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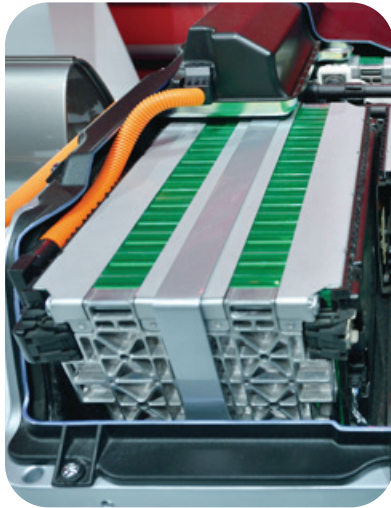
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Alternative Power Report

By *Guy Youngs*, Forecast & Adoption Lead

Caterpillar and NMG Sign Circular Supply Chain Deal



*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.

VW 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.

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Cummins To Invest \$1 Billion in 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. **PSR**

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The global marine inboard engines market is expected to grow from \$2.75 billion in 2022 to \$4.45 billion by 2032 at a CAGR of 5.1%, according to forecasts by Power Systems Research.

Global Report



Michael Aistrup

2032 Personal Watercraft Market May Hit US\$ 3.01 Billion

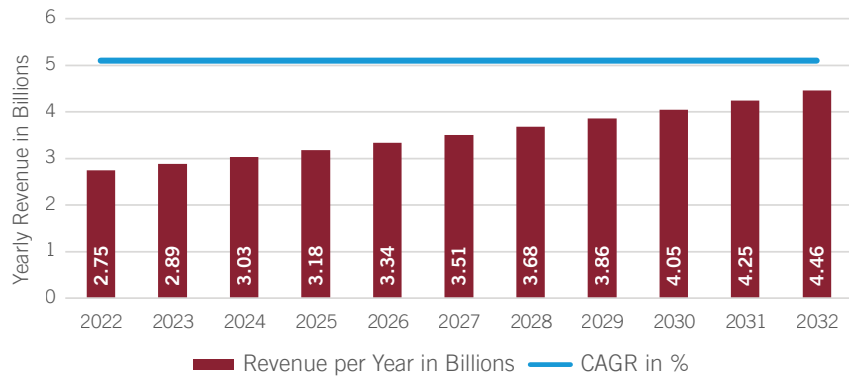
By Michael Aistrup, Senior Analyst

The global marine inboard engines market is expected to grow from \$2.75 billion in 2022 to \$4.45 billion by 2032 at a CAGR of 5.1%, according to forecasts by Power Systems Research.

A marine inboard engine is a reciprocating engine mounted within a boat's hull. It is a four-stroke engine that has been modified for maritime usage. The engine spins a drive shaft that passes through the hull and is connected to a propeller. While outboard engines must be periodically serviced to ensure they remain watertight, inboard engines typically do not require much maintenance. Additionally, inboard engines tend to be more fuel-efficient than outboards.

The distinctive marine torque, low pollution levels, consistently excellent dependability, and the option of providing new ease and satisfaction with joystick docking and driving are all common features for maritime leisure and business applications.

Global Marine Inboard Engines Revenue



Source: Power Systems Research

GROWTH FACTORS: Several factors are driving the growth of inboard engines:

- Stringent emission norms and rising environmental concerns worldwide. Technological advancements have created fuel-efficient and environmentally friendly marine inboard engines. These regulations encourage boat owners to replace older models.
- Small recreational boats account for the majority of the global marine inboard engine market share. High adoption rates among consumers are due to many advantages of inboard engines such as as low fuel consumption. The increasing

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Global Report

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popularity of recreational boating, especially among the affluent population, is driving demand for marine inboard engines.

- Increasing demand for marine inboard engines from the commercial sector because of the growth in maritime trade and tourism.
- More consumers are spending vacations by charting boats/yachts.
- The ease for owners to customize their boat/yacht.
- A stronger job market, low fuel prices, and increasing consumer confidence.

TRENDS: A trend that will gain traction in the marine inboard engines market in the coming years is hybrid turbochargers. The marine industry has made a substantial investment in R&D to cut down harmful emissions from boats, along with improving fuel economy and reducing operating costs.

Electric marine inboard engines are becoming more popular as battery technology improves, and the charging infrastructure becomes more widespread.

SUMMARY: The marine inboard engine has a solid reputation for dependability and longevity. This engine has become one of the most popular power sources for a variety of commercial and recreational applications. However, high maintenance associated with inboard engines could create challenges for inboard engines.

