Alternative Power Report

May 21, 2026

News on Alternative Power Sources

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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.

Zwitterions May Be Key To New Solid-State Batteries

EU Scrambles for Alternative Energy

By Guy Youngs, Forecast & Adoption Lead

Liquid electrolytes have been key EV batteries for some time now and the lithium-ion formula is the most important component. There are a lot of different formulae that do various things such as the removal of toxic inputs from the supply chain, or reductions in weight, elimination of fire hazards, and cutting costs.

The ultimate goal is to combine all these improvements in one electrolyte, but solid state or semi solid state batteries are appearing before that goal can be achieved and they promise to revolutionize the battery market. But, getting the electrons to move about within a solid is difficult at best. And that's where Zwitterions come in.

Zwitterions are the building blocks of a new electrolyte created by a team of scientists at Oak Ridge National Laboratory, a branch of the US Department of Energy located in Tennessee. ORNL scientists believe that when changing the battery polymer by the interdiction

of Zwitterions they can make significant improvements to batteries. But what is a Zwitterion? A Zwitterion is a molecule that contains both positive and negative charges but is overall electrically neutral.

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

PSR Analysis: While this technology is a few years away (it's only in the early stages of research right now) it shows great potential in making solid state batteries actually work as designed. **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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GMG Reports Graphene Aluminum-Ion Energy Density of 101 Wh/kg

One of the new battery technologies is graphene aluminum-ion battery which is designed specifically with rapid charging in mind. Graphene aluminum-ion batteries avoid the use of lithium and copper, instead using aluminum substrates and a newly developed chloride-free electrolyte. This enables cost and weight reduction, improved safety risks, and eliminates the need for thermal management system. The battery has similar performance characteristics as lithium titanate oxide cells, but can be produced at a much lower cost

The technology works by making atomic sized holes in the graphene, which allows the aluminum ions to penetrate and be held in the graphene to make a higher energy density, thus enabling them to outperform standard lithium batteries.

Australia-based Graphene Manufacturing Group has reported a significant increase in the energy density of its graphene aluminum-ion battery technology, as it moves closer to commercialization of ultra-fast charging cells

Source: *BEST Mag* **Read The Article**

PSR Analysis: Graphene Manufacturing Group started developing prototypes back in 2021, so these improvements in energy density, along with rapid charging abilities, make graphene aluminum batteries a potential market disruptor. **PSR**

The Fast Lane: 3 Ways To Get More Critical Minerals, Now

In modern life, thousands of products (ranging from mobile phones to missiles, or fertilizer even) depend on a few critical minerals such as copper, cerium, rare earth elements and potash. Governments around the world consider these essential to their economy and national security, and their supply chains can be disrupted by geopolitical tensions, extreme weather, or trade restrictions.

For instance, in 2026, the U.S. critical minerals list include 60 minerals that companies in defense, agriculture, power, mining, and other industry sectors, need to get their jobs done. But spiking demand, restricted access, and rising prices can make it challenging to get these minerals

This is why experts at the National Laboratory of the Rockies (NLR) are researching other ways to make, mine for, or recycle these minerals. This article looks at three ways to get more of these precious minerals:

- How To Mine Metals From Seawater, Industrial Waste, and More
- An Economic Way To Recycle Graphite
- Supply Chain Recipes To Cut Costs and Energy

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

PSR Analysis: Given the Chinese near monopoly on Rare Earths and the resulting global supply constraints there is a big rush to secure supplies of critical minerals, and this is taking place all over the globe. Any way to improve access is vitally important. **PSR**

A Closer Look at CATL's New Sodium-Ion Battery

CATL unveiled a new sodium-ion battery for energy storage at the ESIE 2026 show in Beijing, in April. The show is the 14th Energy Storage International Conference and Expo (ESIE). ESIE was born alongside the development of China's energy storage industry and serves as a key communication and cooperation platform in the energy storage field.

CATL's new battery expands its sodium-ion lineup beyond passenger cars, commercial vehicles, and auxiliary power, into utility-scale and commercial storage.

In terms of applications, the battery is aimed at utility-scale storage, renewable energy base projects, and AIDC (artificial intelligence data center), storage scenarios, according to CATL. Interestingly the battery pack has compatibility with CATL's 587Ah Lithium battery.

Source: *ESS News* **Read The Article**

PSR Analysis: Sodium-ion batteries offer several advantages over traditional lithium-ion batteries, namely that Sodium is more abundant and widely available than lithium, which reduces the cost of production and supply chain risks, and that Sodium batteries have a reduced environmental impact during disposal and recycling compared to lithium-ion batteries. **PSR**

The Cost of Advanced Biofuels

The European car industry has long wanted EU lawmakers to weaken EU car CO2 targets by counting combustion cars running on advanced biofuels as zero emissions. This is despite that fact that there are not enough advanced biofuels to go around, and that the CO2 targets are a major driver of more affordable EV models

Advanced biofuels are also far more expensive than charging an EV.

