Alternative Power Report

March 16, 2023

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.

Subway To Add EV Charging Stations

Planned Stations Would Let You Charge Vehicle While You Eat.

Guy Youngs

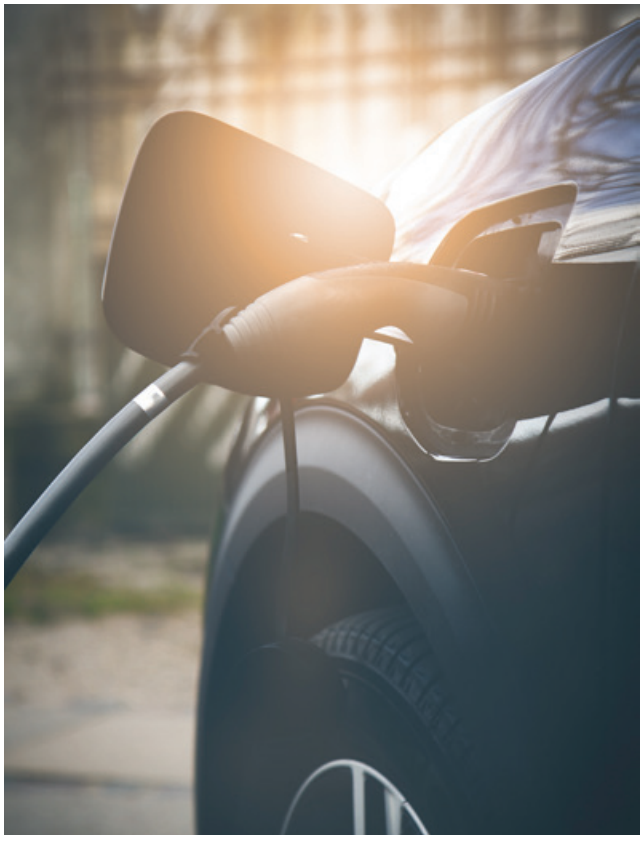
By Guy Youngs, Forecast & Adoption Lead

In the August 2022 issue of PowerTALK, we reported that Tesla had deployed cube lounges at Supercharger stations with automated coffee, food, and even a swimming pool. Well, the Subway sandwich folks want to get in on the act, too.

Subway is teaming up with Miami-based GenZ EV Solutions to provide an "EV charging oasis" of the future so you can eat while your EV charges. Starting in 2023, "Subway EV charging oasis" parks with multiple spots, picnic tables, Wi-Fi, restrooms, green space, and playgrounds will be installed at select locations. As part of the plan, new or freshly remodeled stores will get small-format, fast EV charging stations.

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

PSR Analysis: Subway is joining the movement to make the recharge wait time more enjoyable to customers, and at the same time generate an alternative revenue stream. Providing customers with things to do while they wait could encourage use and even develop into a go-to location.



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.

CONTACT US

New power source installations vary across industry segments. Contact PSR for data on your specific application needs.
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Lithium-Air Battery Could Offer Longer Range

Most owners of electric cars have wished for a battery pack that could power their vehicle for more than a thousand miles on a single charge, and Range Anxiety is a big issue for EV adoption. Researchers at the Illinois Institute of Technology (IIT) and U.S. Department of Energy's (DOE) Argonne National Laboratory have developed a lithium-air battery that could make that dream a reality.

The main new component in this lithium-air battery is a solid electrolyte instead of the usual liquid variety. Batteries with solid electrolytes are not subject to the safety issues of liquid electrolytes used in lithium-ion and other battery types, which can overheat and catch fire.

The battery chemistry with the solid electrolytes can potentially boost the energy density by as much as four times above lithium-ion batteries, which translates into longer driving range.

Source: *CleanTechnica* **Read The Article**

PSR Analysis: Range or machine operating time are big inhibitors to the adoption of EVs/ Electric machines so anything that improves that is a big plus. The lack of a safety issue (overheating and potential fire) is also a significant plus.

Has Battery Recycling Arrived Too Soon?