The diesel engines segment is expected to account for the largest share of the global marine inboard engines market during the forecast period. However, electric engines are projected to grow at a higher CAGR than diesel engines during the forecast period. **PSR**

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North America Report

By *Chris Fisher*, Senior Commercial Vehicle Analyst

EPA Introduces Phase Three GHG Emission Standards

In early May, the Environmental Protection Agency (EPA) held a virtual public hearing regarding the Phase 3 greenhouse gas emission standards for heavy duty trucks. There are various comments and opinions from the stakeholders that attended the hearing. Along with introducing the Phase 3 Greenhouse Gas (GHG) rules to begin for MY 2028 trucks, the EPA also revised the Phase 2 GHG standards for the MY 2027 truck standards.

This link from CCJ (Commercial Carrier Journal) is a good overview of the conference.

CCJ: 'Destined to fail': Trucking sounds off to EPA on new Phase 3 greenhouse-gas regs

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Global Report

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The Environmental Protection Agency this week held virtual public hearings related to its Phase 3 greenhouse gas emissions standards for heavy-duty trucks, unveiled last month. Among the dozens who testified during the hearings, trucking industry stakeholders were part of a small minority advocating for EPA to take a step back and reconsider the proposed standards that would take effect beginning with model-year 2027 trucks.

Part of EPA's proposal is to electrify 25% of new long-haul trucks by 2032, as well as 35% of new short-haul regional tractors and 50% of vocational vehicles. The proposal also reopens the "Phase 2" GHG emissions regs to make them more stringent for MY 2027 trucks and promulgates new emissions standards beginning with the 2028 model year.

The U.S. Environmental Protection Agency (EPA) in December updated emission standards for heavy-duty commercial vehicles for the 2027 model year, tightening tailpipe NOx limits to a level 80%-plus below the current standard and reducing the particulate matter limit by 50%. The agency also will require that OEMs extend warranties to 450,000 miles from 100,000 and useful life limits to 650,000 miles from 435,000 miles.

PSR Analysis: PSR has been following the developments surrounding the zero-emission vehicle trends over the years and has cited numerous barriers to adoption to series vehicle production which include charging and power grid infrastructure along with hydrogen fueling and storage infrastructure plus other factors such as total cost of ownership, vehicle duty cycles, range expectations, battery weight, etc.

None of these barriers have been overcome. It appears the EPA is tightening the emission standards to a point where the traditional ICE engine will be unable to meet the GHG standards, thus forcing zero-emission vehicles into the heavy truck market before significant barriers have been overcome. **PSR**

DATAPOINT: North America Lawn Mowers **3,364,000**

By Carol Turner, Senior Analyst, Global Operations

3.4 million units is the estimate by Power Systems Research of the number of lawn mowers to be produced in North America in 2023. This includes 215,000 electric units.

Lawn mowers are produced in many versions and power sources and are designed to cut grass in home lawns and public areas such as parks and golf courses. **Robotic Mowers** autonomously mow a designated area. **Walk Behind**

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North America Report

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Lawn mowers are produced in many versions and power sources and are designed to cut grass in home lawns and public areas such as parks and golf courses.

Reel Mowers use blades set on a revolving cylinder or reel to cut grass. These mowers are powered either manually or by engine power; when the reel mower is moved forward the reel moves, cutting the grass.

Walk Behind Rotary Mowers come with high rear wheels and are very well suited for yards with lots of obstacles such as flower beds, trees and ponds. **Rear Wheel Drive Self-propelled Mowers** are good for rough, hilly terrain. Engines use either an overhead cam design, which provides cooler, more efficient and cleaner operation with longer valve life and fuel efficiency, or the side valve engine, which is the more traditional design that provides reliable power.

Battery-powered mowers come in many designs, including self-propelled units; they are light weight and compact. Electric mowers are quick-starting and feature quiet operation. They are considered more environmentally friendly than gasoline machines. Corded units also are available.

Commercial Walk-Behind Mowers are heavy-duty motor-driven machines designed for large commercial operations; the operator walks behind the mower and guides it by handle controls.

Riding Reel Mowers have blades that spin vertically and use a scissoring action to cut the blades of grass. A reel mower will have between three and seven blades, depending on the model type.

Riding Rotary Turf Mowers have blades that spin horizontally and use a sucking and tearing action to cut the blades of grass.

Product information for this report comes from industry interviews and from two proprietary databases maintained by Power Systems Research: **EnginLink™**, which provides information on engines, and **OE Link™**, a database of equipment manufacturers.

Market Share: With 66% of total units produced, MTD leads in the production of lawn mowers in North America. In second position is Honda Power Products with 15%. Third is Toro Mexico with 10.5%.

Export: Mexico exports up to 85% of its production worldwide. The United States exports up to 30% of its production worldwide.

Electric Power. The transition from gasoline powered units to electric power is continuing. In 2022, production of Battery/Corded Electric units increased 49%, but production of battery-powered units is expected to drop nearly 15% in 2023 because several models have been dropped. Total electric production is expected to increase 2% in 2023.