New research by T&E (one of Europe's leading advocates for clean transport and energy) assesses the cost of running a car on advanced biofuels versus charging an electric vehicle. It builds on earlier research that found biofuels are a 'dead end' technology for cars due to their CO2 emissions, limited availability, fraud risks and other factors.

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

PSR Analysis: The article contains links to a T&E briefing and a presentation of their research finding which must be worrying for any manufacturer or user of biofuels. For instance, the research shows that using HVO is 79% more expensive than charging an EV, and ethanol is even more expensive. **PSR**

CATL Secures World's Largest Sodium-Ion Battery Order with Hyperstrong

At the end of April, battery manufacturing heavyweight CATL announced that it had secured what is described as the world's largest sodium-ion battery order with Chinese system integrator HyperStrong. The agreement is a 3-year partnership with a total order volume of 60 GWh.

Sodium-ion batteries offer several advantages over traditional lithium-ion batteries. Sodium is more abundant and widely available than lithium, and this reduces the cost of production and supply chain risks. Sodium batteries also

have a reduced environmental impact during disposal and recycling compared to lithium-ion batteries.

According to CATL's announcement, "This collaboration signifies that CATL has successfully overcome challenges across the full mass-production chain of sodium-ion batteries, reaching large-scale delivery capability."

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

PSR Analysis: Not only does this agreement bring sodium batteries into the mix when considering which battery type to use, it also shows how much cheaper sodium batteries are, when compared to Lithium Ferrous Phosphate batteries (which are the cheapest lithium battery). **PSR**

University of Kentucky Turns Coal into Battery-Grade Graphite

Most EV batteries use 10 to 15 times more graphite than lithium with graphite typically used as the anode.

Around 90% of the world's battery grade graphite comes from China, so many nations around the world list graphite as a critical mineral and are constantly on the lookout for alternative sources because of monopoly and geopolitical concerns.

The University of Kentucky's Center for Applied Energy Research is developing a process to make ultra-pure synthetic graphite using coal combined with refinery by-products. The process avoids the more hazardous chemical treatments commonly associated with conventional synthetic graphite production.

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

PSR Analysis: Assuming this process delivers what is promised, and is commercially viable, then it will be a welcome alternative to graphite in what is becoming a politically sensitive material market. **PSR**

Brazil's Public Transit Skews To Electric

The electrification of Brazil's public transit landscape has proceeded with a rapidly increasing pace – not so long ago, the number of Electric buses was measured in units. Now, (as of 2026) the fleet has expanded to approximately 1,500 battery-electric buses across nearly 30 municipalities.

This is not just a technological upgrade; it is a significant carbon reduction strategy with Sao Paulo remaining the epi-center of this change. This is all well and good, but its continued success (and growth) depends on how the cities manage energy demand and peak power loads

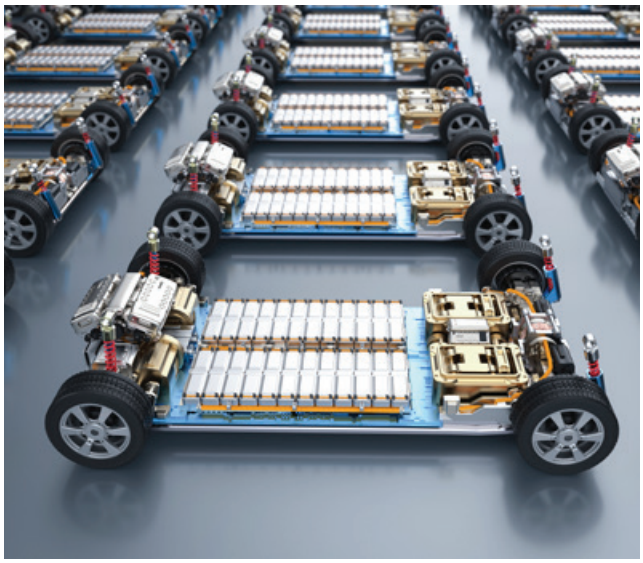
In practice, the number of buses a single 150 kilowatt charger can support ranges from two to eight depending on the depot and route profile. This variance proves that using fixed bus to charger ratios is fundamentally flawed. A one size fits all approach to infrastructure planning leads to either overcapacity or power shortages during peak service hours.

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

PSR Analysis. Brazil has long been a leader in alternative fuels (especially ethanol) but this move towards electric buses is interesting – partly because it represents a shift in focus beyond the novelty of the electric motor and toward the rigorous engineering of the grid, but also because Brazil seems to have skipped the tentative foray into hydrogen buses that so many nations have adopted (and then reverted to electric when the state subsidies end). **PSR**

A Final Note

Tesla Semi lands 60-truck order from port drayage fleets in California – **Click Here**… **WattEV** orders 370 Tesla Semis in largest California EV truck deployment - **Click Here**… **Chinese scientists** develop water-based battery that could last for 300 years - **Click Here**… **AI Data Centers** need big batteries but lithium isn't fit for the purpose- **Click Here**. **PSR**



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