

Alternative Power Report

July 20, 2026

News on Alternative Power Sources



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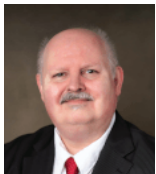
Moving from ICE To Alternative Power

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.

New Battery Could Lead To Big Leaps in Performance

Oxygen Plays New Role

By Guy Youngs, Forecast & Adoption Lead



Researchers at Dundee and Warwick universities in the UK, have identified the key role oxygen plays in storing and releasing a battery's energy and this could lead to the development of batteries for electronics and vehicles that charge faster, last longer, and are safer to use

Previously it was thought that oxygen in the battery was "passive". But the study found that while phosphates showed little oxygen participation, the layered oxides (in the cathodes) showed "significant" electron extraction from oxygen

Source: [MSN](#) [Read The Article](#)

PSR Analysis: Our current battery technology is limited by our understanding of the underlying physics of how and why batteries fail over time. This research opens up new avenues to explore and will help design batteries with much longer lifetimes. **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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New “Air” Battery Makes Larger Electric Aircraft Possible

The global aviation industry has been struggling to wean itself away from kerosene jet fuel, but there have been some signs that change is on the way. However, this may apply only to much smaller aircraft.

Full sized airplanes represent a significant challenge, which requires a completely new generation of lighter, higher performing (increased energy density) batteries. And, the US startup Air Energy may have a solution: solid State Lithium-Air batteries.

The idea is to use oxygen as a key ingredient in a rechargeable lithium-based battery, thereby saving considerable weight while potentially boosting energy density far beyond the capacity of ordinary lithium-ion technology

The US Energy Department’s Argonne National Laboratory discovered that the cathode-centered assumption behind all the previous work, was mistaken. They observed lithium hydroxide forming on the anode during operation, causing the battery to degrade, and the research work kicked off.

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

PSR Analysis: Obviously we are not there yet, and the batteries are not suitable for the larger aircraft, but if the latest research can be upscaled into production, then light aircraft may just have found their zero-emission option. **PSR**

Batteries Don’t Need To Electrify Every Ship To Reshape Shipping Fuels

Maritime transportation accounts for nearly 3% of global energy consumption, around 3% of greenhouse gas emissions and both energy consumption and emissions are expected to further increase over the coming decades. This paints quite a bleak picture, so when a paper is produced that argues that it’s not all doom and gloom, it gets interesting.

The paper argues that not every ship needs to become battery-electric. This goes against the standard anti-eco argument, that states that marine transport is not suitable for electrification. Inland vessels, ferries, coastal ships, offshore support vessels, service craft, port craft and many short-sea routes operate in regular patterns that are much friendlier to electrification.



The report finds that, by 2030, roughly 30% of maritime energy consumption and nearly 20% of maritime greenhouse gas emissions are technically electrifiable.

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

PSR Analysis: The report / paper infers that by electrifying smaller vessels, maritime emissions can be significantly reduced. Meanwhile, when the industry focusses on larger, deep-sea vessels and looks towards alternative fuels such as ammonia or hydrogen, it may be missing a relatively easy win. And it’s something that has already started to happen with vessels such as ferries. **PSR**

Fossil Fuels Are 40% Of Freight Shipping Tonnage, But Half Its Fuel Use

When one discusses maritime fuel use and its replacement, the discussion often is about bunker fuel and whether ammonia, methanol, hydrogen, LNG, biofuels, synthetic fuels or batteries can replace it.

Leaving aside the issue of Inland sea vessels, ferries, coastal ships, offshore support vessels, service craft, port craft and whether they can or should be electrified, one of the issues that is not being discussed (until now that is), is what happens to the marine market in terms of cargo capacity and cargo hauled, when fossil fuels are replaced.

Fossil fuels are roughly 40% of maritime tonnage, but they represent about half of maritime freight energy because coal, oil, and gas are mostly long-haul bulk trades.

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

PSR Analysis: Fossil fuel cargos travel long distances in very large tonnages, so any decline removes more than a proportional share of cargo mass. It removes a larger share of the ocean work and the fuel burned to do that work. This means that elimination of fossil fuels from the high seas may have a greater effect than simply a reduction in the fuels burnt by shipping. **PSR**

Paving the Way for Lithium–Nitrogen Batteries

Scientists from Belgium's University of Namur and China's Wuhan University of Technology have proposed a plan to advance lithium–nitrogen (Li-N_2) batteries.

