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Alternative Power Report

By *Guy Youngs*, Forecast & Adoption Lead

Are Hydrogen Engines in Your Future?



*Guy
Youngs*

According to newly published research by Interact Analysis, hydrogen internal combustion engines (H2 ICE) are forecast to be sold in 220,000 vehicles in 2035.

On the plus side, H2 ICE vehicles have some notable advantages. The engine technology is reasonably similar to diesel engines, enabling use of existing knowledge, design and production vehicles. The vehicles can deliver high power, work with impure fuel, work in dirty and dusty conditions and refuel quickly.

On the downside, there is no hydrogen infrastructure in place in almost all locations in the world, there is a lack of awareness about the technology and limited development so far. Most importantly, the current cost of hydrogen fuel is high – it will need a big reduction before the vehicles can become competitive. Even at half the cost of today, H2 ICE vehicles do not have a good total cost of ownership. The cost of the engine is not substantial, but the cost of the tanks adds a lot to the cost of the vehicle, then there is infrastructure and above all hydrogen fuel.

However, while H2 ICE vehicles can – at least in theory – be zero carbon eventually – NOX emissions will still remain, along with small amounts of other emissions.

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

PSR Analysis: This is an interesting article that looks at most of the issues around HICE (Hydrogen ICE), but the article doesn't address the differences between HICE and Fuel Cells, most notably Fuels Cells are completely emissions free and more efficient than HICE. **PSR**

Growth of Hydrogen Internal Combustion Engines (H-ICE)

Hydrogen ICE vehicles offer an alternative to traditional gasoline and diesel-powered vehicles and have the potential to reduce emissions and reliance on fossil fuels. These vehicles are becoming increasingly popular and more automakers are starting to offer hydrogen-powered options in their vehicle lineups.

While the progress of hydrogen internal combustion engines goes forward it still face challenges which need holistic approaches from industry to win. There are several disadvantages and challenges to using hydrogen as a fuel for internal combustion engines:

- Hydrogen fuel is expensive
- Limited hydrogen fueling infrastructure
- Storage and handling of hydrogen
- Production of hydrogen
- Safety concerns
- Limited range

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Alternative Power Report

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Source: *Hydrogen Newsletter* **Read The Article** (with video)

PSR Analysis: Another interesting article and video looking at HICE, but this article focusses on the challenges facing HICE and doesn't really look at the advantages of an HICE and should be viewed in conjunction with the previous article, "**Are hydrogen engines vehicles your future?**" **PSR**

JCB Reaches Hydrogen Milestone

JCB'S £100 million investment in a project to produce super-efficient hydrogen engines is going full steam ahead. A team of 100 engineers has been working on the exciting development for more than a year and the 50th JCB hydrogen combustion engine has now come off the production line as part of the development process.

JCB's hydrogen-fueled backhoe loader is one of three hydrogen vehicles the OEM is developing. JCB hydrogen engines are powering prototype backhoe loaders and Loadall telescopic handlers and the company has recently unveiled its very own designed and built mobile refueling bowser to take fuel to the machines. The bowser has enough hydrogen to fill 16 hydrogen backhoe loaders and can be transported either on the back of a modified Fastrac tractor or on a trailer.

Source: *IVT International* **Read The Article**

PSR Analysis: As part of its hydrogen development, JCB also has investigated its use in fuel cells but for the time being, JCB has come to the conclusion that fuel cells are too expensive, too complicated and not robust enough for construction and agricultural equipment. **PSR**

Hyster Begins Pilot of Hydrogen Fuel Cell Powered Container Handler

Hyster Company is testing a top-pick container handler powered by hydrogen fuel cells (HFC) at Fenix Marine Services in the Port of Los Angeles.

Based on the standard Hyster H1050-1150XD-CH top-pick container handler design, the truck is powered by two 45kw hydrogen fuel cells from Nuvera, a wholly owned subsidiary of Hyster parent company Hyster-Yale Group. The HFC-powered top pick is designed to provide the zero emissions benefits of a battery electric option, with enough capacity to keep operators moving and avoid the need to stop in the middle of a shift to refuel or recharge.

Refueling the top pick with hydrogen fuel is expected to take approximately 15 minutes, with the intention to provide eight to 10 hours of continuous run time, all while producing no harmful emissions – only water and heat. The top pick is also equipped with a patented Hyster® energy recovery system for electric container handlers that recovers and stores energy from lowering loads and braking.