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North America Report

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	2021	2022	2023
Battery:	138,145	218,713	221,641
Corded:	25,731	25,731	27,226
Total Electric:	163,876	244,444	214,237

	2021-2022:	2022-2023:
Battery:	58% increase	1.3% increase
Corded:	no change	6% increase

Trends: In 2022, production of lawn mowers in North America decreased 4%. Production is expected to increase 8% in 2023 over 2022. The 2020 decline was mainly due to COVID-19 issues that carried into 2023 production year. Spring is predominately the kickoff season for mower sales and dictates the demand. There is always a demand for new products that enhance overall mowing productivity with increased mowing speeds along with the demand for fuel efficient and eco-friendly models. Production is expected to increase up to 5% by 2025. **PSR**

Brazil/South America Report

By *Fabio Ferraresi*, Director Business Development South America



Fabio Ferraresi

Special Report: Agrishow 2023

Our Power Systems Research South America Team visited the Agrishow 2023, in Ribeirão Preto-SP, Brazil, visiting customers and checking the new launches and market expectations. It's the world's largest show on Agricultural Equipment


The general expectations of exhibitors we talked with were not positive. Exhibitors carefully spoke about some factors influencing the market, such as lower commodities prices and the new government often speaking against Agribusiness that does not promote positive investment decisions.

On the other hand, the projections of business during the show surpass US\$ 2.6 Billion (R\$ 13.2 Billion), that is 18% nominal growth over 2022 business and actual growth of 9.5% discounting inflation. The expectation is for a recovery in commodities prices in 2H 2023. The government is also announcing more credit for this segment and OEMs are offering their own credit lines.

OEMs are investing in capacity expansion, localization and new products.

The AGCO group announced R\$ 1 billion of investment on new product lines and capacity in the period of 2023/2024. **Read The Article, Read This Article, Too**

Only Komatsu sold above R\$ 100 M (US\$ 20 M) and JCB expected 47% growth on 2022 business. **Read The Article**

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South America Report

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Product Launches

JACTO

- Pulverizador Autonomo Brasileiro . Arbus 4000 JAV
- Spreader. Uniport 5030 NPK and Tellus 10.000 NPK
- [Read Product Information](#)

BALDAN. One of the highlights is the Avola sprayer, a self-propelled sprayer with a capacity of 2000 and 2500 liters that motivated R\$ 150 Million (US\$ 30 Mi) investment on a new unit for self propeled equipment, starting with Avola Sprayer line.

- Sprayer Avola
- [Read Product Information](#)

LS TRACTOR launched Plus Forest line with models of 80, 90 and 100 horsepower.

- Plus 80
- Plus 90
- Plus 100
- [Read Product Information](#)

KUHN launched the Fighter Sprayer with two technologies in the same machine. The Autospray precision spraying system, which makes operations simpler, possible to select the size of the drop and the required dose, working with a wide speed range. And the I-SPRAY, a system of sensors installed in the spray bar that apply herbicide only at the weeds, avoiding waste and reducing costs.

[Read Product Information](#)

MAHINDRA Mahindra launched its 110-horsepower tractor (M105) at the show. Now fully manufactured in Brazil, the brand begins production of the model that serves medium-sized rural producers. Mahindra brought to Agrishow 2023 the 6675 F tractor, unique with a cabin designed for application in various fruit orchards. [Read Product Information.](#) [Here's more Product Information.](#)

TATU MARCHESAN launched its line of hydrostatic sprayers at Agrishow 2023. The first self-propelled sprayer of the brand, Kontrol model has advanced technology, 4x4 hydrostatic transmission system, free span of 1.60m, embedded technology with the AGRES monitor and power plant. [Read Product Information](#)

JOHN DEERE announced that the line of 7M tractors will be produced in Brazil by early 2024. [Read Product Information](#)

MWM, recently acquired by Tupy, presented to the public the motor pumps in biomethane and diesel versions. Developed in Brazil, the motor pumps will compose the portfolio of products for the agricultural segment. MWM also presented its solution to convert Diesel Trucks to Natural Gas or Biomethane, with total cost 30% lower than acquiring a Natural Gas Truck from the OEM.