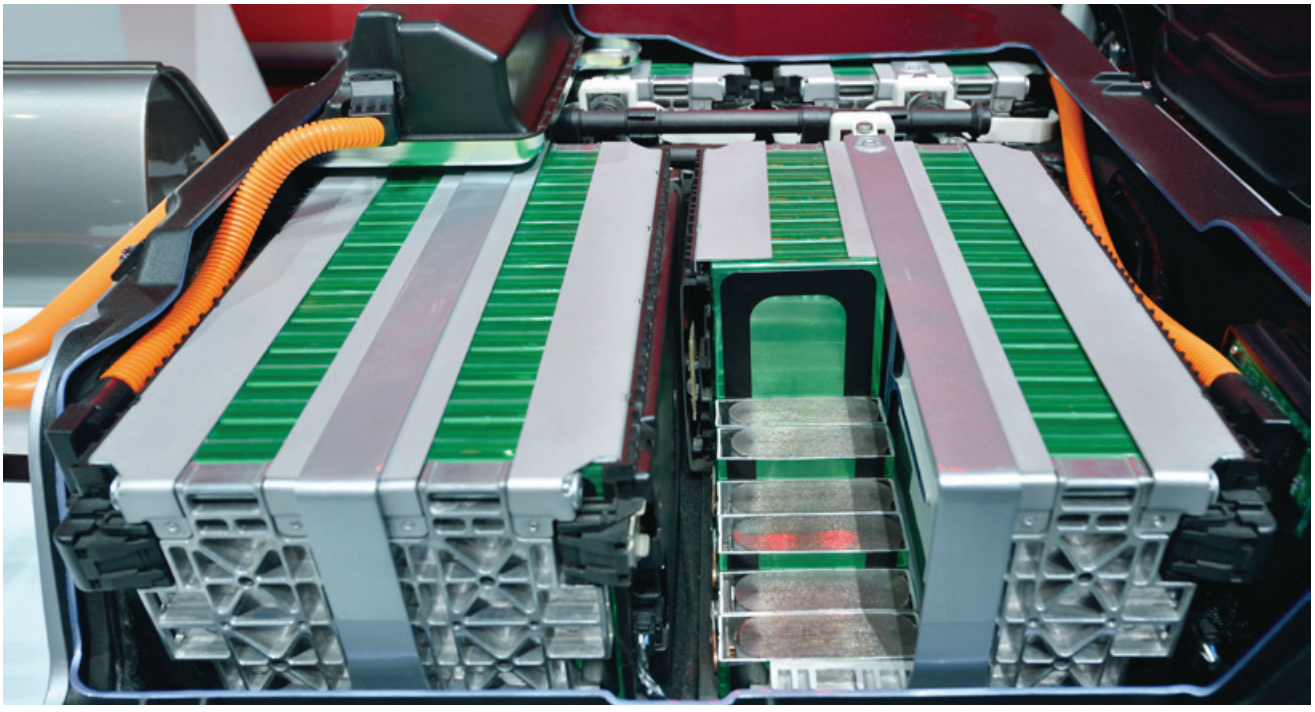
There is a recent report from the *Washington Post* with a scary title: "EV Battery Recycling Has Boomed Too Soon." There aren't enough used electric vehicle batteries to meet even 10% of the raw material demand for electric vehicles made in the US, the Washington Post says.

Meanwhile, the US already has more battery recycling capacity than it has batteries available to recycle, with more public and private battery recycling facilities planned or under construction. The Post concludes its report with this pithy statement: "Many of these investments are destined to fail. Those few that succeed will do so only by diversifying away from recycling, at least temporarily."

Currently, defective batteries that go directly from manufacturing to the scrap heap account for about three-quarters of batteries recycled in US and global battery plants. That percentage will decline as battery manufacturing technology improves, leaving less scrap available for recycling.

Source: *CleanTechnica* **Read The Article**

PSR Analysis: Those batteries last a long time (up to 0.5 million miles according to Elon Musk) and when they are no longer suitable for their original purpose, they have a second life and can be used for grid-scale energy storage



or sold to EV owners who need to replace their batteries but don't want to pay for a new one and are willing to accept shorter range and lower performance in order to save some money. However, companies like Redwood Materials, a leading battery recycling company, will undoubtably have taken this into account.

Nikola Plans To Develop Hydrogen Fuel Network

The lack of a refueling infrastructure is one of the largest challenges facing H2 development, so Nikola plans to start building a hydrogen fuel network. The network would make it possible for H2-powered vehicles to refuel conveniently, particularly when those vehicles are the company's own trucks.

The company has already started the construction of H2 plants in order to produce the H2 necessary to supply the hydrogen fuel network. Once those are in place and the refueling stations are built, it will become feasible for companies to begin including H2-powered trucks in their fleets.

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

PSR Analysis: Evolution and growth of this segment continues. It was not that long ago when diesel fuel gained popularity in the automotive world, and similar statements about diesel availability were common. It took a few years for locations other than truck stops and farm stations to start dispensing; infrastructure is the key.

Hyundai Plans Mass Production of Hydrogen Engines

After completing the design of its H2 internal combustion engines and rolling out the prototype, Hyundai Doosan Infracore (HDI) is revving up development of the engines, with the aim to hit mass production by 2025.

Hyundai Doosan Infracore's H2 ICE is an 11-litre class engine. The new hydrogen engines will be installed on commercial vehicles, including large buses, trucks, and construction equipment.

Hyundai Doosan Infracore will unveil its prototype hydrogen-powered ICE power unit this year (2023), with plans for full-scale testing slated for 2024, and full-scale mass production planned for the following year in 2025.

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

PSR Analysis: While HICE does have some advantages over EV (refueling speed and familiarity with ICEs to name but two), there still are challenges to overcome (hydrogen production and infrastructure, for example). EV devotees might ask why we should use energy to create hydrogen when it can go straight into batteries.

