



# The Hybrid Vehicle and Alternative Fuel Report

July 30, 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](mailto: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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## HYBRIDS

The same range extender system that extends the range of the BMW i3 is going into Workhorse Group's E-Gen hybrid trucks, [Truckinginfo](#) (June 21, 2016) informs. Workhorse converts delivery trucks into hybrids for companies like UPS. The hybrid Workhorses use two-cylinder gasoline engines and BMW's range extender for battery and electrical operations.

Not only is Workhorse Group working on hybrid delivery trucks, but it also is working on a hybrid delivery system. What is this hybrid delivery system, you ask? Let us explain: Workhorse is developing a truck and drone delivery system. Drones are launched from the roof of a Workhorse delivery truck, and the package is delivered to the customer's doorstep, according to [Work Truck](#) (June 24, 2016) magazine.

Kiessling Transit, which contracts with Boston area transit agencies and companies to provide specialized transit services is converting 32 of its buses to hybrid, a company [press release](#) (June 29, 2016) reveals. The bus company expects to improve fuel efficiency by 25 percent. This is the second time the company converted buses. Last year, Kiessling converted 35 buses to hybrid. Lightning Hybrids of Colorado is performing the conversion using a Commonwealth of Massachusetts grant that pays 80% of the cost.

Speaking of hybrid buses, on our recent trip to our ancestral homeland,

we



Solar powered diesel-electric hybrid bus © 2016 Thomas L R Smith

were shuttled from the terminal of Amsterdam's Schiphol Airport to our plane to Basel, Switzerland on a solar-powered diesel-electric hybrid. It was very quiet. It seems that Schiphol's entire fleet of shuttle buses are solar powered diesel-electrics. These are made by BYD, a Chinese manufacturer.

One of the concerns about hybrid and electric cars is that the motors are dependent on heavy rare earth metal. Not only are these expensive, but one or two countries have a near monopoly on them. Honda recently developed an electric motor that is free of heavy metals, [Reuter](#) (July 11, 2016) reports. The motor was developed with Daido Steel and is slated for use in Honda's Freed hybrid minivan.

## ELECTRIC VEHICLES



Amsterdam Car Charger © 2016 Thomas L R Smith

On our recent visit to Amsterdam in the Netherlands, we were met by several electric car charging stations throughout the city. Parking was only allowed for charging. As the placard says, Amsterdam's goal is to have all of the city's mileage to be electric by 2040. We have to admit, however, while we saw many electric car charging stations, we did not see many electric cars charging at them. But bicycles? We

saw a ton of bicycles! One was even electric, but we didn't have time to get a picture. Apparently Amsterdam has three high-rise bicycle garages. This one (below), the



Fietsflat Bicycle Parking Garage, Amsterdam © 2016 Katherine E Smith

Fietsflat, located near Amsterdam's Centraal<sup>1</sup> Train Station, holds 2,500 bikes. Remember where you parked.

The Leicester City Council in the United Kingdom received 10 Nissan Leaves for the low, low price of £287,000 (\$408,308.44) the [Leicester Mercury](#) (Martin, June 29, 2016) mentions. The electric cars replace some of the city's diesel cars. The city also plans to add some electric Nissan vans to the fleet. The electric vehicles are part of a six-month test. The council will evaluate performance and then decide if they will replace another 95 diesel vehicles in its 800 vehicle fleet.

A group of Ohio private-sector executives, Columbus Partnership, is trying to convince other executives to trade their personal gas-powered vehicles to electric cars, [Columbus Business First](#) (Knox, June 30, 2016) leads. Columbus Partnership has put up \$90 million to a fund to get companies to go electric. The money was part of the Columbus's effort to secure the U. S. Department of Transportation's Smart City Challenge, which provides even more federal money for transportation initiatives.

Zip World, an outdoor adventure company that operates in North Wales (in the United Kingdom and not the North Wales in Pennsylvania) has a fleet of 17 electric cars and vans, the [Daily Post](#) (Powell, July 3, 2016) posted in one of its daily posts. Zip World will use the vans at one of the three locations it operates in Wales.

Milton Keynes, a town in Buckinghamshire in England, is giving electric car owners free parking, [Recombu](#) (Griffin, July 7, 2016) reports. The free parking is courtesy of a £9 million (\$11,890,606.42) grant from the United Kingdom Transport Ministry. In all, the United Kingdom is making 15,000 parking spaces available to electric cars for free. Drivers can't park anywhere. The spaces set aside for free parking are marked with the letter "G."

In the northern end of the United Kingdom, the Scottish Borders Council bought six electric cars using an £87,000 (\$114,942.53) grant from Transport Scotland, [Holyrood](#) (Davidson, July 8, 2016) holds. SB cares, a social service agency, will get two of the cars, while a sports and culture agency will get one. While the story does not specify, from the photo included with the article, the vehicles appear to be Nissan Leaves.