[Read Product Information](#)

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South America Report

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CASE IH is betting on connectivity and presented an electric tractor at Agrishow. [Read Product Information](#)

Case IH and New Holland, brands of CNH Industrial, showed at Agrishow their new launches focused on precision agriculture, through new technologies, the Agxtend line. [Read Product Information](#)

FCA. Dodge / Ram took advantage of Agrishow to show the public for the first time the new Limited version of the 1500 pickup. [Read Product Information](#)

HORSCH do Brasil presented at Agrishow 2023 its line of Dakar fine grain seeders with the VF model. [Read The Article](#)

MASSEY FERGUSON recently launched the Fuse Guide, an electric autopilot that can be installed on new or used tractors, combine harvesters and sprayers. [Read The Article](#)

VOLKSWAGEN TRUCKS AND BUS. Volkswagen launched at Agrishow 2023 the brand's first autonomous truck. The company has just delivered the first 20 units of the VW Constellation 31,280 8x4 with this technology. [Read The Article](#)

DAF TRUCKS Brazil presented an unprecedented version of the DAF XF, the New DAF XF Off-Road truck. [Read Product Information.](#)

XCMG showed the On Highway heavy EV truck for the first time for Brazilian Market, initially imported from China.

Show Report: Automec 2023

The Power Systems Research team in Brazil attended Automec 2023 this month, the show dedicated to the On Highway aftermarket. It's the show that features main components manufacturers selling in Aftermarket.

This year's edition took place April 25-29 at São Paulo Expo where more than 1500 brands were shown by 450 international exhibitors from 12 countries, in seven international pavilions.

More than 90,000 attendees visited the show(20% above last edition), with 30% of returning rate, coming from all regions of Brazil and 60 countries. The estimated volume of business is US\$ 6 Billion (R\$ 29,5 Billion).

These numbers make Automec the largest B2B business event in Latin America, the largest automotive aftermarket business event in the Americas and the second largest in the world in the segment.

PSR Highlights. The show is an opportunity for distributors, retail, repair shops, and components manufacturers to do business.

We talked to several people in the show and the expectations for Aftermarket business in 2023 are high. Repair shops, both independent and from big freight

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South America Report

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More than 4,000 exhibitors presented their solutions and welcomed 130,000 visitors from around the globe.

transportation companies, come from many regions of the country looking for better equipment, new technology and components solutions.

New technologies for EV diagnosis and repair shown at the event are targeting repair shops in this new market.

During the show we had interesting discussions about Components Remanufacturing and ESG approach affecting this business in Brazil. **PSR**

Europe Report

By Guy Youngs, Forecast & Adoption Lead



Guy
Youngs

Show Report: Hannover Messe 2023

General Observations. The core topics at HANNOVER MESSE included artificial intelligence, hydrogen, energy management, connected and intelligent production, and the new Manufacturing-X data ecosystem.

More than 4,000 exhibitors presented their solutions and welcomed 130,000 visitors from around the globe. There seemed to be a very large Chinese contingent at the show (both as visitors and exhibitors), as well as a large number of local governments, universities and startups. There seemed to be a predominance of exhibitors showing bearings, copper fittings, cables and components as well as systems / electronics companies.

There was also a large number of independent robots in evidence, ranging from robotic dogs and robotic servers to robotic messengers following pre planned routes.

The Exhibition site was huge with each hall easily taking at least 1.5 to 2 hours to walk thoroughly.

Selected Companies. More than 4,000 companies exhibited their products at the show, but we thought these few had products that were especially interesting.

Eikto is a Chinese company based in Xuancheng (Anhui Province) and which is situated approximately 150km west of Shanghai. Their products are mainly suited to Material Handling Equipment, Golf-Buggy, Aerial Work Platform, Cleaning Equipment and small marine applications.

They had a small stand showing their Battery Cells (in different sizes) and their new Lithium-Ion Battery Pack (Picture 2 &3). They weren't too open about the size of the Battery pack but I would estimate its between 10kWh and 20kWh

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Europe Report

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Delta is a Dutch company with a global presence (Netherlands, Taiwan, USA, Australia, Japan, Singapore, India, Thailand, Indonesia and the Philippines) that specializes in EV chargers. It was one of a number of companies with EV chargers on display.

It also made a big issue about retrofitting older buildings with chargers.

Wilo. The Wilo Group is a multinational technology group and a supplier of pumps and pump systems for building services, water management and the industrial sector. It has also used its expertise to move into Hydrogen.

Their H2POWERPLANT uses electrolysis to convert green solar, wind and hydropower into green hydrogen. When it's needed, a fuel cell can then be used to convert the hydrogen back into electrical energy. The waste heat is either used in the interconnected system for heating, stored or converted into cooling on site. This sustainable use of all released energy optimises system efficiency. The process relies on the precise configuration of the water-bearing systems in addition to intelligent control of energy and load management.

The 20ft container includes all the components necessary to generate hydrogen and fuel cells to convert it into electricity. The storage of H₂ is in a separate 20ft container

MTU is a regular at most trade shows and their stand was fairly small (smaller than at Bauma). They were mainly displaying their Fuel Cell package.