The researchers argue that the development of Li-N_2 batteries is hindered by poor reversibility, limited cycling stability, and sluggish nitrogen activation.

They go on to suggest that improved electrolytes, catalysts, separators, and cell designs, alongside standardized testing and flow-type architectures, are needed.

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

PSR Analysis: These batteries were first demonstrated nearly a decade ago but development of the technology has been limited. One reason why these batteries may be important in the future is that in the battery, lithium reacts with nitrogen gas to form lithium nitride (Li_3N) during battery discharge and, ideally, regenerates lithium and nitrogen during charging. If researchers can resolve these issues, this battery has great potential. **PSR**

Hydrogen Demand Shrinks When It Is Counted Properly

When Hydrogen fuel is discussed, it almost seems to be a mythical wonder fuel that will solve all our future energy problems. The problem with this idea, is that hydrogen is already in use but most of its use is tied to the fossil-fuel system, fertilizer, methanol and process chemistry.

Many of these claims treat hydrogen as if every hard-looking energy problem automatically becomes a hydrogen market. This is simply not true; a better test is much narrower: where is hydrogen already used, which of those uses survive decarbonization, and which new uses can beat direct electrification or better molecules?



After all, if hydrogen is already tied to the fossil fuel system, when that declines what will happen to hydrogen? For example, oil refineries use hydrogen to remove sulphur and upgrade heavier hydrocarbons. That demand exists because the world processes enormous amounts of crude oil. As road transport electrifies, oil demand declines.

Transport is where most hydrogen-demand projections fail the simplest adoption test. Battery-electric vehicles have won light-duty road transport. But buses, trucks, rail, and passenger cars are effectively a dead end for hydrogen without substantial (measured in trillions of dollars) infrastructure investment.

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

PSR Analysis: Is hydrogen dead? No, there are genuine uses for hydrogen that will survive the decline of the fossil fuel market, (for instance Ammonia - Fertilizer is real hydrogen demand, and it is not going away, and neither is the use of hydrogen in process nor chemical feedstock), but hydrogen production needs to be cleaned up so that it doesn't rely on natural gas and other fossil fuel for its production. **PSR**

SuperDielectrics: Tests Validate High-Power Zinc Battery Performance

SuperDielectrics, a UK battery developer, has announced independent test results for its next-generation water-based zinc battery. It claims that the technology outperformed both standard and next-generation lithium iron phosphate (LFP) batteries.

The testing was done in high-power applications across cycle life, charging speed, discharge performance and safety.

Charge performance reportedly was 48 times better, life cycle was up to 13 times better, and discharge performance was around 10 times better.

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

PSR Analysis: The battery technology uses widely available raw materials and contains no critical minerals. The core innovation in the battery is a polymer separator designed to deliver rapid ion transport while using a water-based electrolyte system. **PSR**

Water-based Battery Could Turn Data Centers into Energy Storage

Cambridge-based advanced battery technology company, SuperDielectrics recently published independent test results for its upcoming water-based Zinc battery (see the previous article).

But why are we talking about this product in two separate articles?

SuperDielectrics is advertising its battery technology as the holy grail for AI data center problems – why?, Data Centers are where all infrastructure spending will be concentrated over the next decade, with tens of billions of dollars already announced, and SuperDielectrics wants a chunk of this money.

SuperDielectrics' battery leverages Zinc in addition to the proprietary polymer, and this metal is readily available which could mean that batteries would be cheaper, immune to geopolitical and supply chain vulnerabilities, and easier to scale up – all important factors for data centers. Unlike lithium batteries, this battery is safe to deploy in data centers, whereas off-site deployments are



currently required for lithium -based solutions due to their potential as a fire hazard.

