyperlinks to internet sources where available. Some articles may require free registration or paid subscriptions to access. *The Hybrid Vehicle and Alternative Fuel Report* (ISSN: 1946-1011) is compiled, written, and edited by Thomas L. R. Smith, Ph. D. (hereinafter referred to as "The Editor"), Economic Analysis Branch of the Budget and Financial Analysis Division, Washington State Department of Transportation. Contact *The Hybrid Vehicle and Alternative Fuel Report's* editor at smithtm@wsdot.wa.gov or (360) 705-7941. Contributions of news items, original articles, cookies, and positive comments about *The Report* are welcome.

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National Sales for September 2016

Hybrid car sales were down slightly from the previous month and September last year, [HybridCars](#) (Cobb, October 4, 2016) says. Most of the mediocre performance stems from the main Prius model is just not selling as well as Toyota or analysts thought it would when it was reintroduced. Since Prius sales make up almost a third of hybrid sales, when Prius does poorly, the entire sector does poorly. As usual, Toyota hybrids accounted for 68.2 of the market. While Toyota dominated, most of its models declined from the previous month and year, while Ford, Hyundai, Honda, and Chevrolet models improved over the same time periods. But even with their gains, they are not making significant inroads on Toyota's dominance. Hybrids accounted for 2.19% of the new car market.

Plug-in sales were also down from August; however, they were well ahead of the previous year. The Volt led the sector with 33.64% of the market and even though sales were down, they were still at a good pace. The Ford Fusion also sold well and the two Ford plug-ins edged out General Motors with 38.78% of plug-in sales. Plug-ins accounted for 0.42% of new car sales (Cobb).

Fully electric cars are doing well. Brad Berman (October 2016) at [PluginCars](#) says that 17,000 plug-in vehicles sold (this includes plug-in hybrids) in the United States in September set an all-time record for U. S. sales. And that was with gas prices still at relatively low levels. A closer examination of [HybridCars'](#) (Cobb) numbers shows Tesla leading sales, with the top two battery cars, the Model S with 40.87% of the market and the Model X with 25.92% of the market. Nissan's Leaf is a distant third with 13.12%. Electric cars took 0.7% of new car sales. Combined hybrids, plug-in hybrids, and battery electric cars made up 3.31% of the new car market.

HYBRIDS

The City of Philadelphia acquired 22 plug-in Hybrid Fords, *Philly Voice* (Tanenbaum, October 3, 2016) voiced. The vehicles will be spread amongst the Philadelphia Police Department, the Streets Department, and other agencies. Seventeen of the vehicles are going to the Police and Sanitation Division of the Streets Department, while another five will go to other city agencies. Philadelphia already has 203 hybrids and plug-in hybrids in the City fleet. It even has an electric Zamboni in the Parks department.

The State of Delaware's alternative fuel vehicle incentive program proved so successful in its first 14 months that the State is altering the program, *Newsworks* (Eichmann, October 4, 2016) files. The rebate program got twice as many participants as expected. The State will increase the rebate for electric cars from \$2,200 to \$3,500.

London's Gatwick Airport's taxi fleet will transition to hybrid and electric by 2020, the *Crawley and Horley Observer* (Wynn-Davies, October 7, 2016) observed. Airport Cars Gatwick and the airport agreed to the move in the airport's drive to reduce emissions by 75%. Airport Cars Gatwick moves one million passengers to and from the airport. The taxi company has 250 vehicles that travel about 50,000 miles per taxi.

UPS just bought another 200 hybrid trucks from Workhorse Group, *Trucks.com* (Hawes, October 11, 2016) tells. Last May, UPS ordered 125 hybrids from that company. The new trucks will be available to UPS fleets in January 2017. Workhorse Group is also working on a delivery van-drone combination.

Ireland just extended tax breaks for hybrid and electric cars, *The Irish Times* (McAleen, October 11, 2016) informs. The benefits were slated to expire on December 31st, however, Ireland's new budget extends the hybrid tax break for two years and electric vehicle subsidy for five. A buyer can get a rebate of €1,500 (\$1,653.62) for a hybrid, €2,500 (\$2,756.04) for a plug-in hybrid, or €5,000 (\$5,512.07) for an electric car.

