

Alternative Power Report

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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.

Caterpillar and NMG Sign Circular Supply Chain Deal Similar Circular Supply Agreements Likely

By *Guy Youngs*, Forecast & Adoption Lead

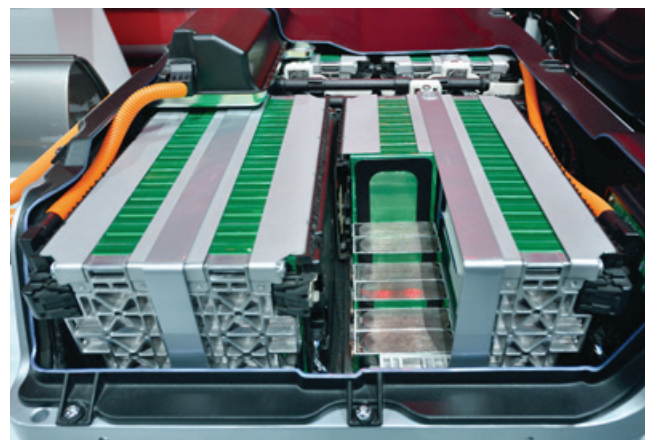


*Guy
Youngs*

Nouveau Monde Graphite Inc. (NMG) and Caterpillar Inc. have signed agreements to provide a zero-exhaust emission fleet, supporting infrastructure, and service for NMG's Matawinie Mine. Caterpillar will supply heavy mining equipment to transition from traditional models to Cat zero-exhaust emission machines.

Additionally, a non-binding memorandum of understanding (MoU) has been signed between the two companies to advance commercial discussions targeting NMG's active anode material.

Caterpillar and NMG have planned the development and testing of equipment and infrastructure for the Matawinie Mine in Saint-Michel-des-Saints, Québec, Canada. During the pre-production phase and early production years, the equipment used for commercial production will support operations and be gradually replaced with Cat® zero-exhaust emission machines as they become available.



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

PSR Analysis: This agreement could establish a full circular value chain whereby NMG supplies carbon-neutral graphite materials to Caterpillar for the development of its sustainable battery supply chain to electrify heavy vehicles, including NMG's Matawinie fleet. We expect to see more circular supply agreements like this in the future as OEMs seek to secure their supply of critical materials.

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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Volkswagen To Build Its Largest Battery Cell Factory In Canada

The battery division of Volkswagen Group, PowerCo SE, said it plans to construct its biggest battery gigafactory to date in St. Thomas, Ontario, Canada. A potential final expansion stage could produce up to 90 GWh of batteries annually.

This will be the company's first overseas gigafactory for cell production, and it will provide the company's BEVs in the North American region with their unified cells technology, a cell technology created for mass production. Construction is expected to start in 2024 and be completed in 2027.

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

PSR Analysis: The choice to extend PowerCo SE's cell production network to Canada is more evidence of the Volkswagen Group's growth plan for the North American market, and it also demonstrates that the Canadian government is prepared to offer incentives similar to those available under the US's IRA legislation.

Cummins To Invest \$1 Billion in US Hydrogen Fuel Network

Cummins has announced that in addition to the recent investments it has made in its Fridley, Minn., plant, it will also invest more than \$1 billion across its US engine manufacturing network in an effort to support the transition into hydrogen fuel.

The investments are being made in Indiana, North Carolina and New York. The \$1 billion is intended to provide an upgrade of facilities supporting the first "fuel-agnostic" engine platforms in the industry. The fuel-agnostic concept refers specifically engines that can use different types of fuel, especially a variety of low-carbon and zero-carbon fuels.

Cummins plans to invest \$452 million in its Jamestown Engine Plant in western New York, upgrading its 998,000 square-foot facility to produce what it calls the industry's first fuel-agnostic internal combustion engine platform that leverages a range of lower carbon fuel types. The X15N is part of the new fuel-agnostic 15-liter engine platform produced at JEP.

Source: *Hydrogen Fuel News* [Read The Article](#)



PSR Analysis: Over half of all medium and heavy trucks in the USA use a Cummins engine – the company hopes that this investment will smooth and support their transition to hydrogen power. Cummins credited congressional leadership and the Biden administration for support of its effort.

Japan's Love of Hydrogen Power Could Lead To Failure

Japan continues its efforts to make hydrogen a carrier of energy at all levels of society even though the results are not productive. Japan's focus on hydrogen for transportation, imported hydrogen and derivatives for electrical generation, and hydrogen for home heating and cooking is proving economically destructive.

Japan, and especially, Toyota, has been pushing hydrogen for years. Toyota began exploring hydrogen for vehicles in 1992, at the same time it was exploring electric vehicles. It delivered the first EV cars in 1993.

But at some point, industrial and energy and transportation policy became entangled, and instead of abandoning hydrogen when it became clear that electric vehicles were vastly superior, Toyota kept pushing hydrogen, to the extent that it gave away \$15,000 of free hydrogen with every car, including refurbished ones. It loses money on every one, yet it persists.

When you compare the most expensive form of energy with wind and solar energy you have a recipe for economic disaster.

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

PSR Analysis: Japan is slipping into hydrogen and energy poverty. Japan will have to make changes in the way it deals with energy or it will not be able to compete internationally and will have problems paying for imported energy.

California Bans New Diesel Trucks in 2036, a World First

The California Air Resources Board (CARB) has voted unanimously to finalize its Advanced Clean Fleets (ACF) rule. This is a massive new regulation on medium- and heavy-duty fleet vehicles that, among other things, requires all new medium- and heavy-duty vehicles sold or registered in the state of California to be zero-emission come 2036.