Source: *Supply Post* **Read The Article**

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Alternative Power Report

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Problems include supply chain disruptions, the migration of production and use of internal combustion engines to alternative drive types, uncertainty of inflation and rising interest rates, and the war in Ukraine.

PSR Analysis: A quick refueling time, 8 -10 hours running time and an energy recovery system should make this pilot quite successful provided they can secure hydrogen fuel. The quick refueling time also means that this equipment could also be run on a shift basis, minimizing machine idle time, too. **PSR**

North America Report

By Jim Downey, Vice President-Global Data Products

U.S. Economy Faces Multiple Problems



*Jim
Downey*

SUMMARY. Many of the biggest challenges facing the U.S. economy in 2022 are continuing into 2023. These problems include supply chain disruptions, the migration of production and use of internal combustion engines to alternative drive types, uncertainty of inflation and rising interest rates, and the war in Ukraine.

There were also positives which came out of 2022, including a return to more face-to-face business transactions and meetings. Trade shows made a big comeback in 2022, and this trend will continue in 2023 as the huge CONEXPO-CON/AGG will be held in March in Las Vegas.

The push towards electrification is not all negative either. Innovation and action around alternative drive types will continue to grow.

When final numbers are compiled, North American production is expected to be up 12%-13% in 2022 over 2021. This is up from the third quarter expectation of 10%-11%. The 2023 forecast includes an estimated growth rate of 7%, an increase over 2022.

AGRICULTURAL. Agricultural machinery production projections are falling in line with last quarter's growth rates, 6.5% for 2022 and 3-4% growth for this year (2023).

Financing costs for new ag machinery will rise as interest rates are increasing, which could hurt demand. 2024 may flatten out in terms of growth. The war in Ukraine is still a concern with no real sense of when it will come to an end. Crop exports from Ukraine are still uncertain but are dropping.

CONSTRUCTION. Power Systems Research estimates that construction equipment production will increase in North America by 7.5% in 2022 versus 2021. That is down from our estimate of 10.5 % last quarter. 2023 and 2024 are expected to slip with growth of only 5% and 2.0%, respectively. Government expenditures should help push new equipment demand.

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North America Report

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INDUSTRIAL. This segment's growth patterns are very similar to that of the construction segment. Industrial equipment production is expected to slow in 2024 and 2025. New machinery orders in 2022 increased 12% above their level in 2021. With predominant backorders, this is predicted to continue to increase into the future.

MEDIUM & HEAVY VEHICLES. Medium and heavy commercial vehicle production is expected to increase by 12.5% in 2022 over last year, primarily driven by improved class 8 truck production. While not back to pre-pandemic levels, the supply chain has seen improvement during the past few months.

Within the class 8 truck segment, PSR expects truck demand to remain strong into the first part of next year as a result of significant pent-up heavy truck demand. While commercial vehicle demand is expected to decline slightly in 2023, production levels are expected to remain strong through at least the first half of the year.

POWER GENERATION. We expect this market to come in around 6% ahead of 2021, for 2022. This is down slightly from our third quarter projection. This segment's main drivers for growth come from data centers, infrastructure developments, healthcare and general backup standby. Demand is currently high, and we are projecting growth of 10% for 2023. **PSR**

DATAPOINT: United States Combines 7,433

By Carol Turner, Senior Analyst, Global Operations

7433 units is the estimate by Power Systems Research of the number of Combines to be produced in North America (United States) in 2022. Final 2022 production numbers will be available later in Q1 2023.

A combine is a farm machine that harvests grain crops. Combines can reap, thresh and winnow crops into a single process. Crops include wheat, oats, rye, barley, corn, etc. Combines overall boost crop output and farm income.

This 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.

Exports: Collectively, up to 30% worldwide

Market Share: With 60% of total units produced, Deere captured the lead for combine production in North America (US). In second position was Case with 27%; third, was Claas Omaha with 8%.

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DataPoint Report

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Trends: In 2020, Covid-19 played a role in the sales decline from 2019. Parts availability was reduced, and soft demand caused a drop in orders for new machinery.

From 2020-2021 production of combines in North America increased nearly 10%. Production is expected to gain nearly 17% in 2022 when final numbers are reported in Q1 2023.

Sales of combines picked up in Q4 2020 after a tough spring for sales. 2021 sales increased by 560 units or 9.6% over 2020. This is a favorable sign; a few years ago, farmers were reluctant to buy or trade in pricey equipment because of lower commodity prices.

