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Alternative Power Report

By Guy Youngs, Forecast & Adoption Lead

Why Is California Building a Refueling Network for Hydrogen Cars Nobody Uses?

Guy Youngs

California is essentially the only state in the USA that has any hydrogen cars to speak of, but even in that state, there are only about 12,000 of them on the roads. Despite this, the state intends to spend hundreds of thousands of dollars per year (or more) to build a refueling network for those vehicles.

California lawmakers are now debating how much money to pour into a fueling station network for hydrogen cars.

A lobbying group for suppliers and supporters of H2 includes Shell, Chevron and Toyota is aiming for a designated 30% of the Clean Transportation Program money, which would represent about $300 million spent over the next 10 years.

Today, there are only two H2-powered models available in California, the Toyota Mirai and the Hyundai Nexo. Of those, only 1,767 have been sold in the state. There has already been a 20% decline in sales from last year to this year, though the summer did see an uptick.

Source: *Hydrogen Fuel News* **Read The Article**

PSR Analysis: Hydrogen is a light and leaky gas that many worry should not be used for fuel, and especially not for domestic heating. You can find more information about this by searching for Michael Barnard's "hydrogen ladder." If you compare the growth of hydrogen v's EV chargers, there are accusations that the state is being asked to set up the refueling infrastructure while EV chargers were mostly established by private companies.

Redesigned Zinc-Air Batteries 'Better' than Lithium, say Researchers

Researchers at Edith Cowan University in Australia have redesigned zinc-air batteries and have found the technology to be preferable to lithium-ion batteries – even for electric vehicles, and they claim to have overcome the technology's notorious power output limitations.

Zinc-air batteries consist of a zinc negative electrode and an air positive electrode. The chemistry holds promise and is significantly more sustainable than lithium-based counterparts, but the poor performance of air electrodes and short lifespan has limited the technology's power output.

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Rechargeable zinc-air batteries (ZABs) have a higher energy density than lithium-ion batteries, meaning that they can store more energy in a smaller space.

However, the Edith Cowan team says it has made a breakthrough in the technology which has enabled engineers to use a combination of new materials, such as carbon, cheaper iron and cobalt based minerals, to overcome these issues.

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

PSR Analysis: Rechargeable zinc-air batteries (ZABs) have a higher energy density than lithium-ion batteries, meaning that they can store more energy in a smaller space. This makes them more efficient and capable of powering EVs for longer distances. They're also less expensive to produce than lithium-ion batteries, have a longer lifespan and are safer. The study is still in its early stages, but the Edith Cowan researchers are optimistic that it could lead to the development of commercially viable zinc-air batteries for EVs.

Black Mass, Black Gold, And the Truth About EV Battery Recycling

"Black mass" is a term used to refer to the residual compound formed by shredding of li-ion batteries that have reached the end of their usable life cycle. It is a huge task and challenge to recover the valuable cathode elements (lithium, nickel, manganese, and cobalt) entwined within the battery and upcycling them into usable battery materials.

RecycLiCo is among the first companies to turn that black mass into what is referred to as "black gold." They do this by recovering almost all of the cathode materials within black mass and upcycling them into battery-grade precursor cathode active material (pCAM) and lithium that can be used again in the battery manufacturing process.

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

PSR Analysis: EV detractors are quick to point out the massive cost of mining the battery metals (lithium, nickel, cobalt, and manganese) that make up the core of modern li-ion car batteries. This is a cost that may take tens of thousands of miles to get ahead of. But those detractors are missing a critical bit of information: battery recycling, and if it can be done effectively and in a low cost manner, it will go some way to alleviating the shortages of these materials.

Australian Mining — Can It Power All The New EVs?

Australia is already the largest exporter of lithium in the world and has the largest lithium mine in the world. Each quarter, the Australian government produces a report from the Department of Industry Science and Resources which discusses Lithium and most of the other minerals needed to support the EV revolution.

The report is 175 pages long and this article focusses on the sections dealing with copper, nickel, zinc, and lithium.

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The worldwide EV battery supply chain relies heavily on China, which makes 75% of all lithium-ion batteries, and holds about 70% of cathode production capacity and 85% of anode output. And, over half of lithium, cobalt and graphite processing/refining capacity is located in China. As countries look to cut their dependency on Chinese imports and develop their own lithium and battery production, export opportunities will rise for Australian producers.

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

PSR Analysis: There is a lot of detail in this article, and even more in the Australian Government's report, but is does suggest that Australia can, and is ramping up mineral production to meet this demand. It also suggests that there is, as a result, a bright future for Australian mining. **PSR**

Global Report

Hydrogen Fuel Cell Commercial Vehicle Update

By Chris Fisher, Senior Commercial Vehicle Analyst

Chris Fisher

With regards to zero-emission medium and heavy vehicles, we have heard during the past few years that battery electric commercial trucks will ultimately replace the diesel-powered internal combustion engine for commercial trucks. At some point in the future this might be true for short and regional haul freight carriers but what about the long-haul heavy truck segment?