Auyan. Established in June 2011, and located in Weifang City, Shandong Province, Auyan New Energy Technology Co., Ltd. specializes in manufacturing cryogenic equipment. As an offshoot of this they have developed their own Hydrogen electrolysis and storage equipment

Their mobile electrolysis machine manufactures approximately 1m cubed of hydrogen per hour. They have larger versions too.

Accelera (Cummins) had a small display under their new related business name, Accelera. Accelera is the new brand for Cummins' New Power business segment, it launched March 8, 2023. Accelera is an energy technology leader committed to securing a sustainable future for the industries that keep the world running. A diverse portfolio of zero-emissions solutions includes battery systems, fuel cells, ePowertrain systems and electrolyzers

Others. Some of the university stands had very interesting displays. One was a fuel cell powered bike with a thermos like device on the left for fuel. A lower box holds the fuel cell and the upper box holds a small battery.

Golz is a medium sized, family run company that specializes in handheld and small portable equipment for construction sites (table drills, power saws, drills, etc). They have a long term relationship with Stihl and make some of the Stihl products.

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China Report

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They have branched out into providing power packs for small construction sites. One product shown was a power bank that has 4.8 kwh. The business idea is that a small contractor takes one or two of these power banks to his site, uses them and recharges over night.

Pre-Zero is a plastics recycling company that was founded in 2009 under the name GreenCycle. It originated from a department in waste disposal logistics of Lidl. PreZero, are now the environmental division of the Schwarz Group with 485 locations worldwide and over 30,000 employees. **PSR**

China Report

By *Jack Hao, Senior Research Manager - China*

Weichai, BYD To Jointly Produce Batteries



*Jack
Hao*

Weichai Power and BYD have agreed to jointly produce power batteries in Shandong, and to cooperate in programs to develop EV commercial vehicles. On May 23, the companies signed an agreement to build a research and development and manufacturing base for power batteries, continuously strengthen the new energy industry chain, innovation chain, and value chain, and make positive contributions to promoting the industrialization development of China's new energy commercial vehicles.

Weichai Power is the largest manufacturer of diesel engines in China. Since 2010, Weichai Power has set a strategic goal of leading the global industry development in the new energy business by 2030. Weichai Power has invested more than 4 billion yuan in this effort. It has strategically restructured the Canadian Ballard hydrogen fuel cell, the British Siris solid oxide fuel cell, and the Swiss rapid air compressor, developed the first hydrogen internal combustion engine heavy truck in China, comprehensively laid out the three technical routes of pure electric, hybrid power, and hydrogen fuel cell, and dispersed the risks brought by the uncertainty of industrial development with the investment strategy of coexistence of multiple technical routes.

BYD has successively launched multiple technologies in the field of new energy vehicles, including blade batteries, DM-i super hybrid, and CTB battery body integration. From January to April this year, BYD's cumulative sales exceeded 750,000 vehicles, ranking first in the domestic new energy passenger vehicle market. BYD Group has set a market sales target of over 3 million new energy vehicles this year.

Currently, both companies have established new energy businesses in Shandong.

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China Report

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Weichai Power has established a new energy engine base in Weifang, Shandong, and China National Heavy-Duty Truck has built a new energy heavy-duty truck manufacturing base in Laiwu, Jinan; Weichai laid out a power battery, chip, and vehicle factory in Jinan in 2021. This is the industrial foundation for both sides to achieve strategic cooperation in Shandong.

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

PSR Analysis: Weichai and BYD are using their respective advantages to establish a more comprehensive and in-depth strategic cooperative relationship in the field of new energy. They will jointly produce power batteries in Shandong, build a research and development and manufacturing base for power batteries, continuously strengthen the new energy supply chains, promote the industrialization of China's new energy commercial vehicles, and bring a leading effect to the process of off- road electrification.

The Weichai New Energy Commercial Vehicle Blue Engine Automotive Brand Strategy Release and Product Launch Event was held in Chengdu on May 15th, marking the beginning of Weichai's car manufacturing.

The latest new energy light truck brand is LANDKING. This includes advantageous products such as Weichai Power and three electric systems: Fast Transmission, Hande Axle, and the globally leading BYD Blade Battery. With the strong economic recovery and the deepening of the "dual carbon" strategy, the huge potential of new energy light trucks is highlighted. **PSR**

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Far East: Japan Report

By *Akihiro Komuro*, Research Analyst, Far East and Southeast Asia

Hitachi To Launch Remote Excavator in FY2023



Akihiro Komuro

Hitachi Construction Machinery says it will release a medium-sized hydraulic excavator that can be operated remotely during fiscal 2023. Workers will be able to remotely operate the excavator without getting on the machine during construction of housing sites and rivers. Demand is expected to increase due to labor shortages at construction sites, and the company will introduce the medium-sized models, which are widely used.