ELECTRIC VEHICLES

Wanaka, a town on New Zealand's South Island, will become the home to a 1904 Baker Electric car, the *Otago Daily Times* (Price, September 30, 2016) tells. The car lives in Christchurch, but its owner plans to retire and live in Wanaka. The 112-year-old car is one of six remaining Bakers and was built in the United States, where it stayed until 2012, when the current owner bought it and shipped it to New Zealand. The owner says the car is ideal for running into town to get coffee.

Nottingham, near Sherwood Forest, is planning on building a six-mile electric highway, *BBC News* (October 3, 2016) notes. Only electric buses, taxis, and private

automobiles will be allowed to use the electric lanes, however, there will be bicycle and gas vehicle lanes next to the electric route.

Porsche is developing its own electric vehicle charger, the BBC's *Top Gear* (Horrell, October 3, 2016) says. The subdivision of VW wants its fast charger to be the standard for Europe, so it is trying to recruit other German automakers to adopt their charger. Porsche is the lead for the entire VW Group for charging system development.

A company that rents electric cars to Lyft and Uber drivers in California has stopped operations, the *San Francisco Chronicle* (Said, October 11, 2016) chronicled. Evercar, headquartered in Los Angeles, said that it has suspended operations. The company has directed that renters of its car return them and they are not renting any new vehicles. Evercar rented electric and hybrid cars to Uber and Lyft drivers, which competes with Uber and Lyft's own leasing deals for drivers. There is no word if this is a temporary shut or permanent shutdown. In July another company that leased cars to Lyft and Uber drivers ended leasing operations.

Tesla has submitted a new long-range master plan to the City of Fremont that calls for doubling its factory space in that California city, the *San Francisco Chronicle* (Baker, October 7, 2016) reported. The plant now has 4.5 million square feet, but the master plan adds another 4.6 million. Tesla says it needs the space in its drive to build one million vehicles per year. The City's planning commission and council have to approve the plan. After that, Tesla can submit building permits. Tesla also bought a 25-acre parcel near the plant.

ALTERNATIVE FUELS

Bad news for biofuels: It appears that the Renewable Fuels Standards (RFS) put in place by Congress and administered by the Environmental Protection Agency, not only fails to reduce the amount of regular fuel used at the rates originally planned, they also do not cut greenhouse gas (GHG) at the rates believed, and, when fully implemented, may actually increase GHG, according to a study by *University of Minnesota* biosystems engineers and economists (Hill, Tajibaeva, & Polasky, October, 2016). One of the problems is that, because biofuels tend to have less energy per gallon than petroleum fuels, there is not a gallon-for-gallon trade off. Unfortunately, the RFS has assumed that there is a one-for-one trade. It actually appears that it takes about three gallons of renewable fuel to replace one gallon of petroleum. Another problem is that renewable fuels cause a "market rebound" effect. Because the use of biofuels reduces the price of petroleum, since it increases the supply, more people buy petroleum, increasing GHG. The authors conclude that "the best way to reduce pollution is by imposing a tax on pollution-causing activities" (p. 353). That's what we economists refer to as a Pigouvian tax.

It isn't exactly rocket science, but the National Aeronautics and Space Administration has cut its use of petroleum by 62% by a combination of flexible fuel, natural gas, electric, and hybrid vehicles, *Green Fleet* (Dao, October 10, 2016) floats. NASA has a fleet of 3,138 ground vehicles, almost half of which are flex-fuel vehicles. NASA only has 257 electric vehicles, 117 hybrids, and 10 plug-in hybrids. It also has 4

natural gas vehicles. NASA's fleet is spread to 16 locations around the world. The space agency plans to incorporate even more electric vehicles since most of NASA's driving is done within a 25-mile area.

COMING TO A LOCATION NEAR YOU: The latest news on new charging stations which may or may not be somewhere close to you.

United States: Atlanta's¹ Hartsfield-Jackson International Airport will get 300 level 1 and 2 chargers, the *Atlanta Journal-Constitution* (Yamanouchi, September 29, 2016) journaled. The first 100 will be installed by year's end. Originally, the airport had planned a charging network of 18 chargers, but Atlanta's Mayor made a slight change to that plan.

Five new chargers are coming to Arizona's Salt River Project service area, *AZ Business Magazine* (September 30, 2016) says. Salt River provides water and electricity to cities around Phoenix. Salt River currently has 750 chargers in the area. The new chargers will go in shopping areas in Phoenix, Scottsdale, Chandler, Gilbert, and Tempe.

