

Alternative Power Report

January 18, 2024

News on Alternative Power Sources



www.powersys.com | +1-651-905-8400 | info@powersys.com

Moving from ICE To Alternative Power

As manufacturers continue to shift their equipment production from ICE to alternative power sources, they need the latest information. That's why analysts at Power Systems Research continue to revise our global data and forecasts to provide the freshest picture available.

GM, Komatsu Plan Hydrogen Fuel Cells for EV Mining Truck

GM Conducts Fuel Cell Research for 50 Years



By Guy Youngs, Forecast & Adoption Lead

General Motors and mining and construction equipment giant Komatsu plan to jointly design and validate the hydrogen fuel cell technology for the 930E electric drive mining truck. GM has

been conducting hydrogen fuel cell research and product development for more than 50 years and has developed platforms for both lithium-ion batteries and hydrogen fuel cells.

Mining trucks typically operate at a single mine throughout their life, a situation that simplifies the challenge of rolling out hydrogen refueling stations. GM and Komatsu plan to test the prototype HYDROTEC-powered mining vehicle in the mid-2020s at Komatsu's Arizona Proving Grounds research and development facility. The prototype mining truck will be powered by more than 2 megawatts of HYDROTEC power cubes.

Source: *Electrek* [Read The Article](#)

PSR Analysis: This is an interesting take on a problem that may have already been solved but it makes a first with GM



and Komatsu and that's a step in the right direction. Some pundits question whether the economics of hydrogen are a non-starter, especially since we already have battery electric superheavy haulers in service. It takes roughly three times as much electricity to generate hydrogen and then burn it as it does to just power up batteries. Watch this space to see how GM and Komatsu resolve this issue.

Editor's Note: This monthly report includes news and analysis about EV and alternative power sources such as batteries and fuel cells from analysts at Power Systems Research.

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+1 651.905.8400 | info@powersys.com

Drivers of Heavy, Dirty Cars Pay Stiff Penalty Tax in France

As of Jan. 1, 2024, the French government has revised its “malus écologique”, a one-time penalty tax for registering bulky, CO2-emitting cars, to include many more ICE vehicles, even some of the most popular budget models.

Drivers of cars emitting 118 g/km of CO2 pay €50 (about \$55), and this increases rapidly with higher CO2 emissions, with a maximum ceiling for vehicles reaching €60,000 (\$65,590). Vehicles weighing 1,600 kg/1.6 tons or more will have to pay between €10 and €30 per additional kilo.

Source: *Electrek* [Read The Article](#)

PSR Analysis: Governments are always looking for revenue streams, and in this the French government is no different, but while it won't generate vast sums, it is a step in the right direction to discourage ICE purchases, and we must not forget that taxes always seem to grow.

Survey: EV Range Anxiety Slips in Importance

Euromonitor International has released the results of its Electric Vehicle Readiness Index for 2023 survey, which evaluates the most prepared countries which can support widespread EV adoption.

Norway, Switzerland and Sweden ranked at the top of the index, due to EV market maturity and consumer buying power. Brazil, South Africa and India were ranked at the bottom, owing to limited government incentives, low incomes and the undersupply of public charging stations

Source: *EV Magazine* [Read The Article](#)

PSR Analysis: What is telling about this survey is that it shows that Range Anxiety has fallen to third place with only 22% citing it as a major concern behind charging infrastructure and price. This represents a significant shift over the last few years.

Will Fuel Cell Cars Be Relevant in 20 Years?

Research by IDTech predicts that by 2044, hydrogen fuel cell cars will represent only about 4% of the total zero-emission passenger vehicles market. While the research



predicts that hydrogen fuel cell cars would be a “very small portion” of the car market, IDTech also forecasted that about one fifth of zero-emission trucks would run on hydrogen.

Greater upfront costs for FCEVs over both combustion engine vehicles and BEVs, and increasing running costs makes a fuel-cell car a hard sell for consumers. IDTech cited lack of hydrogen refueling as a significant factor holding back FCEV

Source: *Hydrogen Fuel News* [Read The Article](#)

PSR Analysis: One of the questions that surrounds the whole hydrogen fuel subject (FCEVs or H2 ICEs) is what happens after the government subsidies disappear? How much of hydrogen's current growth has been bolstered by hefty government and OEM incentives, where the upfront cost of the car is heavily subsidized and, in some cases, the cost of fuel was covered for a period of time?