The main target is hydraulic excavators with a body weight of 10 to 30 tons. Hitachi Construction Machinery will prepare a body that can be remotely controlled and will install the necessary remote-control controller and video system in consultation with the customer.

Until now, there have been cases of major general contractors modifying hydraulic excavators to enable remote control on their own. Hitachi Construction Machinery

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In the future, Hitachi Construction Machinery plans to release a hydraulic excavator of the same class that is compatible with automation in addition to remote operation.

will make it easier to provide after-sales service by making its own remote-controlled excavators. In the future, Hitachi Construction Machinery plans to release a hydraulic excavator of the same class that is compatible with automation in addition to remote operation.

Source: The Nikkei

PSR Analysis: I visited CONEXPO2023, the world's largest construction equipment exhibition, where many remote-control systems, including Trimble, were on display. The system consists of multiple large monitors, a cockpit, and joysticks to operate construction equipment from a remote location via the Internet. It is my impression that many of these systems were developed by telecommunications giants and aimed at construction equipment manufacturers.

Hitachi Construction Machinery is now offering this system as its own service to its customers. In the midst of a serious labor shortage, such labor-saving systems are in high demand. Unmanned operation is the ultimate goal of the construction machinery industry, but the first step would be to operate multiple job sites from a single location using such a remote-control system. **PSR**

極東 > 日本レポート:

小室 明大 – 極東及び東南アジア リサーチアナリスト

日立建機、遠隔ショベル2023年度に発売 一般土木現場向け

日立建機は2023年度中に遠隔操作に対応する中型の油圧ショベルを発売する。宅地造成や河川の工事などで、建機に乗り込まずに作業員が操作する。工事現場で人手不足により需要が高まっているとみて、普及台数が多い中型で導入する。

主に車体重量が10~30トンクラスの油圧ショベルを対象とする。遠隔操縦に対応できる車体を用意し、日立建機が顧客と相談しながら必要な遠隔操作のコントローラーや映像システムなどを搭載する。

これまで、ゼネコン大手が独自に遠隔操作できるように油圧ショベルを改造する事例はあった。日立建機は自ら遠隔対応にすることでアフターサービスなどをしやすくする。今後、遠隔操作に加えて自動化に対応する同クラスの油圧ショベルも発売する計画だ。

PSR 分析: 筆者は世界最大の建機展示会CONEXPO2023を視察してきたが、Trimbleをはじめ多くの遠隔操作システムの展示があった。複数の大型モニタとコックピット、操作のジョイスティックなどで構成されたシステムを用いて、インターネット経由で遠隔地にある建機を操作する仕組みだ。こうしたシステムは通信大手が開発を主導し、建機メーカーへの導入を狙ったものが多かった印象がある。

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今回日立建機はこうしたシステムを自社のサービスとして顧客に提供する。人手不足が深刻な現場ではこうした省力化に貢献する仕組みは需要が高い。無人化は建機業界にとっては究極の目標だが、まずはこうした遠隔操作システムによって、複数の現場を1か所から運用することが第一歩になるだろう。PSR

参考: 日経 (一部筆者により元記事内容を改編しました)

Far East: South Korea Report

By *Akihiro Komuro*, Research Analyst, Far East and Southeast Asia

Kia Plans Customer Specific EVs

Kia is pursuing its own EV strategy centered on specific applications such as delivery vehicles and cabs. The company is jointly developing delivery vehicles with Korea's largest online retailer, Coupang, and customer specific EVs will account for 1 million of the 1.6 million EV sales target for 2030. A dedicated plant will also be built in the suburbs of Seoul.

The company and Coupang will develop vehicles with increased cargo capacity and refrigerated and frozen interior equipment, with the assumption that only one driver will be on board. Coupang will have its own distribution center and delivery vehicles for high-speed delivery and will hire drivers directly. Coupang has indicated that it plans to operate 10,000 EV delivery vehicles in the future.

It has also signed a joint development agreement for delivery trucks with CJ Daehan Transport, the largest land transportation company in Korea. It will also develop EVs suitable for refrigerated delivery in cooperation with restaurant chains and other companies.

First, Kia will accumulate expertise in individual development and mass production based on collaboration with domestic companies, and then begin to receive orders from overseas clients in the U.S., Europe, and other regions.

Kia will build a plant dedicated to EVs to expand PBVs in Hwaseong City in the Seoul metropolitan area. Construction will begin by the end of 2023, and the company plans to secure an annual production capacity of 150,000 EVs by the second half of 2023.

The Hyundai Motor Group, including Kia, is applying the "E-GMP" EV platform to all EV models. The structure allows for a high degree of flexibility in vehicle interiors, as the batteries are laid under the floor.