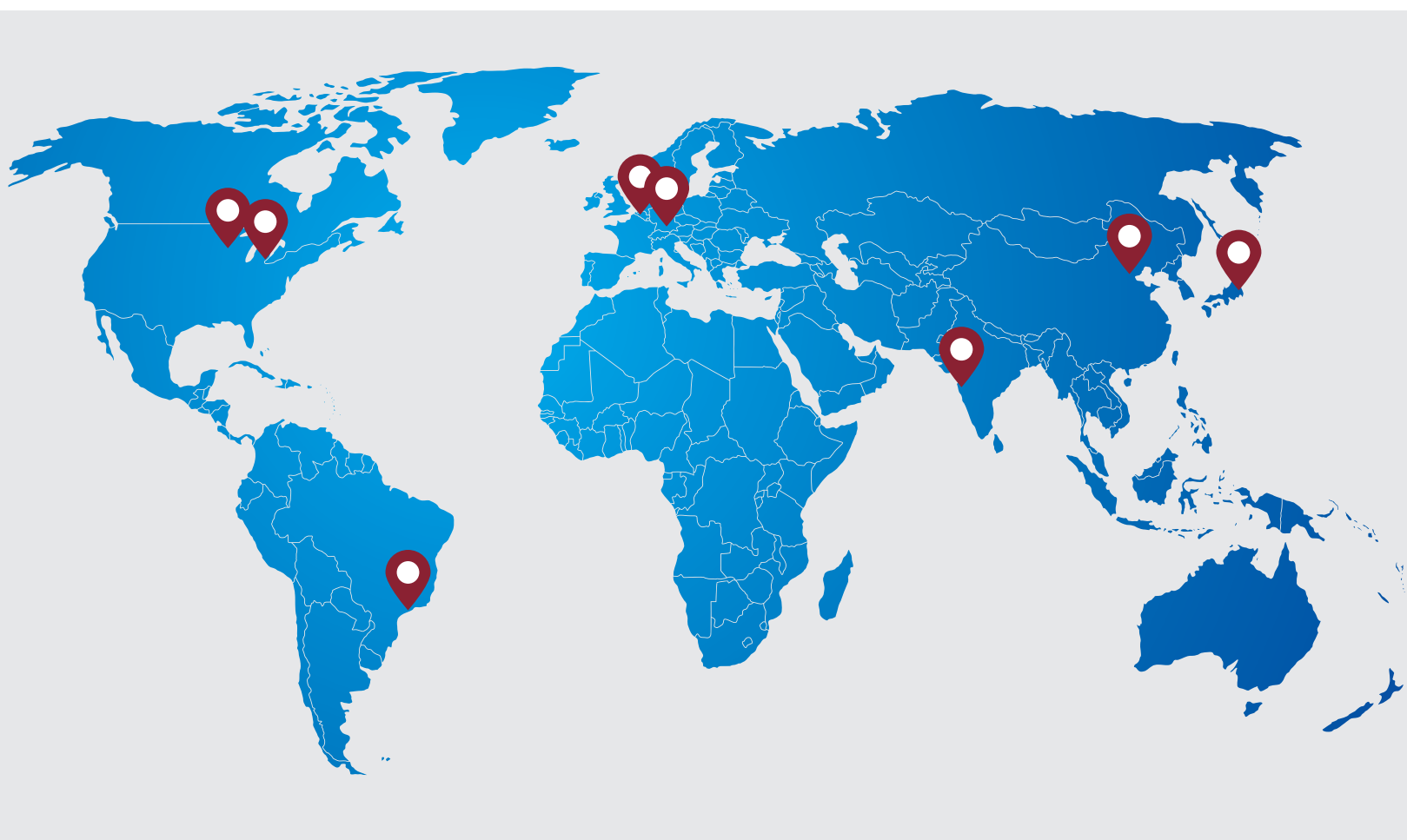
AI data centers are particularly power-intensive and require significantly higher peak power when performing certain computing tasks. Lithium batteries are not ideal for this because frequent charging and discharging degrades them fairly quickly, but they also do not charge or discharge as fast as the Zinc-based offering from SuperDielectrics.

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

PSR Analysis: Great, I hear you say. But not so quick. SuperDielectrics is being very coy about energy density; zinc batteries are less energy dense than Lithium batteries, and this may work against them. **PSR**

A Final Note

LiSA pilots low-energy salt-crystallized lithium refining – [Click Here...](#) **EV battery pressure** method could double lifespan - [Click Here...](#) **India's unstoppable** electric tuk-tuk revolution - [Click Here...](#) This **zinc mine** needed a truck no one made, so they made it themselves - [Click Here.](#) **PSR**



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