Cathode Material for Cheaper, More Sustainable EVs Developed

Researchers at the U.S. Department of Energy's (DOE) Argonne National Laboratory have invented and patented a new cathode material that replaces lithium ions with sodium and that would be significantly cheaper to produce. The cathode is one of the main parts of any battery. It is the site of the chemical reaction that creates the flow of electricity that propels a vehicle. Estimates suggest that a sodium-ion battery would cost one-third less than a lithium-ion one.

Source: [MSN Read The Article](#)

PSR Analysis: Research in battery technology has developed at a tremendous pace and anything that reduces cost and is more sustainable is a plus. Sodium is far more naturally abundant and easily mined than lithium. It is thus a fraction of the cost per kilogram and much less susceptible to price fluctuations or disruptions in the supply chain.

Dieseltgate 2.0: 600K Ram Trucks Recalled, Cummins To Pay US\$2 Billion

Engine maker Cummins is recalling 600,000 Ram trucks as part of a huge US\$2 billion settlement with federal and California authorities for using illegal software to cheat results of diesel emissions tests.

The settlement was reached in December 2023, but new details emerged recently noting that Cummins had agreed to pay \$1.675 billion in civil penalties – the largest ever

to be paid under the Clean Air Act – in addition to \$325 million to remedy environmental damage, the AP reports. The total bill is more than \$2 billion, in what federal and California authorities called a landmark settlement.

Source: [Electrek Read The Article](#)

PSR Analysis: This problem is far more complicated than a simple “Cummins bad and EPA good” scenario. Diesel engines emit more NOX when they’re operating at their peak efficiency. Yes, we should be reducing pollution, but it’s not an easy one size fits all answer. And California is making sure this efficiency takes place as it will not allow the truck to renew their registration without proof that the recall was completed.

Nations Begin Tightening The Screws On Chinese Electric Car Imports

Inside China a state subsidy is the norm, but outside of China the position is very different. The level of involvement by the central government feels a lot like a subsidy, one that undercuts local manufacturers. The problem is especially acute when it comes to electric car production.

Many of China’s car companies are looking more and more to export markets to absorb some of their production. But for some countries, the electric car onslaught coming from China is seen as a threat to local companies and their workers. The EV revolution was never intended to displace domestic industries and workers but that seems to be happening.

In response, France and Turkey recently announced restrictions on electric car imports designed to stem the tide of Chinese EVs flooding their ports. In France, the new rules heavily favor cars manufactured domestically or elsewhere in the EU at the expense of Chinese made cars.

The Turkish government has imposed harsh new rules on foreign companies who want to sell electric cars in Turkey. By the end of 2023, companies importing EVs were required to have at least 140 authorized service stations spread evenly across the country and open a call center for each brand.

Source: *CleanTechnica* [Read The Article](#)

PSR Analysis: While countries cannot directly ban the sale of imported cars (under World Trade Organization rules) they do have some options to slow the rapid rate of imports and France and Turkey have done so.

Silicon Powder Yields 10X Battery Improvements

Sila's Titan Silicon anode powder consists of tiny particles of nano-structured silicon that replaces graphite in traditional lithium ion batteries. Compared to graphite, silicon stores up to 10 times more energy, so using it instead of graphite for anodes — which release electrons when a battery discharges — can significantly improve a battery's energy density.

However, the material swells during repeated charging, with the resulting cracks radically reducing battery life. The Sila technology allows for this expansion by using nano-scale carbon “scaffolding” to keep the silicon in check.

The silicon powder has several advantages. With it, EVs could soon be able to travel up to 500 miles without stopping to charge. When the need does arise to recharge, the Sila batteries could do so in about 10 minutes.

