

Alternative Power Report

July 25, 2023

News on Alternative Power Sources

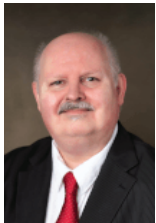


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Moving from ICE To Alternative Power

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.

BYD Establishes JV To Produce Sodium-Ion EV Batteries Goal Is To Create World's Largest Supplier of Sodium-Ion Batteries for Small EVs



By Guy Youngs, Forecast & Adoption Lead

Chinese automotive conglomerate BYD, is establishing a joint venture with Huaihai Holding Group. Together, the two companies intend to establish themselves as the world's largest supplier of sodium-ion batteries for small EVs. Previously, we've seen CATL (BYD's main competitor), announce plans to produce sodium-ion cells.

Sodium-ion batteries deliver a lower energy density than traditional lithium-ion cells but cost notably less to produce. Their main component (sodium) is also safer and more abundant than lithium. The chemistry is ideal for smaller EVs that generally deliver less range and have less demand on a daily mobility basis.

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

PSR Analysis: This could potentially be a game changer. If the weight, volume or energy density of the new battery chemistry isn't too far out of line, this could be a major upset. It's also another example of how rapidly the battery market is changing.



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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Graphic Shows Life Cycle Emissions: EVs vs ICE Vehicles

According to the International Energy Agency, the transportation sector is more reliant on fossil fuels than any other sector in the economy. In 2021, it accounted for 37% of all CO₂ emissions from end-use sectors.

To gain insights into how different vehicle types contribute to these emissions, this graphic visualizes the life cycle emissions of battery electric, hybrid, and internal combustion engine (ICE) vehicles using a report from Polestar and Rivian

Source: *Visual Capitalist* [Read The Article](#)

PSR Analysis: This is an interesting infographic that shows how different the emissions are from vehicles across several stages of their lifecycle. One thing that is extremely interesting is that EVs produce considerably fewer emissions across their life cycle (contrary to what some fossil fuel enthusiasts state) and if the emissions generated by the fuel production stage are reduced or eliminated (by the use of renewable power, for instance) the effects will be even more dramatic.

Offshore Hydrogen Could Be 10x Cost Of LNG

European energy policy makers apparently are taking a DNV report on offshore hydrogen manufacturing seriously. But this report doesn't stand up to scrutiny, in either its assumptions or its conclusions, according to this article.

DNV is an international classification organization that sets standards for ships and offshore structures, according to Wikipedia.

There's a rule of thumb for construction. Whatever something costs to build onshore, it costs 10x to build offshore and 100x to build on the ocean floor. Offshore wind farms make sense because they are essentially untended – there is no operations labor offshore. Construction and maintenance are it.

The article then compares this to an offshore electrolysis plant and suggests that the DNV report (which is so crucial to the EU's thinking) doesn't include this in their calculations.

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

PSR Analysis: This DNV report concludes that producing hydrogen offshore is very expensive, but that Europe

should go ahead with this. The details in this report are quite compelling and this suggests that the DNV report and its recommendation should be reviewed.

Hurtigruten Norway Plans Wind-Solar Ship with 60 MWh of Storage

Hurtigruten Norway (a cruise ship operator) has unveiled plans to construct its first zero-emission ship, powered by solar and wind energy. The company aims to develop the most energy-efficient cruise ship in the world, known as the Sea Zero. It will be 135 meters (443 feet) long and feature 270 cabins accommodating 500 guests and 99 crew members.

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

PSR Analysis: The ship has a huge battery pack (60mwh) that will give it enough power to run for 300 to 350 nautical miles and it has sails covered with solar panels. What makes this interesting is that it's really the first cruise ship to be fully powered by solar and wind. This could well be the first of many such ships.

What Is the Future for Alternative Power?

Making the switch from diesel powered machines to a low carbon option is not as simple as some would argue. Switching to electric has drawbacks such as their modest power density, which currently holds back their ability to power heavy equipment for a full working day. Cost is another important consideration.

So, what about HVO (Hydrotreated Vegetable Oil)? HVO, which is of particular interest to many equipment manufacturers, is obtained from cooking oil waste, grease and fat residues, waste fats and vegetable oil. The manufacture and use of HVO is nearly climate-neutral when only renewable energy sources are used in the production process. The problem with this fuel is its availability.