Currently, the lack of charging infrastructure, range anxiety and the extreme weights associated with the batteries will be a significant deterrent to mass adoption of long-haul battery electric trucks. However, hydrogen fuel cell trucks for long-haul applications appear to be a viable option in this segment. Even though fuel cell trucks currently have a greater range and lighter weight than battery electric trucks, they have the same problem as electric trucks due to a lack of a power infrastructure.

In 2022 there were approximately 250 operational hydrogen re-fueling stations in Europe. Earlier this year, the EU nations agreed to add hydrogen re-fueling stations in all major cities and every 200km on the major routes. The plan is to have complete network coverage by 2030. The EU will likely provide subsidies for the infrastructure, but it will be the private sector that will likely drive this. There are numerous joint ventures surrounding hydrogen infrastructure and below are a few notable ones.

In 2021, Shell and Daimler announced the rollout of a hydrogen-based trucking initiative in which Shell will initially establish a hydrogen-refueling network which joins the Port of Rotterdam with Cologne and Hamburg thus creating an

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infrastructure corridor while Daimler plans to introduce hydrogen fuel cell trucks to customers starting in 2025. The corridor is expected to include 1,200 kilometers with 150 hydrogen re-fueling stations. Daimler plans to introduce approximately 5,000 heavy duty fuel cell trucks by 2030.

In April 2021, Daimler and Volvo announced a joint venture known as Cellcentric to jointly manufacture hydrogen fuel cells for trucks in Europe starting in 2025 and they called upon the European Union policymakers to boost incentives for climate-neutral technologies.

The plan is to begin testing the fuel cell trucks by 2025 and launch mass production by the end of this decade. Daimler and Volvo have also cited the need for 300 high-performance hydrogen refueling stations for heavy-duty vehicles by 2025 and 1,000 stations by 2030. Both companies have stated that battery electric trucks will work for short haul applications, but hydrogen fuel cells should play a major role in the longer haul segment.

Last year, the EU announced that in some circumstances natural gas will be considered a "green" energy which will benefit production of hydrogen fuel. Prior to this announcement, it would have been very difficult to produce enough "green" hydrogen to support the type of fueling infrastructure required for mass adoption of hydrogen fueled vehicles.

In North America, the path for hydrogen fuel cell vehicles is not so clear. Currently, there are 62 hydrogen fueling stations in the United States and Canada most of which are located in California. The sheer size of the United States and Canada make it challenging to develop a significant re-fueling infrastructure in the near to mid-term.

In October 2021, Nikola signed a memorandum of understanding with Opal Fuels to build and operate hydrogen fueling stations across North America. Under the preliminary agreement, the two companies will work to co-develop the technology necessary to accelerate the adoption of fuel-cell electric vehicles.

Also in 2021, Nikola and Travel Centers of America (TA) agreed to collaborate on the installation of hydrogen fueling stations for heavy-duty trucks at two existing TA stations. This collaboration is a first step for the parties to explore the mutual development of a nationwide network of hydrogen fueling stations.

Nikola's original plan was to develop a network of about 700 hydrogen stations in the U.S. and Canada to support its Class 8 fuel cell trucks which recently started production at their Coolidge plant in Arizona.

Last year, congress introduced the "Hydrogen for Trucks Act" to support the adoption of heavy-duty hydrogen fuel cell vehicles and hydrogen fueling stations. This act would incentivize the adoption of heavy-duty hydrogen fuel cell vehicles

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Global Report

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E-bikes are bicycles equipped with electrical motors for transforming electrical energy into mechanical energy to assist pedaling.

by covering the cost difference between these vehicles and traditional diesel vehicles and encourage parallel deployment of vehicles and fueling stations.

The act would also provide data and benchmarks for different types of fleet operations, thereby incentivizing private investment and accelerating deployment. **PSR**