Santa Nella, just off the I-5 in Merced County, California, will get a Recargo charging station, the *Merced Sun-Star* (Shanker, October 4, 2016) illuminates. We can't tell you exactly where the station will go because Recargo hasn't decided where they will put it yet. They are looking for a business with a parking lot large enough for four chargers. Recargo is willing to pay businesses for hosting.

Boston College opened a level 2 charging station in the Commonwealth Avenue garage, *The Boston College Heights* (Sandquist, October 6, 2016) hails. The charger was installed with a grant from the Massachusetts Electric Vehicle Incentive Program. Boston College plans to install chargers at the Newton and Brighton campuses.

Beautiful downtown Burbank has a new charging station, Los Angeles Times (Carpio, October 5, 2016) tells. Actually, the level 2 charger is at the Hollywood Burbank Airport. There are three chargers at the station, each capable of charging two vehicles at a time. Only valet parking customers can use the chargers for \$5.

Tesla opened an eight charger superstation at Bandana's Bar-B-Q restaurant in Rolla, Missouri, the *Waynesville Daily Guide* (Hohenfeldt, October 7, 2016) guided. Rolla is roughly midway between Springfield, MO, and Saint Louis on Interstate 64.

Around the World: Montreal will get the largest Tesla Supercharger station and you can't use it, even if you own a Tesla, *Electrek* (Lambert, October 3, 2016) exclaims. The charger station which has 12 stalls was sold to Montreal's Taxelco an all-electric taxi service. The company has Nissan Leaves and Kia Soul electric cars, but maintains an all Tesla fleet at the airport. The Tesla supercharger station will service those vehicles.

¹ Editor's former hometown, 1961-1972.

Malaysia plans a 300 charger network by the end of the year, [Nikkei Asian Review](#) (Choo, October 7, 2016) reviewed. GreenTech Malaysia will operate the system, which will be free to users. Eventually the network will grow to 25,000 chargers.

There's a new charging station at the Daylesford Town Hall in Australia, [The Ballarat Courier](#) (Wrigley, October 10, 2016) carries. The charger is powered completely from wind energy. Daylesford is 114 kilometres (70.8 miles) northwest of Melbourne, Australia next to Wombat Planation.

OTHER TECHNOLOGY

McLaren Applied Technologies will make new batteries for Formula E racing, [The Verge](#) (O'Kane, September 28, 2016) says. The new batteries McLaren will make will allow cars to finish the race on a charge and increase the top speed to over 150 mph. Currently, race teams change cars in the middle of the race, rather than recharging or swapping batteries. The new batteries will be available for the 2018 racing season. *Hybrid Report* subscriber Doug McClanahan contributed this article.

Warning: Science Ahead. [Seeking Alpha](#) (Morin, September 26, 2016) explains why lithium ion batteries catch on fire and the latest technology that will keep that from happening. Lithium batteries have a separator between the anodes and cathodes that holds the electrolyte and keeps the anode and cathode from coming in contact with each other. This is important because if the anode and cathode contact each other, it creates a short. Electrolyte is flammable. So if the separator doesn't work or fails the anode and cathode contacts, causing a spark which will ignite the electrolyte. The problem is that first generation separators begin to shrink and degrade at 100 degrees centigrade and fail at 150 degrees. While current separators are better, they still degrade at 150 degrees and fail 200. A manufacturing defect, heavy usage, or performing under hot environments exacerbates (makes worse) the situation. With new technology for batteries, not only does the separator continue to separate at high temperatures, but it causes other components in the battery to fail. This is actually a good thing, because the next thing to fail after the separator is the aluminum current collector on the cathode. When this fails, it creates alumina, which insulates the cathode, reducing heat in the battery and closing the short. This article was also contributed by Doug McClanahan.

A team headed by Iowa State University received a \$3.8 million Department of Energy Vehicle Technology grant to develop new electric motors using electrical steel, the [University](#) (University Relations, September 27, 2016) says. Electric motors have been around since 1836, so some scientists believe that the big changes that make electric motors better have already been made. What's left are incremental changes in the materials used to make the motors. That's where the latest research comes in: making steel that's lighter and has more electrical resistivity² for use in the stator core. The electrical steel that Iowa State is developing increases resistivity which reduces heat and power loss in an electric motor. All of this could reduce the size and weight of electric motors, while making them more efficient and powerful. One drawback is the

² Which is related to, but different from, resistance. It appears resistance is a function of resistivity.

electrical steel is fragile and expensive. It should be a decade before these motors are found in vehicles.

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That'll do.