For instance, in 2017, production and purchases of new combines rebounded as portrayed in production figures. The gain can be attributed to an increase in commodity prices such as corn and soybeans that peaked in 2013/2014.

Expect production to increase 10% by 2025. **PSR**

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Brazil/South America Report

By *Fabio Ferraresi*, Director Business Development South America

Brazil Moves Forward on Truck Fleet Renewal Program



*Fabio
Ferraresi*

In December 2022, the Brazilian Government published regulations for the Fleet Renewal Program authorized by the law that was published in H1 2022. Under this regulation, truck owners may receive the old truck market value from companies in the Oil and Gas exploration chain, provided that they prove the truck was taken out of circulation, disassembly and recycled. The program is voluntary, both for owners selling the old truck and for O&G companies designating resources for the program in exchange for a reduction of duties on O&G exploration contracts.

Source: *M&T* [Read The Article](#)

PSR Analysis: Preliminary analysis suggests the program won't be very effective, since significant recycling and paperwork efforts are required to sell the old truck at market prices. It seems this is a regulation published to show environmental efforts, but one that will have limited effectiveness. No impact is seen in the Truck Market now unless market conditions change drastically.

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South America Report

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First Synthetic Fuel Neutral CO₂ Starts in Chile

Construction of the first world carbon-neutral synthetic fuel plant was started in Chile, in December 2022. With a US\$55 million investment in the project, Siemens Energy, HIF Global and Porsche will produce Methanol and Gasoline using water, wind and CO₂. The plant has a planned capacity of 550 million liters in 2027.

The Haru Oni plant is installed in the Magallanes, Chilean Patagonia region. It is known for the vast potential for its hydrogen market, with winds of more than 6,000 hours of charge to generate green electricity, three times more than in Europe.

Source: *Automotive Business* [Read The Article](#)

PSR Analysis: Cost competitiveness is the major factor in the success of this project. E-fuels are an interesting alternative to accelerate the decarbonization of the transportation industry, especially in vehicles with complex electrification, such as ocean-going vessels and airplanes where the energy density and battery weight becomes a difficult factor.

FPT Developing Ethanol or Biomethane Engine in Brazil

FPT, Mahle and Brazilian universities are working to develop an FPT F1C Bi-Fuel engine to meet Brazilian transportation needs using Ethanol, or Biomethane and Hydrogen for use in hybrid vehicle applications.

The project involves the creation of mathematical models, which will be used to characterize and predict the behavior of the engine operating with ethanol and biomethane, assisting in the development of components and hardware, and testing the equipment at Mahle's technology center in Jundiaí (SP).

Read The Article

PSR Analysis: Brazil and much of South America have extensive renewable sources for fuel. FPT and Mahle are betting on alternatives that cost effectively meet the decarbonization needs consistent with infrastructure restrictions. **PSR**

Europe Report

By Natasa Mulahalilovic, Marine Analyst

Cost Increases Cause Losses at HanseYacht Group

Cost increases in several areas caused HanseYachts AG to report a loss of EUR 20.72 million (US\$25 million) for the fiscal year 2021/2022 ended June 30, 2022. However, because of the great demand during the pandemic for sailing boats and fully complete order books, production increased from 446 to 568 boats, compared to the previous year.

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Europe Report

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The main boat builder's market, Germany, has not been growing as expected due to high inflation and the uncertain political and economic environment caused by the war in Ukraine.



Natasa
Mulahalilovic

Revenues totaled EUR 132,38 million, an increase of 22.8% compared to the previous fiscal year. But, at the same time, costs of materials increased 40.7%, personal expenses climbed 22% and other operating costs increased 58%. All this led to a net loss higher by 130.5% compared to the previous fiscal year.

The recent Covid-19 shutdown and worker absenteeism heavily impacted the finances of the group for fiscal year 2021/2022.

HanseYacht Group said it will not exhibit this year at BOOT, the biggest indoor pleasure boat trade show held in Dusseldorf, Germany.