E-Bike Market Analysis

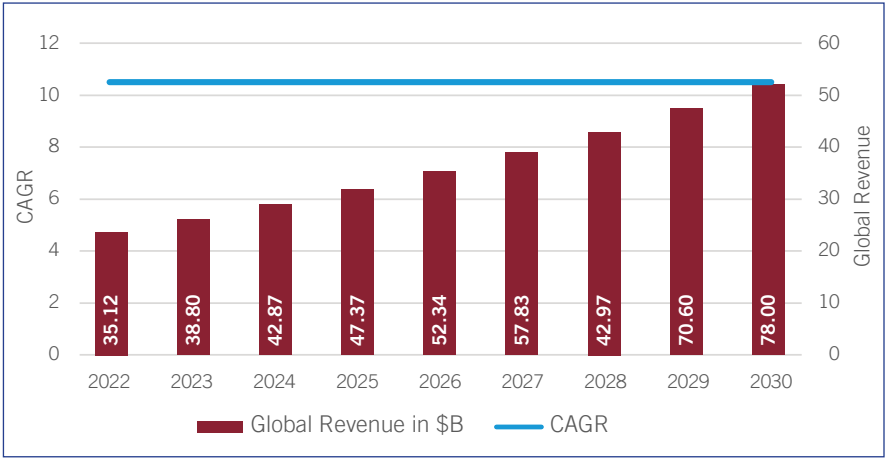
By Mike Aistrup, Senior Analyst

Michael Aistrup

The pandemic bike boom boosted e-bike sales 145% from 2019 to 2020, more than double the rate of classic bikes, according to the market research firm NPD Group.

Research by Power Systems Research estimates the global e-bike market size at US$ 23.2B in 2022 and expects the market to reach US$ 78B by 2030, exhibiting a CAGR of 10.5%.

E-bikes are bicycles equipped with electrical motors for transforming electrical energy into mechanical energy to assist pedaling. They use rechargeable batteries that require minimum maintenance and provide power to the motor.



Source: Power Systems Research

Drivers-of-Demand. The cost of Li-ion batteries is declining as the volume of production increases and manufacturing efficiency improves.

- Between 2010 ($1,160/kWh) and 2019 ($156/kWh), the average cost of Li-ion battery packs per kWh fell by more than 86.55%. By 2030, it is predicted to drop by around 35% propelling the global electric bike market forward.
- The expanding use of EVs in the global automotive sector has provided Li-ion battery manufacturers with economies of scale, thereby lowering the cost of Li-ion batteries and making them viable for use in e-bikes.

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One of the key drivers of E-Bike demand is the desire for a more sustainable mode of transportation. E-Bikes emit no greenhouse gases and have a much smaller carbon footprint than traditional gasoline-powered vehicles.

Governmental agencies in many countries are encouraging the use of e-bikes to reduce fossil fuel expenses, decrease air pollution, and improve air quality. They are also providing subsidies, constructing bicycle routes, and installing electric vehicle charging stations in public places to boost the sales of e-bikes.

Also contributing to the growth in demand for E-Bikes is the increasing popularity of cycling for recreation and commuting. E-Bikes make cycling more accessible, especially for people who live in hilly areas or those who want to cover longer distances without getting fatigued. This has made E-Bikes a popular choice among commuters, recreational cyclists, and elderly people.

E-Bike Market Trends. Several important trends can be seen in the e-bike market. These include:

- **Continued rise** in the integration of lithium-ion batteries in e-bikes for fast charging and optimized performance of the vehicle.
- **Increasing use** of mid-drive motors to lower maintenance costs and improve gear usage.
- **Key market** players are starting to manufacture connected e-bikes integrated with the internet-of-things to intercept and transmit data from the cloud without using a smartphone.
  - o Seamless connectivity with public transportation systems will enable connected e-bikes to become a critical solution in last-mile connectivity.
  - o An element of the seamless Mobility-as-a-Service technology with the incorporation of connected elements.
  - o Multiple features in e-bikes, automatic emergency calling, anti-theft systems, remote diagnostics, integrated navigation/GPS and pedaling assist sensors.
  - o The integration of technology has also improved the safety of E-Bikes, making them more attractive for riders.
- **Growing adoption** of e-bikes by logistic companies to travel longer distances at higher speeds and deliver packages is offering a favorable market outlook.
- **Increasing popularity** of E-Bikes for commuting. As people become more concerned about the environmental impact of their transportation choices, E-Bikes are becoming a popular alternative to traditional gasoline-powered vehicles, particularly for short-distance commuting. This trend is also driven by the convenience of E-Bikes, which are typically easier to park and maintain than traditional vehicles.

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Mini Tractor / Loader / Backhoes are compact machines that perform well for trenching, landscaping, and material handling. Units are configured with a front loader and rear backhoe attachment.

E-bike Market Challenges. Product recalls due to possible failures will be a major challenge for the global electric bike market during the forecast period.

Conclusion. The global e-bike market is a highly opportunistic and competitive market owing to the shifting consumer trend towards eco-friendly modes of vehicles. Consumers find e-bikes an economical alternative for electric vehicles. E-bike sharing services along with support from government organizations to promote the application and adoption of e-bike will drive the market growth over the upcoming years. **PSR**

DATAPOINT: *North America Tractor/Loader/Backhoes (TLBs)*

7,450

By Carol Turner, Senior Analyst, Global Operations

7,450 units is the estimate by Power Systems Research of the number of Tractor/Loader/Backhoes (TLB) expected to be produced in North America in 2023.