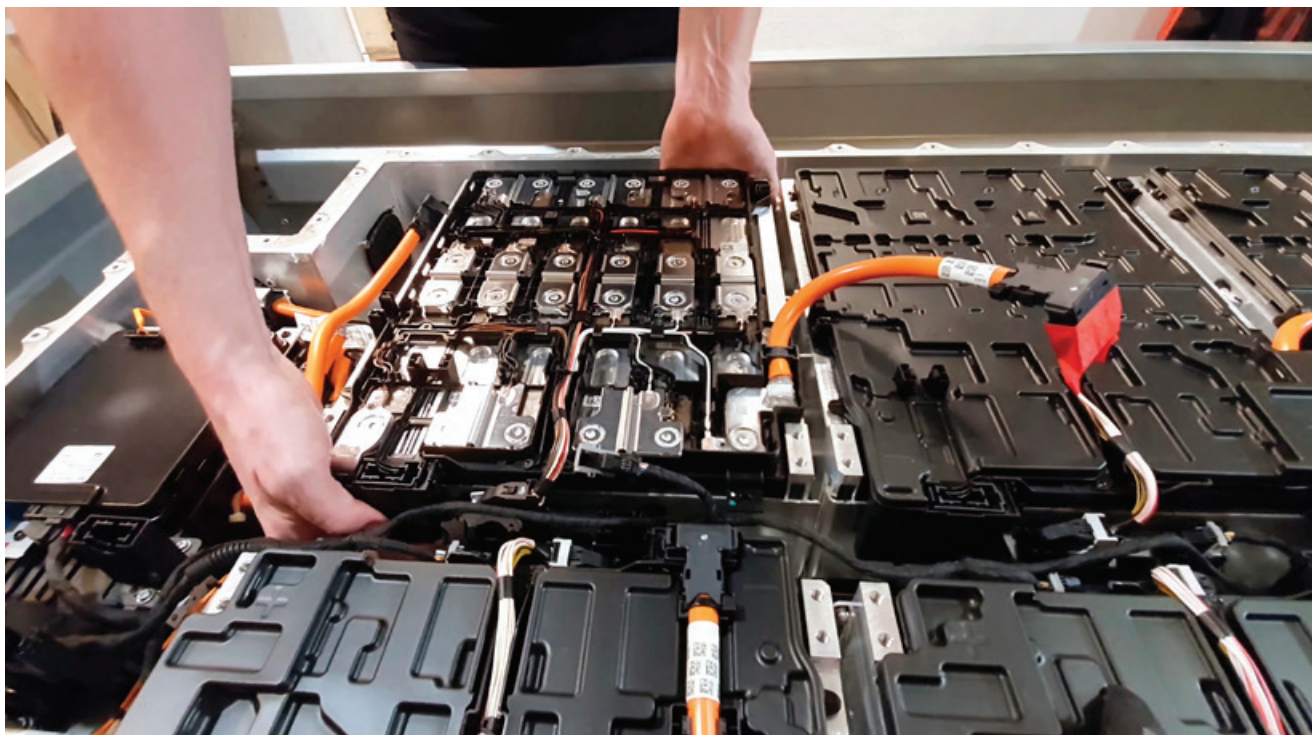
Source: *CleanTechnica* [Read The Article](#)

PSR Analysis: Using silicon powder does not require new manufacturing techniques so the technology is proven and should be relatively cheap (but this wasn't mentioned in the article) and it bypasses the virtual Chinese monopoly on purified graphite (China currently supplies 96% of the purified graphite used by the world's battery makers).

A Final Note

Acculon launches production of sodium-ion battery modules, packs. [Click Here ... More Range](#) from Nickel-Rich Electric Vehicle Batteries. [Click Here ... The Battery Domino Effect.](#) [Click Here ... More Hydrogen Fleets](#) that reached the end of the tragicomedy including Iceland.

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CONTACT US

Purchasing and Inquiries

Headquarters
St. Paul, USA
+1 651 905 8400
info@powersys.com

Detroit, USA
+1 734 545 0474
infode@powersys.com

Beijing, China
+86 10 5737 9201
infocn@powersys.com

Campinas, Brazil
+55 19 3305 5657
infosa@powersys.com

European Headquarters
Brussels, Belgium
+32 2 643 2828
infobr@powersys.com

Frankfurt, Germany
+49 160 1807 044
infoge@powersys.com

Pune, India
infoin@powersys.com

Tokyo, Japan
+81 90 9139 0934
infojp@powersys.com

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