Marion, Massachusetts, became the leasee of three BMW i3 electric vehicles, [Sippican Village Soup](#) (July 11, 2016) serves. The state of Massachusetts provided grants for most of the leasing costs, so the town is only on the hook for \$6 (that's right, six dollars) per month for three years on each vehicle. The vehicles replace Crown Victorias and are projected to save \$8,500 over the three-year lease. The town also received a \$10,500 grant for charging stations.

The City of Leeds, in the United Kingdom, received the first of 42 electric vehicles, [Fleet News](#) (July 12, 2016) notes. The electric vehicles are a mixture of cars and vans. The City expects to save £24,600 (\$32,500.99) on fuel costs each year. Leeds

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<sup>1</sup> Hey, that's the way the Dutch spell it.

wants to encourage drivers to switch to electric, too, so they are offering free parking for electric cars.

Due to the popularity of electric cars and increased of its charging network, Ecotricity will begin charging for charging on Britain's motorways, *The Daily Mail* (Moore, July 16, 2016) mailed. Ecotricity runs the Electric Highway, the network of charging stations on the United Kingdom's limited access highway system. The company will start charging £6 (\$7.93) per half hour.

Elon Musk (July 20, 2016), the guy behind Tesla, has rolled out the second part of his *Master Plan*, which he calls Part Deux. That's Franglish for Part Two. The plan is: create solar roofs for electric cars, expand Tesla's electric car lineup to have vehicles in all major segments (including commercial vehicles), develop self-driving cars that are safer than regular cars, and develop car sharing. It's that second bit, vehicles in every major segment that has the world abuzz. That means that we could see Tesla electric big rigs rolling down the highway.

Mercedes-Benz plans to get in on that action and will offer the Urban eTruck to the market in five years, *Transport Topics* (Behrman, July 27, 2016) tracks. The truck only has a 120 mile range and would be used for inner-city deliveries, rather than long-haul operations. Several companies are testing electric trucks and introducing them to the market. The main markets are in short-haul operations like port drayage or last-mile delivery. Some of the electric truck brands include Daimler's Fuso, Volkswagen's Scania and MAN, and start-up Nikola Motors.

The Apple iCar, which Apple<sup>2</sup> refuses to say it's building, will launch a year later than planned, *USA Today* (Molina, July 24, 2016) reports. The delay may be due to several factors, from the original head of the project leaving Apple, to the design chief being unhappy with the progress on the project. Of course, the possibility that Apple isn't making a car could also be a factor.

Portland's TriMet will add four electric buses thanks to a federal grant, the *Portland Tribune* (Redden, July 24, 2016) says. The Federal Transit Administration is providing \$3.4 million to buy the New Flyer 40-foot buses and in-route charging equipment. The grant includes design and construction costs. The buses should operate in 2018.

Siemens successfully flew an electric airplane in Germany on June 24<sup>th</sup>, *Electric Vehicle News* (July 8, 2016) notes. The Extra 330LE aerobatic airplane was equipped with a Siemens electric motor. There have been other flights of electric aircraft, but this set a record for power to weight ratio<sup>3</sup>. What is important about this, is that Siemens is working with Airbus to develop electric hybrid propulsion systems for regional airliners, and this is a big step forward. *Hybrid Report* subscriber Doug McClanahan sent this in.

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<sup>2</sup> In the interest of full disclosure, the Editor owns a teeny, tiny amount of Apple stock. The Editor also has no inside information about the iCar.

<sup>3</sup> We really have no idea what that's all about.

*Hybrid Report* subscriber Tonia Buell, who is also a project development manager for WSDOT's Innovative Partnerships and has her thumb on all things electric vehicle, provided us with a new tool: monthly sales data for electric vehicles by State. That's right, we can discuss how Washington's electric vehicle sales are doing when we discuss national sales figures. Unfortunately, the electric vehicle [Sales Dashboard](#) from the Alliance of Automobile Manufacturers only has electric, plug-in electric, and hydrogen cars. It does not give us the monthly Washington sales for hybrids.

There is still plenty of time to sign up for the National Drive Electric Week event at Sunnyside Beach in Steilacoom, Washington, on Sunday, September 18, from noon to 2:00 PM. Sign up and get more information at the [Drive Electric Week](#) website. If you take the survey when you register, you have a chance to win \$100. At the moment there are 29 people registered to attend. There are five models of plug-in vehicles for a total of 16 individual cars. You can come and show off your wheels or look at others.

## ALTERNATIVE FUELS

There are no alternatives.

**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:** More charging stations may be coming to New Jersey, thanks to a \$725,000 grant program established by the Department of Environmental Protection, [NJ.com](#) (Sherman, June 21, 2016) notes. Grantees can get \$250 for a level 1 charger and up to \$5,000 for a level 2 charger. You can get more information at [drivegreen.nj.gov](#).

Stone Harbor on the Jersey Shore installed a fast charger, the [Cape May County Herald](#) (Stone Harbor Borough Council, July 8, 2016) heralded. The station is at the 94<sup>th</sup> Street parking lot. Users will pay a nominal fee, however, we don't know what that is.