Tractor / Loader / Backhoes are full-size machines that are three pieces of construction equipment combined into one: the tractor, the loader and the backhoe. These units are designed to tackle an array of construction and agricultural related activities.

Mini Tractor / Loader / Backhoes are compact machines that perform well for trenching, landscaping, and material handling. Units are configured with a front loader and rear backhoe attachment.

The small construction segment is predicted to increase the demand for TLBs due to the machine's efficient use in material handling and digging applications. TLBs are efficient to use for digging applications and for material handling as well (it's an all-in-one machine). TLBs are easy to operate, especially in limited spaces and are a versatile machine.

This product information 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 combined plant totals of 54%, Deere leads in production of TLBs in North America. In second position is Case New Holland with 45%; third, is Kubota with 1%.

Trends: In 2022, production of Tractor/Loader/Backhoes in North America increased

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nearly 1%. From 2022-2023 production is expected to climb another 2%. This segment rebounded 57% from 2020-2021 from the 41% prior year decline.

The decline was attributed to weak demand for TLBs due to cost and the effectiveness of mini excavators as being a much more profitable tool than the backhoe loaders along with Covid-19 related factors. The COVID-19 global pandemic made 2020 a very challenging year across most industries, including the production of construction equipment in North America.

The off-highway segments (agricultural, construction and industrial) all saw dramatic production declines in 2020 compared to 2019. The decline also was caused by lower shipment volumes and foreign-currency exchange issues along with JCB redirecting manufacturing back to the UK.

Production will remain flat then steadily increase over the next five years. The increase: TLBs are still a significant selling pieces of construction machinery and will remain a popular machine. Expect production to gain an additional 5% by 2025.

Battery Electric.
Company: Case New Holland
2021: 13
2022: 7
2023: -0 (out of production)

From 2021-2022, production of Battery Electric TLB decreased 46.1%. Production dropped 100% from 2022-2023. Case model 580 EV has been discontinued. Production started in 2020. **PSR**

Brazil/South America Report

By Fabio Ferraresi, Director Business Development South America

Companies Support Fleet Renewal Program

Fabio Ferraresi

Gerdau, Vamos and Volkswagen Caminhões have formed a partnership to support the national fleet renewal program, aimed at removing from roads vehicles more than 20 years old.

The fleet renewal program provides for the purchase of low emission and more efficient vehicles by self-employed drivers and other operations. Under the plan, 140 acquired vehicles were sent to Gerdau's headquarters in Araçariguama, which is responsible for their destruction and recycling.

At the same time, an extension for the incentives program of up to 1 Billion Reais, (US$ 200 M) was announced.

Source: *G1* **Read The Article**

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South America Report

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PSR Analysis: The total of resources and mechanisms to allow access to the resources still are not sufficient for the program to impact the market significantly. However, the small inroads demonstrate the desire of Government and private entities to make changes and should impact the market going forward. More deployments and adjustments in the program should come in the medium term. We will keep monitoring and adjusting our short-medium term forecast as it progresses. **PSR**

Brazil Motorcycle Production To Reach 1.5 Million in 2023

In the first seven months of 2023, manufacturers affiliated with Abraciclo assembled 887,000 motorcycles, up 14.3% over the same period in 2022. Registrations totaled 903,200, up 21.4%, including imports and sales from automakers not yet linked to the association, such as India's Bajaj and Royal Enfield, which began production in Brazil at the end of last year. The entity's expectations for 2023 are for expansion of 10.4% (1.56 million units) in production and 10.9% (1.51 million motorcycles) in licensing.

Source: *Valor* **Read The Article**

PSR Analysis: In 2011, Brazil produced 2 million units, its best year in the history of the segment. However, this year was the beginning of consecutive annual declines that reduced production to 890,000 motorcycles in 2016. The start of the rebound in 2018 was interrupted in 2020 by the shutdown of factories brought on by the pandemic. The industry finally looked to the future again in 2023 and expects to reach a volume of 2 million motorcycles within five years. **PSR**

BEV Demand Boosts Brazil Mining Investment

The increase in global demand for clean energy is accelerating investments in the exploration of reserves of so-called critical or strategic minerals in Brazil. Over the next five years in Brazil, companies are expected to invest approximately US$ 8 billion in key strategic minerals. In copper the expectation is that the resources will reach US$ 4.47 billion, while nickel is in second place, with investments of US$ 2.3 Billion forecast.

