Alternative Power Report

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News on Alternative Power Sources

Power Systems Research
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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.

Plug-in Hybrids May Use 300% More Fuel Than Thought

Study Shows PHEVs Exceed Government Estimates

By Guy Youngs, Forecast & Adoption Lead

There have been several studies that suggest that hybrid electric vehicles (also called PHEVs) are simply not the great environment saver that the marketing people are suggesting. A new study by the Fraunhofer Institute shows that on average, PHEVs use more than three times as much fuel as government estimates suggest.

The study is highly credible as it was based around on-board fuel consumption monitoring data from a massive 981,035 vehicles across Europe.

A gap of over 300% is severe and makes it hard for the EU to regulate something when the estimated numbers are so wildly different from reality. The EU is aware of this problem, and is taking some measures to fix it

Source: *Electrek* **Read The Article**

PSR Analysis: For some time now, people have been arguing that PHEVs are not the planet saver that the marketing people are suggesting it is. This is just more data to confirm this. **PSR**

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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New power source installations vary across industry segments. Contact PSR for data on your specific application needs.
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PV-Powered Refrigerated Trailer Completes Long-Distance Run

Recently in Australia, Protrans Solutions conducted a successful trial with a battery-electric refrigerated trailer charged by onboard solar panels on the 1,100 miles Sydney-Brisbane round trip without using diesel to refrigerate the trailer unit. This demonstrates a depot-to-depot cold-chain capability.

But that's easy, I hear you say, its Australia and its sunny. Well, how about cold and snowy Canada? Transport Canada's Zero-Emission Trucking Program, recently published a study which monitored over than 200 thousand kms (124,224 miles) of diesel and electric truck data over a year of operations in the Montreal-area. There findings were staggering with nearly $200k of savings per electric truck

Meanwhile in Europe, Trailer Dynamics in Germany has a different idea. Instead of electrifying the tractor, electrify the semi-trailer, so if you use an electric truck, great, this boosts your range, but if you are using a diesel truck, the e-Trailer can reduce fuel costs considerably. The benefits of a self-powered, battery-electric semi-trailer go beyond reducing CO_2 emissions as the technology also promises significant efficiency gains, which is music to the ears of fleet managers

Source: *PV Magazine* **Read the Article**

PSR Analysis: This article is one of many that give a clear indication of where trucking (especially reefers) will go in the future, but the key isn't really the cost saving, the efficiency improvements or the de-carbonization, but rather insurance. In the trucking world, if you have a 100k cargo of say, pharmaceuticals, the insurance company has historically insisted on a second diesel ICE to power the reefer unit alone. This is why this real life test of refrigerated goods in Australia's heat, is very telling. **PSR**

Comparing Lithium-ion, Sodium-ion and Solid-State Batteries

Researchers from Newcastle University in the UK, and the Fire Service Academy in Poland, have undertaken a detailed comparison of three key battery technologies: conventional lithium-ion, emerging sodium-ion (SIB), and solid-state batteries (SSB)

They report that high energy lithium types (such as NMC battery variants) are more prone to fire risks (often referred to as thermal runaway) and these can become structural unstable when highly charged, leading to a potential fire risk. They also noted that thermal stability declines as nickel content increases. However, Lithium iron phosphate (LFP), is more robust and can thermal runaway even above 300 °C, making it less prone to fire risks. However, it offers lower voltage and energy density.

Sodium-ion batteries have more safety advantages, including higher thermal runaway, lower heat release rates, reduced hydrogen content in off-gassing and the ability to be transported at zero volts, which significantly lowers logistics risks.

Solid-state batteries represent a much more fundamental shift in thermal runaway risk by eliminating flammable liquid electrolytes.

Source: *Energy Storage News* **Read the Article**

PSR Analysis: This study has been very clear that the future of battery technology will rely on a diverse group of technologies rather than Lithium alone, but before we get to that stage there must be a continuing level of improvement in the refinement of existing lithium technologies, as well as the adoption of these new technologies as sodium-

ion technology offers a practical near-term improvement. Meanwhile, solid-state architecture promises safety gains as well as range gains. **PSR**

Cold-Proof Polymer Battery Design Unveiled

One of the biggest remaining concerns over the use of batteries as a power source is performance in cold weather conditions. So, researchers at Texas A&M University have developed a battery design that continues to operate even in severe sub-zero temperatures.

The problem arises when cold weather disrupts conventional batteries because they rely on a liquid electrolyte to move a charge. If that electrolyte freezes, then the charge can no longer be transported between the cathode and the anode

There are two aspects to the new design, first, by replacing the freezing-prone liquid electrolyte with one that remains fluid, and second, by using soft polymer materials.