Hyundai Motor Group's global sales volume for 2022 is 6.84 million units, of which 2.9 million units will be sold by Kia. Although Kia is inconspicuous in the shadow of Hyundai Motor, its sales volume is on par with that of Japan's Suzuki Motor, and it boasts sales of US\$64.9 billion (9 trillion yen). With an efficient marketing

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Kia used to focus mainly on small cars, but in recent years it has been focusing on SUVs and luxury sedans and has been competing with Hyundai in an increasing number of cases.

strategy centered on Korea, the U.S., and Europe, Kia's operating profit margin in 2022 will be 8.4%, higher than that of Hyundai Motor (6.9%).

Source: The Nikkei

PSR Analysis: Kia's clear target for commercial vehicles seems to be well received by the market. Kia used to focus mainly on small cars, but in recent years it has been focusing on SUVs and luxury sedans and has been competing with Hyundai in an increasing number of cases.

I believe that EVs will spread more quickly in the commercial vehicle market because they are more cost-conscious. Kia is trying to find an opportunity in the commercial vehicle sector, where other major OEMs have not focused their efforts so far. **PSR**

極東 > 韓国レポート:

小室 明大 – 極東及び東南アジア リサーチアナリスト

起亜、顧客仕様のEV100万台計画 配送車・タクシー開発

起亜が配送車やタクシーなど特定用途向けを軸にした独自のEV戦略を進める。韓国ネット通販最大手のクーポンと配送車を共同開発するなど、2030年のEV販売目標160万台のうち顧客仕様EVが100万台を占める。ソウル市郊外に専用工場も建設する。

クーポンとは運転手1人の乗車を前提として荷物の積載量を増やし、冷蔵や冷凍の車内設備を備える車両を開発するもようだ。同社は高速配送のために物流センターや配送車を自前で抱え、ドライバーを直接雇用する。将来的に1万台規模のEV配送車を運用する方針を示しており、起亜への発注ロットが大きい。

韓国陸運最大手のCJ大韓通運とも配送トラックの共同開発契約を結んだ。飲食店チェーンなどとも連携して冷蔵配送に適したEVも開発する。まずは国内企業との協業をもとに個別開発・量産のノウハウを蓄積し、米国や欧州など海外の顧客企業からの受注も始める。

起亜はPBV拡大のためのEV専用工場をソウル首都圏の華城市に建設する。既存工場を拡張する形で、6万6千平方メートルの敷地に1兆ウォン（約1000億円）を投じて新工場棟を建てる。23年内に着工して25年下半年には年間15万台のEV生産能力を確保する計画だ。

起亜を含む現代自グループはEVプラットフォーム「E-GMP」をEV全車種に適用している。電池を床下に敷き詰める構造で、車の内装の自由度が高い。

現代自グループの22年の世界販売台数は684万台で、そのうち290万台を起亜が担う。現代自の陰に隠れて目立たない起亜だが、日本のスズキと同水準の販売台数で、売上高は9兆円を誇る。韓国と米国、欧州を中心とした効率的なマーケティング戦略で22年の売上高営業利益率は8.4%と現代自（6.9%）を上回る。

PSR 分析: 起亜が商用車への明確なターゲットを示したことは市場からも好感を持たれているようだ。かつての起亜は小型車が中心だったが、近年はSUVや高級セダ

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ンにも注力しており、現代自動車と競合するケースも増えていた。

筆者は商用車の方がEV普及は早く進むのではないかと見ている。コスト意識がより高いからだ。これまで商用車分野では他のメジャーな自動車OEMが力を入れてこなかったという側面もあり、起亜はそこにチャンスを見出そうとしている。**PSR**

出典: 日経 (一部筆者により元記事内容を改編しました)

Southeast Asia: Thai Report

By *Akihiro Komuro*, Research Analyst, Far East and Southeast Asia

China's Changan Auto To Build EV Plant in Thailand

Changan Automobile Group, a major Chinese automobile manufacturer, will establish a new plant for electric vehicles such as EVs in Thailand, according to the Board of Investment of Thailand (BOI). The investment will be US\$ 284 million (9.8 billion baht or about 38 billion yen), and construction is expected to be completed within a few years. The initial production capacity will be 100,000 vehicles a year, and on-board batteries will also be manufactured. The Thai government has established an incentive program to encourage local production of EVs, and Chinese EV giants have been actively investing in the country.

In addition to EVs, the new plant will produce electric vehicles such as HVs and PHVs. The company plans to supply vehicles to Southeast Asian countries, Australia, South Africa, and other markets.

Changan Automobile is the fourth largest car OEM in China, selling more than 2 million new vehicles in 2022. The company also has established a joint venture with Mazda and is strengthening the introduction of electric vehicles in China. The company plans to introduce electric vehicles outside of China as well, and this investment is part of that strategy.