Source: *Valor* **Read The Article**

PSR Analysis: A significant part of the investment will take place in Construction and Mining Equipment such as Hydraulic Excavators, Heavy Duty Wheel loaders and Graders that helps to sustain and increase the growth in the segment in Brazil. **PSR**

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Far East: Japan Report

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

Japan Sets Target of 300,000 EV Chargers by 2030

To achieve decarbonization, the government is pushing to expand the installation of rechargers, which had only about 30,000 units as of March 2023.

Akihiro Komuro

The Ministry of Economy, Trade and Industry (METI) has released draft guidelines for the installation of EV chargers, with a target of 300,000 units by 2030. This is double the previous target of 150,000 units and 10X higher than the current number of installations. The company is calling for the installation of chargers in commercial facilities.

The draft guidelines also call on operators to improve the speed of charging and the convenience of operation. To achieve decarbonization, the government is pushing to expand the installation of rechargers, which had only about 30,000 units as of March 2023.

The installation target includes 270,000 regular chargers at commercial facilities and 30,000 fast chargers on highways. The introduction of a new charging method called "plug-and-charge" will also be encouraged. This is a system in which vehicles can be authenticated and charged simply by plugging them into the charger; it has been adopted by Tesla in the United States. The system eliminates the need to hold a membership card over the charger or use a smartphone app to authenticate personal information.

Source: The Nikkei

PSR Analysis: Let's look at the domestic penetration rate of EVs. According to data released by the Japan Automobile Dealers Association, the number of new EVs (standard passenger cars only, excluding minicars) sold in 2022 will be about 31,600. Sales in 2020 and 2021 were about 15,000 and 21,000 units, respectively, so the growth rate is about 150% year-on-year.

However, EVs account for only about 1.42% of the total, as the total sales volume of standard passenger cars is about 2.22 million units. The lack of charging stations has been cited as a reason why buyers are not choosing EVs. This is especially true in rural areas where EVs are not an option.

METI's announcement of an increase in this target is an indication of its desire to improve this situation. Since it is difficult for automakers alone to create such an environment, it is natural for the government to take the initiative, and improving the convenience of the environment in which EVs are used is an essential condition for their widespread use. **PSR**

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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

EV充電器、2030年に30万口へ　経産省が目標引き上げ発表

経済産業省はEVの充電器の設置目標を2030年までに30万口とする整備指針案を公表した。従来目標の15万口の2倍に引き上げた。足元の設置数と比べると新目標は10倍となる。商業施設などへの設置を呼びかける。

指針案は事業者に充電速度や機器操作の利便性の向上も要請している。脱炭素の実現に向け、2023年3月時点で3万基程度にとどまる充電器の導入拡大を急ぐ。設置目標の内訳として、商業施設などの普通充電器が27万、高速道路などの急速充電器が3万と示した。「プラグ・アンド・チャージ」と呼ぶ新しい充電方式の導入も促す。自動車を充電器とつなぐだけで認証や課金ができる仕組みで、米テスラが採用している。充電器に会員カードをかざしたり、スマホアプリで個人情報を認証したりする動作が不要になる。

参考: 日経 (一部筆者により元記事内容を改編しました)

PSR 分析: EVの国内普及率を見てみよう。日本自動車販売協会連合会が発表したデータによれば、2022年のEV (普通乗用車のみ。軽自動車は除く) の新車販売台数は、約3万1600台に上る。2020年が約1万5000台、2021年が2万1000台だったので、伸長率は前年比約150%と大きく向上している。だが普通乗用車全体の販売台数が約222万台なので、EVが占める割合は全体のわずか約1.42%に過ぎない。購入者がEVを選ばない理由として、充電スポットの少なさが指摘されている。特に地方ではその少なさが目立ち、EVが購入の選択肢に入らない。今回経産省が目標の引き上げを発表したのは、こうした状況を改善したいという意欲の現れだ。こうした環境整備は自動車メーカーだけで賄うのは難しいため政府がイニシアチブをとることは当然であり、EV使用環境の利便性向上が普及に向けての必須条件となる。**PSR**

Far East: South Korea Report

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

Korean Battery Companies Increase Sales Significantly

The consolidated financial results for the April-June period of the three major Korean battery companies show significant sales growth. **LG Energy Solution's** sales grew 73% y/y and operating profit was 2.4x y/y. **SK On's** sales grew 2.9x y/y due to the expansion of EV production. **Samsung SDI's** sales grew 23% y/y.

LG Energy, the world's second largest automotive battery maker, posted a 73% y/y

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increase in sales to KRW 8.774 trillion (approximately $6.6 billion) and a 2.4x y/y increase in operating profit to KRW 461 billion (approximately $340 million), while its joint production with **GM** of the U.S., which will begin operations in 2022, also contributed to the continued growth in sales and profit.