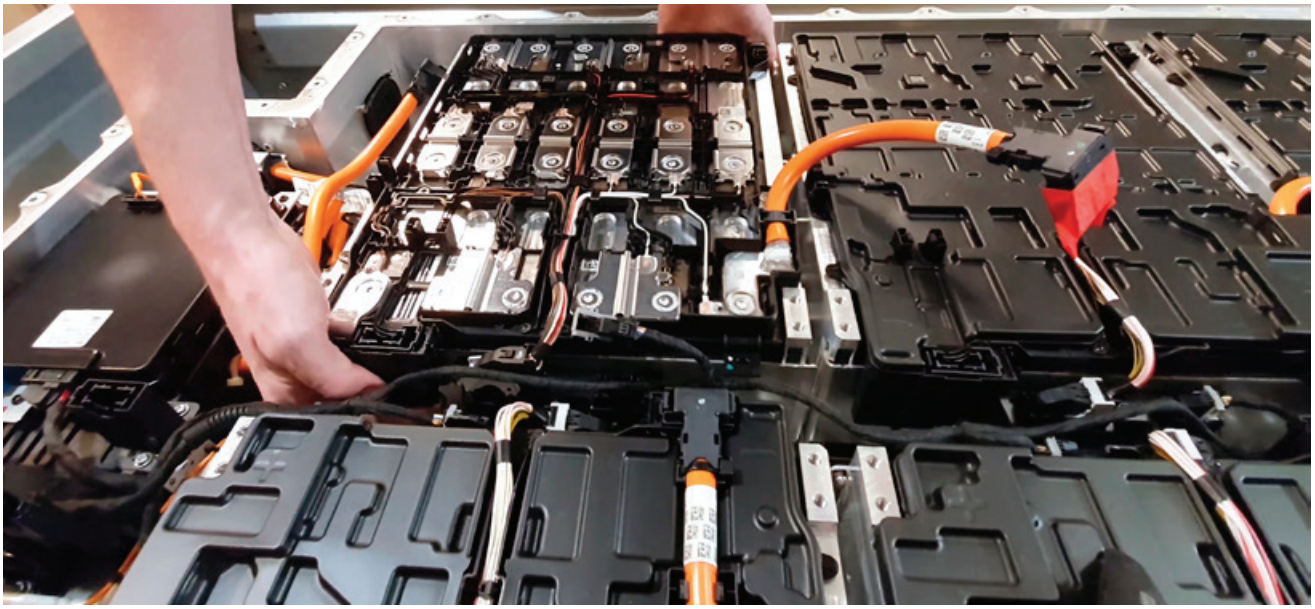
Are HICE engines just an interim stage before FCEV? Only time will tell, but one thing is sure – a large amount of investment will be needed in a hydrogen infrastructure before HICE and FCEV can become truly mainstream.

Electrification Sparks 2023 Miami Boat Show

For nearly a week each year, the Miami Boat Show takes over Herald Plaza, Venetian and Museum Park Marinas, and the entire Miami Beach Convention Centre to showcase everything from mega yachts to the accessories you can use while aboard. This year, there was a significantly larger footprint for electric units than in previous years.

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

PSR Analysis: Its very encouraging (from an environmental standpoint) to see that there are many more electric powered boats, and there was "a multitude of exciting companies developing fully electric marine micro mobility" too. The article also highlights several electric boats and personal electric watercraft (with links).



North America Bids To Bring Rare Earth Supply Onshore

With electric vehicle adoption growing rapidly, the demand for rare earth elements in North America is expected to increase dramatically. An estimated 315,000 tons of rare earth elements will be needed by 2030, most of them for EVs. Attempts are being made to loosen the region's dependence on China for the sourcing and processing of such critically important energy transition materials.

There are many reasons why North America is looking to onshore its processes, one of the biggest being concern around potential supply chain choke points in the event China decides to cut off the supply of rare earth elements.

Las Vegas-based MP Materials owns the only operating rare earth mine and processing facility in the US. Its Mountain Pass Mine, in California, is an open pit site that supplied 15.8% of the world's rare earth production in 2020.

Source: *PV Magazine* **Read The Article**

PSR Analysis: With China's dominance over the rare earth market, it's no surprise to see that the USA (and separately, the EU) are very concerned about supply of these minerals. This is one of many ways the EU and USA are looking to reduce the potential price concerns caused by this market control.

Two-Thirds Of European Battery Production At Risk

More than two-thirds (68%) of lithium-ion battery production planned for Europe is at risk of being delayed, scaled down, or cancelled, new analysis shows. Tesla in Berlin, Northvolt in northern Germany, and Italvolt near Turin are among the projects that stand to lose the greatest volumes of their stated capacity as the companies weigh up investing in the US instead.

According to research by Transport & Environment (T&E), battery production capacity equivalent to 18 million electric cars — 1.2 TWh — is at a high or medium risk of being disrupted or lost. Without this expansion, Europe will not be able to satisfy its battery demand in 2030 and will need to import from foreign rivals.

T&E has called for both EU-wide financial support to scale up battery production and faster approvals processes to capture projects at risk from American subsidies.

Source: *CleanTechnica* **Read The Article**

PSR Analysis: IRA subsidies are chief threat to gigafactory plans unless Europe offers accessible incentives and streamlined permitting. What the EU does about this is expected in March 2023, when the EU Commission will publish a Net Zero Industrial Act, part of its response to the tax benefits and subsidies provided by the IRA for localizing battery supply chains in America. **PSR**

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