In Thailand, BYD, a major Chinese EV manufacturer, will also establish a plant for finished vehicles in Rayong Province in the eastern part of the country, which will be completed in 2024 and is expected to produce 150,000 passenger cars a year. Great Wall Motor also plans to start local production in the same year. In 2022, the Thai government introduced an incentive program to encourage EV production, and many Chinese car giants are taking advantage of the program.

Source: The Nikkei

PSR Analysis: Changan Automobile, one of the "Big 5" Chinese automakers, has joint ventures with several foreign automakers. SAIC, BYD, GWM, and others have also entered the Thai market and are trying to penetrate the stronghold of Japanese automakers in the country.

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South East Report

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Comparing Japanese and Chinese EVs with the same specifications, Chinese EVs are likely to have the advantage in the cost battle. The focus will be on how the reliability of the Japanese brand, including its extensive service network and after-sales support, will stand up to the Chinese offensive.

Comparing Japanese and Chinese EVs with the same specifications, Chinese EVs are likely to have the advantage in the cost battle. The focus will be on how the reliability of the Japanese brand, including its extensive service network and after-sales support, will stand up to the Chinese offensive. **PSR**

東南アジア > タイレポート:

小室 明大 – 極東及び東南アジア リサーチアナリスト

中国・長安汽車、タイにEV新工場 380億円投資

起亜が配送車やタクシーなど特定用途向けを軸にした独自のEV戦略を進める。韓国ネット通販最大手のクーパンと配送車を共同開発するなど、2030年のEV販売目標160万台のうち顧客仕様EVが100万台を占める。ソウル市郊外に専用工場も建設する。

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PSR 分析: 中国自動車メーカーの「BIG 5」の1社であるChangan Automobileは複数の海外自動車メーカーと合併事業を展開している。彼らのタイ進出は、現地における中国勢の存在感をさらに高めることになるだろう。SAIC、BYD、GWMなども進出し、これまで日本勢の牙城であったタイに切り込もうとしている。同スペックでの日本車と中国勢の比較をすればコスト勝負では中国勢が優勢になるだろう。これまでサービス網を広く展開し、アフターサポートを含めた日本ブランドの信頼性が中国勢の攻勢に対してどう立ち回るか、が焦点になる。 **PSR**

出典: 日経（一部筆者により元記事内容を改編しました）

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India Report

By *Aditya Kondejkar*, Research Analyst – South Asia Operations.



*Aditya
Kondejkar*

Electric vehicles (EVs) witnessed strong growth in the Indian market in 2022, with a three-fold increase in sales as compared to the year before. Official data shows that Indians have bought 2,780,000 EVs since January 2023 at an average of more than 90,000 EVs per month. Significantly, the demand for EVs is not limited to metro cities such as Delhi, Mumbai, and Bengaluru, but is increasing in Tier-2 and Tier-3 markets as well.

Source: *Financial Express* [Read The Article](#)

PSR Analysis: While the growth of EVs has been primarily focused on urban areas of India, we are seeing a significantly improved adoption of EVs in rural parts of the country. The statistics from Vahan, the national vehicle registry, reveal that sales of electric cars and 3w's from the contribution of the top 10 districts in India has dropped significantly from 55%-60% in fiscal 2021 to 25%-30% in fiscal 2022. In the 2W's segment, the percentage has dropped from 40%-45% to 15%-20%. The noticeable gaps here are being filled up by smaller towns and rural India.

We believe the current rural infrastructure is fueling this trend. Many rural areas in India have an infrastructure already in place for energy generation from solar panels and if the government pushes further schemes, it could develop a better infrastructure which is eco-friendly and which also can reduce the burden on the grids to provide 24/7 electricity to villages.

The energy generated from solar panels could provide electricity to run heavy irrigation motors during the day, and to charge EV vehicles at night.

Tier 2 and Tier 3 cities in India have been more welcoming to EVs which has accelerated the transition to EVs at a fast rate. Unfortunately, we believe the overall level of education and knowledge about EVs remains quite low. The industry will continue to promote EVs. At the same time, EV players must prioritize easy repairs and spare parts availability to continue the EV growth. **PSR**

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Russia Report

By *Maxim Sakov*, Market Consultant, Russia Operations

Editor's Note: Power Systems Research has paused all research and business development activities in Russia. We have maintained a presence in Russia since 2013 to bring important updates to our clients about the powered equipment markets within Russia. We are monitoring the current situation on a daily basis and hope to again establish this presence when the conflict with Ukraine is resolved. Please contact us at info@powersys.com if you have questions regarding business conditions in Russia. Thank you. **PSR**

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