LG Energy announced that its order backlog as of the end of June was 44 trillion KRW ($332 billion), an increase of 130 trillion KRW ($98 billion) in one year. The company has been accumulating orders through joint venture agreements with **Honda** and **Hyundai Motor**, and is building several new plants, mainly in North America, to meet rising demand.

SK On posted a significant 2.9-fold increase in sales to 3.6961 trillion KRW ($270 million). SK, a latecomer to the market, continues to make heavy upfront investments and will remain in the red for the time being.

Samsung SDI, whose main products are automotive and smartphone batteries, posted a 23% increase in sales to 5,840.6 billion KRW ($440 million). Sales have been growing steadily due to strong car sales, especially in Europe.

Source: The Nikkei

PSR Analysis: The current manufacturing industry in South Korea is driven by semiconductors and batteries. While semiconductor production continues to decline and the profitability of semiconductors is slowing, batteries seem to be doing well. Korean manufacturers also continue to invest in setting up production facilities in North America.

With increasing adoption by automakers in North America and Europe, Korean battery makers will continue to make great strides for at least the next five years or more, according to current estimates.

One concern, as I have often pointed out, is that other battery manufacturers are also investing aggressively to improve their production capacity, so that when demand saturates, price competition may ensue, and excess supply capacity may become a constraint.

The procurement of raw materials, especially rare metals, is also facing international competition, which may make procurement more difficult in the future. The key will be how Korean companies deal with these challenges. **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

韓国電池3社、大幅増収続く　LGエネは営業益2.4倍

韓国電池大手3社の2023年4～6月期の連結決算が出そろった。LGエネルギーソリューションの売上高は前年同期比73%増、営業利益は2.4倍だった。EV生産が拡大し、SKオンの売上高は同2.9倍に拡大。サムスンSDIは23%増収だった。

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Far East Report

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The adoption of EV motorcycles is now in full swing in Indonesia, the largest motorcycle market in Southeast Asia with annual sales of more than 5 million units.

車載電池で世界2位のLGエネの売上高は前年同期比73%増の8兆7740億ウォン（約66億ドル）、営業利益は2.4倍の4610億ウォン（約3.4億ドル）だった。2022年稼働の米GMとの合弁生産も寄与し増収増益を続けた。

LGエネは6月末時点の受注残額が440兆ウォン（約3320億ドル）と、1年間で130兆ウォン（980億ドル）増えたと明かした。ホンダや韓国・現代自動車との合弁契約などで受注を積み上げており、北米中心に新工場を次々と建設して需要増に対応する。

SKオンは売上高が同2.9倍の3兆6961億ウォン（2.7億ドル）と大きく伸びた。後発のSKは活発な先行投資を続けており、当面は赤字基調が続く。

車載電池とスマートフォン向け電池が主力のサムスンSDIの売上高は23%増の5兆8406億ウォン（4.4億ドル）だった。欧州中心に自動車販売が好調で、安定的に販売を伸ばしている。

参考: 日経（一部筆者により元記事内容を改編しました）

PSR 分析: 現在の韓国の製造業は半導体とバッテリーが支えていると言って良い。半導体は減産が続き稼ぐ力の鈍化がみられるが、バッテリーは好調の様子だ。韓国メーカーは北米にも生産拠点を設けるための投資を続けている。北米や欧州の自動車メーカーでの採用が増えており、少なく見積もっても向こう5年以上は韓国バッテリーメーカーの躍進は続くだろう。懸念点としては度々ここで指摘しているが、他のバッテリーメーカーも積極的に生産力向上の投資を続けているため、需要が飽和した場合に価格競争が発生し、過剰な供給能力が足かせになり得る、という点だ。レアメタルを筆頭に原材料の調達も国際間競争の様相を呈していることから将来的に調達が今よりも難しくなる可能性もある。こうした課題を韓国勢がどのように乗り切るか、がキーになる。**PSR**

Southeast Asia: Vietnam Report

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

Ridesharing Giant Gojek Converting Vehicles To EVs

Indonesian ridesharing giant Gojek plans to convert all its motorcycles to EVs by 2030. The adoption of EV motorcycles is now in full swing in Indonesia, the largest motorcycle market in Southeast Asia with annual sales of more than 5 million units.

Gojek, the country's leading ridesharing and delivery company, is said to have over 2 million registered riders, including both motorcycles and cars. The full conversion to EV bikes is expected to contribute significantly to the Indonesian government's goal of 9 million EV bikes by 2030.

Gojek is expanding its sourcing of EV bikes. In addition to forming a strategic alliance with Gogoro, the "Tesla of motorcycles," the company has also invested in Electrum,

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Southeast Asia Report

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an EV motorcycle manufacturer, and in late June began construction of a new factory in West Java with an initial annual production capacity of 250,000 units.