Source: *BEST Magazine* **Read the Article**

PSR Analysis: This is yet another of the many improvements to batteries that have come along in recent years and shows how electric vehicles can replace fossil fuel in most scenarios. **PSR**

First Country To Ban Sale of New Gas Cars Is Doing Just Fine, Thank You

In 2024, Ethiopia made history by becoming the first country in the world to ban the sale and import of new internal combustion-powered vehicles. The decision was based on several factors, but, surprisingly, environmental reasons were quite low on the list.

The major reason for this seemingly bizarre action was economics. As a poor country with no oil reserves, Ethiopia was importing US$ 4 billion of refined fuel every year – US$ 4 billion may not seem like a big number, but to a country whose total budget is only US$ 14 billion, it's massive.

The second major reason behind the decision was the completion of the Grand Ethiopian Renaissance Dam (GERD) which brings in massive amounts of energy to this energy poor country (it doubled the country's generating capacity).

World governments and transportation analysts are watching Ethiopia's electric experiment with interest, and many have expressed surprise at how well the African nation has handled the transition.

By late 2025, there were about 115,000 EVs are on Ethiopian roads, representing 8.3% of the total vehicle fleet but with EV owners spending only about $4 per month on charging, (compared to an average $27 per month for gasoline) the experiment is a resounding success.

Source: *Electrek* **Read the Article**

PSR Analysis: Whilst Ethiopia doesn't have a massive charging infrastructure, the savings are absolutely massive especially when you consider that average wages are around $50 per month. It makes so much sense to ban the import of ICE powered cars and move to EVs especially when solar and wind can support EV's and the country doesn't manufacture cars, so why should they create a dependence on oil? **PSR**

Bosch China Cuts Nearly 200 Hydrogen Fuel Cells Jobs

Bosch is currently in the middle of a global drive to cut costs in order to boost its EBIT from 2% to 7%. So, some 13,000 jobs have gone in the mobility unit with a further 5,500 job losses due shortly

The cuts hit everything from R&D labs to assembly lines, which shows that not even Bosch can protect every legacy division. Historically, China has long been Bosch's R&D and manufacturing backbone, so this action of cutting 200 Fuel Cell and ICE jobs really proves that Bosch is serious about cutting back its costs

Bosch appears to be speeding up its exit from traditional powertrains as electromobility takes center stage. Cutting roles in hydrogen projects shows that fuel cell technology and hydrogen fuel cells aren't catching on as quickly as hoped.

Source: *Hydrogen Fuel News* **Read the Article**

PSR Analysis: Bosch has suffered from tariffs, slowing consumer demand and punishing local competition and has had to balance cost cutting with its strategic targets. As a result, it has followed some other companies in pivoting away from hydrogen. **PSR**

Eco-Friendly Tofu-Brine Battery Promises Ultra-Long Lifespan

In the world of batteries, Lithium ion batteries are king; they are powerful, last around 3,000 cycles, are fairly safe (some more so than others) and are considered to be environmentally good. Well, they may not be the pinnacle for much longer.

Researchers at the City University of Hong Kong and the Southern University of Science and Technology have unveiled a water-based battery that uses tofu brine as a key component. The team describes the design as an "organic" electrode system paired with neutral, non-toxic electrolytes.

The tofu brine battery is totally safe from any fire risk, environmentally friendly, safe to dispose of at its end of life and lasts a massive 120,000 cycles.

Source: *BEST Magazine* **Read the Article**

PSR Analysis: This article is quite short, but it indicates the variety of battery research that is being undertaken in China and given the long life of the battery, it would be well suited to stationary applications such as backup generators and grid balancing, rather than mobile uses. However, the article didn't cover what was the energy density of this novel battery. **PSR**

The Falling Cost Gap Between EU and Chinese Batteries

There have been quite a few articles in the press about how Europe can compete with China in the field of batteries. Most of them concluded that it all comes down to cost.

Currently, the European Union is debating whether to set "Made-in-EU" criteria for public funding in the Industrial Accelerator Act which, the article argues could be used to increase the size / scale of European battery operation, and this in turn will lead to a reduction in costs and close the cost gap v's China

T&E has looked at the certain key cost components of an electric vehicle (EV) and how battery costs would develop were they to be manufactured at scale locally and were supported by "Made in EU" criteria

Source: *CleanTechnica* **Read the Article**

PSR Analysis: Battery supply chains are vulnerable to disruption in the same way as critical minerals and rare earth have been, if Europe is to develop its own, truly local battery supply chain, then it must act and support it. **PSR**

A Final Note

These **Chinese robots** ride ceiling rails to charge your EV – **Click Here**… **Data centers** are becoming power plants – this NJ project proves it - **Click Here**…The world's largest **lithium metal maker** is now producing semi-solid-state EV batteries - **Click Here**… **Mexico** could become data center hub, but clean power lags behind - **Click Here**. **PSR**

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