The rule is a complement to CARB's previous Advanced Clean Trucks (ACT) rule adopted in 2020.

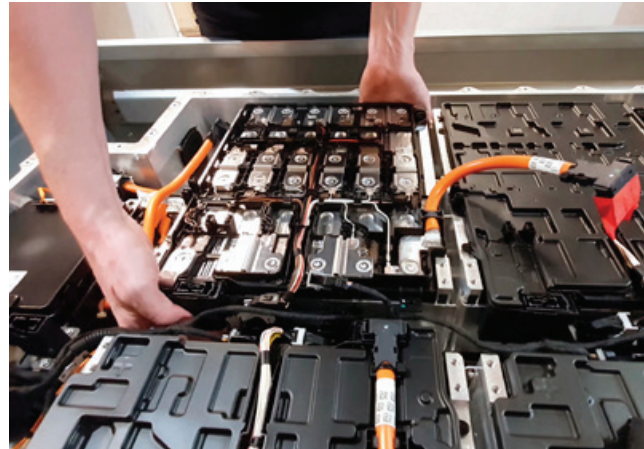
ACT was primarily a manufacturer requirement, requiring that manufacturers supply enough electric trucks. ACF will be a fleet adoption requirement, requiring that commercial fleet operators purchase a certain percentage of electric trucks.

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

PSR Analysis: California again leads the world in emissions control. California is the world's fifth largest economy and where it leads, many US states and nations soon follow. The ACF regulations reduce the timeline for this to happen from the previous target year of 2040 to 2036. This is only one year after similar regulations become effective for cars, so it should encourage massive action by Medium & Heavy Truck manufacturers.

Sodium-Ion Battery Coming To Production Cars This Year

Sodium is abundant, readily available and cheap. The price of sodium carbonate is around \$300 per ton today (Lithium reached \$80,000 earlier this year before falling.) Sodium is chemically similar to lithium, and thanks to the explosion in lithium carbonate prices, many companies are researching ways to use it to replace lithium in the batteries for electric vehicles.



Sodium batteries are much less affected by low temperatures and appear to be able to handle more charge/discharge cycles than lithium-ion batteries do. The New York Times reports a switchover to sodium-ion batteries may make China's control over battery manufacturing even greater. Of the 20 sodium battery factories now planned or already under construction around the world, 16 are in China, according to Benchmark Minerals, a consulting firm.

PSR Analysis: Sodium-ion batteries today have considerably lower energy density than lithium batteries, but bear in mind that not too long ago, LFP (lithium iron phosphate) batteries were woefully deficient in their energy storage capability. However, today's LFP batteries are nearly as energy dense as lithium-ion batteries were just a few years ago. Sodium is an attractive alternative to lithium because it costs only 2% to 3% as much as lithium.

Condensed Matter Battery From CATL Targets Electric Airplanes

At the Shanghai auto show, CATL, announced it expects to begin production of "condensed matter" semi-solid batteries later this year. The company said the new batteries will have an energy density of 500 watt-hours per kilogram. Lithium-ion batteries have approximately 300 watt-hours per kilogram.

At the same time, car manufacturer Nio says it has a new 150 kWh semi-solid state battery (developed by Beijing Welion New Energy Technology) that will be available in a few months that has an energy density of 360 Wh/kg.

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

PSR Analysis: The first generation of true solid-state batteries, which will have roughly the same energy as current lithium-ion batteries, is expected to emerge by 2025, according to CATL. This is significant because improved energy density means longer range or smaller battery packs for cheaper cars. Either way it's a win.

Accelera Displays Complete Hydrogen Technologies Portfolio

Among the hydrogen technologies being showcased at Hannover Messe include Accelera's FCE150, a fourth-generation fuel cell engine. The FCE150 features include enhanced power density, durability and efficiency. The engine is modular and stackable to generate a 300kW solution and operates without producing criteria air or greenhouse gas emissions. Its applications include buses, heavy- and medium-duty trucks, off-highway equipment, rail and marine.

Source: *Hydrogen Fuel News* [Read The Article](#)

PSR Analysis: This is one of several notable developments that Cummins has achieved recently. The others include a list that strongly indicates Cummins is clearly betting on hydrogen.

- The world's largest PEM electrolyzer in operation at 20MW in Canada
- A 100% hydrogen-powered passenger train fleet in Germany
- Hydrogen refueling station for cars, trucks, ships, and industrial customers in Belgium.
- A megawatt-scale demonstration plant for storing wind energy in the natural gas grid in Germany.
- A recently announced a US\$ 1 billion investment in hydrogen.

A Final Note

Deutz/Daimler engine deal – [Click here](#). **VW** brand chief not concerned with e-fuels: 'by 2035, combustion is over' – [Click here](#). Improving **Recycling Of End-Of-Life Vehicles** – [Click here](#). Believe it or not **electric UTVs** will revolutionize the off-road industry – [Click here](#). **Fortum Battery Recycling** Opens Europe's Largest Closed-Loop Hydrometallurgical Battery Recycling Facility In Finland – [Click here](#). **PSR**





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About Power Systems Research

Power Systems Research (PSR), established in 1976, is the leading source of data, analysis and forecasting on the global production of engines and engine-powered equipment, including class 8 vehicles. One of its databases, EnginLink,™ includes production figures down to the model level for OEMs in key market segments, such as commercial vehicles. PSR's global research network includes eight offices and stretches across 200 countries and four continents.



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