Source: The Nikkei

PSR Analysis: The motorcycle market in Indonesia, Thailand, and Vietnam is extremely large. While four-wheeled vehicles such as Uber are the mainstay of ridesharing in North America and other regions, motorcycles are by far the mainstay of ridesharing in Southeast Asia. The sheer number of motorcycles on the road is overwhelming. It takes less than three minutes for a vehicle to actually arrive after a request for dispatch via an app.

As I have pointed out previously, Japanese OEMs are dominant in the motorcycle market in Southeast Asia. However, in response to this wave of electrification, Honda and Yamaha have yet to release inexpensive EV motorcycles in a price range that would be supported locally. Electric models are already on the market, but they are expensive, require leasing contracts, or are being tested on a trial basis. However, I believe that the traditional Japanese approach may be missing the right moment at a time when the market is undergoing a major transformation.
PSR

東南アジア > インドネシアレポート:

小室 明大 – 極東及び東南アジア リサーチアナリスト

ライドシェア大手のゴジェックが全ての二輪のEV化を発表

インドネシア配車大手のゴジェックは2030年までに全ての二輪車をEVに切り替える。年間販売が500万台を超え、東南アジア最大の二輪車市場であるインドネシアでは今、EVバイクの普及が本格化しつつある。

同国の配車大手、ゴジェックは30年までに全ての二輪車をEVバイクとする計画を掲げる。ゴジェックはバイクや自動車を含めて200万人を超える運転手が登録しているとされ、EVバイクの全量切り替えはインドネシア政府が30年までに900万台のEVバイクを普及させる目標に大きく貢献する見込みだ。

ゴジェックはEVバイクの調達を広げている。「バイクのテスラ」とされるゴゴロと戦略提携を結んだほか、自ら出資してEVバイクメーカーのエレクトラムを立ち上げた。6月下旬、西ジャワ州で新工場の建設を始め、まずは年産25万台とする見込みだ。

出典: 日経（一部筆者により元記事内容を改編しました）

PSR 分析: インドネシアをはじめ、タイやインドネシアにおける二輪市場は非常に大きい。ライドシェアにおいては北米などではUberなどの四輪が主流だが、こと東南アジアにおいては圧倒的に二輪が主流である。圧倒的ともいえる膨大な数の二輪が市中をくまなく走っている。アプリで配車をリクエストしてから実際に到着するまでは3分もかからない。

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すでに何度もここで指摘している通り、東南アジアの二輪市場では日系メーカーが優位である。だがこうした電動化の波に対してホンダやヤマハは廉価で現地で支持される価格帯のEVバイクを未だにリリースしていない。電動モデルはすでに発売しているが、高額であったり、リース契約が前提であったり、社会実験を繰り返したりしている。だが市場がこうした大きな変革期にあって従来の日本式の取り組み方では、適切なタイミングを逃すのではないかと筆者は考えている。**PSR**

China Report

By Jack Hao, Senior Research Manager - China

Sany MOTA Lays Out Battery Rental Business

Jack Hao

The Sany Group has taken a major step in the electrification of the heavy truck market segment with the launch on Aug. 30, 2023, of Sany Magic Tower Energy Co., Ltd. The business plan includes battery sales, battery parts sales, new energy vehicle waste power battery recycling and cascade utilization, artificial intelligence basic software development, data processing and storage support services.

The blue ocean market for new energy heavy-duty trucks is about to experience explosive growth. “Blue ocean” refers to a business approach that focuses on creating a new, uncontested market space rather than competing in an existing market, which is often saturated and competitive. In a blue ocean, the competition is irrelevant because the brand or company is establishing a market where none existed before or is radically differentiating itself in an existing market.

The sales of new energy heavy-duty trucks in 2022 were 25,152 units, with a compound growth rate of 104.9% from 2020 to 2022. With the support of the dual carbon policy, industry has experienced explosive growth. The estimated penetration rate of new energy vehicles in 2030 is 40%, and the market space for new energy heavy-duty trucks is huge.

The so-called separation of vehicles and electricity accelerates the electrification of heavy trucks, significantly increasing the market share of electric vehicles. In the separation mode of vehicles and electricity, users only need to purchase unpowered vehicle bodies, reducing the initial investment by about 50%, and enabling the rapid promotion of electric heavy trucks.

In 2022, a total of 12,431 heavy-duty trucks were sold, a year-on-year increase of 273.6%, leading the new energy heavy-duty truck market.

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China Report

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Electric heavy-duty trucks account for 90% of the market share of the entire new energy heavy-duty truck market.

However, there are several pain points in battery separation: poor universality, long recycling period, and high risk of battery ownership.