Cedar Rapids, Iowa, has two new chargers thanks to Tesla, Park Cedar Rapids, and Hilton Hotels, [The Gazette](#) (Morelli, June 27, 2016) of Cedar Rapids says. The chargers are in the Five Seasons parking ramp downtown. There is a Tesla charger and a General Electric charger for non-Tesla electric cars. Prospective chargers are asked to call Park Cedar Rapids or the Doubletree Hotel by Hilton before charging to see if the charger is available, however, charging is on a first come, first served basis. Charging will be free.

The Sonic Drive-Ins at Boerne, Texas, and Westminster, Colorado, have charging stations that are part of a six-month test, the [San Antonio Business Journal](#) (Chapa, June 28, 2016) journaled. The chargers are free during the test. Presumably, Sonic will consider adding charging stations at other drive-ins, depending on the results of the test.

More charging stations may be coming to North Carolina<sup>4</sup>, *Wilmington Biz* (Mohorn, July 12, 2016) buzzes, thanks to a \$1.5 million project established by Duke Energy. Duke give cities and towns up to \$1 million for charging stations and \$500,000 for electric bus charging stations. The program is the result of litigation between Duke and the U. S. Environmental Protection Agency over violations of the Clean Air Act. Cities have to apply for funding by September 1.

Four charging stations on the Mercer University campus in Macon, Georgia, are going away, *The Telegraph* (Baxley, July 15, 2016) sent. The chargers were installed two years ago as part of a federal program, but the stations did not get enough use to justify their continuation.

Drivers on the Massachusetts Turnpike will have fast charging stations at six service plazas, the *Boston Herald* (Goodison, July 19, 2016) heralded. The chargers will be ready at some of the stations as early as this fall.

Red Lodge, Montana, near Yellowstone National Park, opened four charging stations at its public restroom, the *Billings Gazette* (Olson, July 19, 2016) says. There are two Tesla chargers and two for other electric vehicles.

Joplin, Missouri, has two charging stations at the Missouri Southern State University, *Four States Home Page* (Bolander, July 20, 2016) forwards. The chargers are level two provided by Empire District Electric and represent the first public chargers in the area.

More commercial charging stations could be popping up all over the country as The White House announced a \$4.5 billion loan guarantee program to increase charging stations, *The Tribune* (Freking, July 21, 2016) of San Louis Obispo observed. The program, administered through the U. S. Department of Energy will guarantee repayment to private lenders if a company defaults on charging station loans.

**Around the World:** Eleven fast charging stations are coming to Gaspé Peninsula in Canada, *CNW* (Electric Circuit, July 12, 2016) says. The chargers are part of the Electric Circuit, a Quebec-based charging network.

Not to be outdone, neighboring Ontario is building a 500 vehicle charging network across the Province, *CBC* (The Canadian Press, July 13, 2016) pressed. The chargers, at 250 locations, should be in service by March 2017.

Seattle City Light will install 20 fast charging stations around Seattle and in homes around the city next year, *The Seattle Times* (Bernton, July 23, 2016) tells. It is unclear if City Light is giving the home chargers away for free, or if there will be some type of incentive program. The article does say that City Light is footing the bill for the 20 fast chargers.

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<sup>4</sup> The state of the Editor's birth.

## OTHER TECHNOLOGY

Ford is partnering with tequila maker Jose Cuervo to produce bioplastics for Ford cars, *Hybrid Cars* (Le Sage, July 20, 2016) says. Ford will use the fibers from Cuervo's used agave plants in plastics used in various parts of their cars, making the cars more lightweight and achieving the company's sustainability goals.

A group of Massachusetts Institute of Technology nuclear engineers are working on a new lithium-oxygen battery that is lighter than current lithium-ion batteries, can hold a charge longer, and increase the driving distance on a charge. The new wonder battery is described in their report in the journal *Nature Energy*, "Anion-redox nanolithia cathodes for Li-ion batteries" (Zhu, Kushima, Yin, Qi, Armine, Lu, & Li, July 25, 2016). You can download the article for between \$3.99 to \$32, or just read the abstract. Or you can go to *PC Magazine* (Reisinger, July 26, 2016) and get an explanation that us mere mortals can understand. So here's the deal summarized from *PC Magazines summary*: the nanolithia cathode doesn't let the oxygen in the cathode to turn to gas. This reduces heat generated in the chemical gasification process and increases battery life and charging time. Since oxygen doesn't escape from the batteries, they don't need additional systems to provide more oxygen. The battery is in proof-of-concept stage. A working model should be ready next year.

In related battery news, Washington's own Pacific Northwest National Laboratory (PNNL) in Richland will head up a \$50 million, five-year project to develop a small, light, and powerful electric car battery, the *Tri-City Herald* (Cary, July 25, 2016) heralded. PNNL is the lead agency of the Battery500 consortium that will develop a 500 wat-hours per kilogram battery. Current electric car batteries range from 170 to 200 watt hours per kilogram.

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***That'll do.***