Ok, so what about hydrogen fuel cell technology or hydrogen as a fuel within an internal combustion engine? Cost appears as an issue for Fuel Cells, and while Hydrogen ICEs are a (relatively) simple conversion of a diesel engine, in both cases fuel supply, and its cost is a very big factor.

Source: *International Construction* [Read The Article](#)



PSR Analysis: Again, a high level article but Contractors/ Machine owners may have anxiety about their equipment purchases for some time to come as there is no single power source that will replace diesel in the entire construction industry, but rather each machine will need to use a specific power source depending on its duty cycle and costs.

VW Claims New Dry Battery Process Is Money-Saver

Battery technology is constantly evolving as scientists and vehicle and battery manufacturers seek to improve battery technology that will lead to less expensive electric cars with longer range and faster charging times. In the latest development, Volkswagen says it has come up with a new dry coating process that will allow it to lower the price of its electric cars by several hundred dollars. Dry coating reduces energy consumption in the production of battery cells by 30%, which could lower the cost of electric cars by several hundred dollars per vehicle.

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

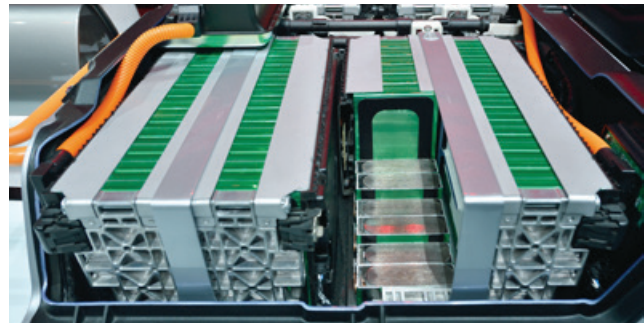
PSR Analysis: The mass production of batteries and EVs that use them, are beginning to show many incremental and beneficial changes that are a result of the large scale spending on research and development. We can expect many more of these changes over the next 10 to 15 years as the technology continues to develop.

Aluminum-Ion and Lithium-Sulfur Battery News

This update on battery news contains two articles:

First, researchers from the University of Ulm and the University of Freiburg reported they have created new anodes for aluminum-ion batteries that significantly improve their performance. As Aluminum is the most abundant metal in the earth's crust and its recycling is easy, the high discharge voltage, capacity, and excellent capacity retention, makes rechargeable aluminum-ion batteries a great potential replacement for Lithium-ion batteries.

Meanwhile, Lyten announced the opening of its small pilot battery factory in the United States for lithium-sulfur batteries. Lyten is a California company that has been pursuing lithium-sulfur batteries for many years, helped by significant financial support from the US military. The Lyten



lithium-sulfur batteries have an energy density of up to 900 Wh/ kg — roughly three times greater than conventional lithium-ion batteries.

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

PSR Analysis: Both of these articles talk about research that could have a significant impact on the future of battery-powered transportation and energy storage. It also shows that scarcity and high prices are adding to the push to replace Lithium-ion batteries.

This Is Why E Fuels Won't Work

The combustion engine is scheduled to be phased out in Europe by 2035. Apparently, climate neutral but astronomically inefficient e-fuels have entered the zero emission transport debate and now, thanks to a few lobbyists, they may form a small part of the powertrain mix after the 2035 phase out.

Source: *Fully Charged* [Read The Article](#)

PSR Analysis: Fully Charged is a small independent organization whose purpose is to educate, encourage and explain to its viewers that a very high percentage of the energy that the global population demands can and should, come from 'clean' sources, like solar, wind and energy storage. They do regular podcasts on their site, and this video talks about why E Fuels are not the way forward. This is a very high level video that addresses this concern in simple ways.

A Final Note

The **construction industry** is switching to electric equipment, [Click Here](#)...**Volkswagen** slows ID.4 and ID.7 EV production in Germany, [Click Here](#)...**Volvo's** heavy electric truck runs 12 hours a day with one charge break, [Click Here](#)...**Toyota** claims solid-state battery has 745 mile range and 10 minute charging time, [Click Here](#). **PSR**



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