Due to differences in vehicle brand, battery brand, vehicle model, battery exchange technology standards, and battery capacity, battery universality is poor. If a batch of batteries can only be applied to a single user in a single scenario, it indirectly increases user usage costs and asset holding risks.

Source: *Sany* **Read The Article**

PSR Analysis. Electric heavy-duty trucks account for 90% of the market share of the entire new energy heavy-duty truck market. In electric heavy-duty trucks, the electric tram and charging models each account for 50% of the market share.

The potential for the electric vehicle to dominate the mainstream market comes from the increasingly mature business and operational models of electric heavy-duty trucks. First, the business model of "separating cars from electricity" can greatly reduce the cost of purchasing a complete vehicle, making it comparable to the purchase price of a fuel heavy truck. Users can also avoid the problem of low residual value of second-hand cars caused by battery decay.

Secondly, the "battery swapping" mode brings great convenience to users in operating battery swapping heavy trucks, greatly shortening the recharge time. Compared with charging models powered by fast charging, replacing heavy trucks can significantly reduce the load and impact on the power grid. The battery belongs to the battery bank, which can conduct centralized monitoring, maintenance, and management of the battery, extend its service life, and improve its safety.

Currently, users of electric trucks are not able to achieve both load efficiency and transportation distance. The construction of power exchange stations and the interconnection and exchange of batteries are still the biggest challenges in the operation of electric heavy-duty trucks.

Pure electric heavy-duty trucks have shown enormous development potential and are an important way to achieve zero emissions. At the same time, Ningde Times is constantly making efforts in the field of battery swapping; mastering low-cost battery assets is its core advantage.

Battery swapping brands such as "EVOGO" and MTB technology have been launched and linked with car companies such as Beiqi Foton, FAW Jiefang, Sany Heavy Industry, SAIC Group, etc. MTB (Module to Bracket) for heavy-duty electric trucks technology integrates the battery module directly into the vehicle's chassis, which can result in as much as a 40% increase in battery system utilization and a 10% reduction in weight. **PSR**

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India Report

By Aditya Kondejkar, Research Analyst – South Asia Operations.

Bus Sector Bounces Back: EVs Fuel Post-Covid Growth

Aditya Kondejkar

OEMs increasing their focus on the Bus sector to drive growth in the post-Covid period.

Ashok Leyland. One of India's leading commercial vehicle manufacturers, Ashok Leyland has announced plans to invest ₹1,000 crore in setting up an integrated commercial vehicle (CV) and electric bus (e-bus) manufacturing plant in Uttar Pradesh. This plant is expected to have a planned production capacity of 2,500 buses annually, with the potential for expansion to 5,000 buses per year.

This significant investment is a strategic move for the company and carries several implications and opportunities. This critical analysis examines the key aspects of this investment decision.

"Contingent on market adoption and demand of alternative fuel vehicles in the state, Ashok Leyland intends to invest up to ₹1,000 crore in this new facility over the next few years," says Shenu Agarwal, Ashok Leyland MD & CEO.

Source: *Times of India* **Read The Article**

Olectra Greentech. The company's decision to establish a greenfield electric vehicle (EV) manufacturing facility in Hyderabad, with an initial production capacity of 5,000 buses, trucks, and other EVs, expandable to 10,000 units, demonstrates a strategic response to the escalating demand for EVs.

Source: *MercomIndia.com* **Read The Article**

Government Support. The government is planning to spend nearly 580 billion rupee ($7 billion) to deploy 10,000 electric buses in 169 cities over a decade, along with charging and associated infrastructure facilities. Pursuing plans for an eventual fleet of 50,000 electric buses nationwide, at an estimated cost of $12 billion, the government has been aggregating demand from state governments and issuing contracts or tenders inviting companies to bid.

"With focus on reforming urban transport, we are trying to build a low footprint and high passenger density integrated EV mobility ecosystem" - Nitin Gadkari, Minister of Road Transport and Highways

Source: *Economic Times* **Read The Article**

PSR Analysis. The overall efforts from the entire ecosystem indicate a changing landscape of the bus segment and stakeholder's long-term vision and confidence in the future of electric mobility of the segment.

Also, the government's support opens up substantial market opportunities

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India Report

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> *With careful planning and collaboration between the public and private sectors, this initiative has the potential to transform India's public transportation.*

for manufacturers of electric buses. With careful planning and collaboration between the public and private sectors, this initiative has the potential to transform India's public transportation. Additionally, this entire development would cut emissions and reduce fuel imports, with companies offering incentives to build vehicles and parts in the country. **PSR**

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 maintained an important presence in Russia from 2013-2022 to bring important updates to our clients about the powered equipment markets within Russia. We are continuing to monitor the current situation 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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