The main boat builder's market, Germany, has not been growing as expected due to high inflation and the uncertain political and economic environment caused by the war in Ukraine. Work in progress had a value of only EUR 8 million, down from €XX the previous year, mainly due to a parts shortage and supplies not being delivered as scheduled. Privilege Catamarans, the French brand acquired just three years ago, recorded a loss of EUR 7.78 million

HanseYacht Group was established in 1990 originally producing traditional sailing boats. The builder has rapidly become one of the leading European brands investing in new brands and markets. Norwegian motorboat brand Fjord was acquired in 2005, and the UK sailboat brand Moody one year later. HanseYacht added the main sailboat competitor at the time Dehler in 2009, the luxury motor yachts manufacturer Sealine with the UK origins in 2013, and finally the French builder of ocean-going luxury catamarans Privilege Marine SAS in 2019. The new brand Ryck Yacht, the powerboat with an outboard engine, was introduced at the Cannes Festival in 2021. The group has been listed on the Frankfurt Stock Exchange (EU Regulated market) since 2007.

Carrying seven brands in its portfolio, from smaller outboard boats to luxury motor yachts, HanseYacht Group has become one of the most respected German boat builders, the bestselling sailing boat producer in the country and the third largest globally.

The group has been taking measures to ensure a healthier year in 2022/2023. The company has worked with its lenders to restructure its finances by setting up new loans and renegotiating existing loans. The luxury catamaran business line was sold in October 2022.

HanseYacht is a very popular brand and has a long tradition of offering high-quality boats. Its latest Hanse 510 and 460 models are solid bestsellers, and the company has invested in innovative solutions and is implementing its "Confidence 2026 Strategy," which is focused on a significantly reorganized management team supported by "high professional experts." Based on these moves, the group is looking for a much improved outcome in 2022/2023. **PSR**

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China Report

By *Jack Hao*, Senior Research Manager - China



*Jack
Hao*

Case New Holland(CNH) To Halt Sales of Construction Machinery

CNH Industrial Group says it is stopping the sales of construction machinery and equipment in the Chinese market after Dec. 31, 2022. This is another significant development by foreign brands in the Chinese market.

John Deere withdrew from the Chinese market after the original industrial structure was changed by the merger of the Chinese plant of Kobelco Construction Machinery Co., Ltd. At the same time, Hitachi Construction Machinery also made changes to Hitachi Construction Machinery (Shanghai) Co., Ltd., which is responsible for sales and services in China, and set up a new sales and service company, "Hitachi Construction Machinery Sales (China) Co., Ltd.", which began operating Nov. 1, 2022.

On Dec. 29, 2020, the Ministry of Ecology and Environment announced that from Dec. 1, 2022, all off-road mobile machines below 560kw (including 560kw) produced, imported and sold and their diesel engines installed shall meet the requirements of the Chinese IV emission standard. The implementation time of Chinese IV emission of off-road mobile machinery above 560kw and its installed diesel engines has not been announced.

Domestic brands caught up with and surpassed foreign brands in 2017, becoming world leaders, in many cases. Product quality and price, as well as channel and service are steadily improving, and market share is growing.

With the development of domestic brands, the gap between domestic brands and foreign brands has gradually narrowed, and the absolute technical advantages of foreign brands have also been slightly reduced. Now, in the face of domestic brands with high performance-price ratio, loyal users of foreign brands are gradually changing to domestic brands, and the market share of foreign brands in China is shrinking.

Source: *hc360* [Read The Article](#)

PSR Analysis: In recent years, China's construction machinery market has been in a period of deep adjustment, which has brought a lot of pressure to foreign and domestic brands. At the same time, COVID-19's superimposed impact on China's economy and infrastructure has doubled the pressure on many companies.

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China Report

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Meanwhile, the upgrading of emission standards has increased product costs, and the growing trend of electrification is requiring companies to spend additional funds to develop new products and to meet the environmental protection emission standards. These developments have posed great challenges to foreign-funded construction machinery products.

With the improvement of the strength of local brands, the technological advantages of foreign brands have been gradually reduced. Compared with the improved service system of domestic brands, the advantages of service speed and maintenance quality of foreign brands has been reduced. Based on the successful experience of Caterpillar in China, it is very important to develop and produce localized products and have powerful agents to achieve a win-win strategy.

Southeast Asia has been supported by policies such as the "One Belt and One Road" and the RCEP agreement. The Regional Comprehensive Economic Partnership (RCEP) is an agreement between the member states of the Association of Southeast Asian Nations (Asean) and its free trade agreement (FTA) partners. The pact covers trade in goods and services, intellectual property, etc.

Many foreign brands have begun to establish new factories in Southeast Asia, made new infrastructure investment, and implemented major projects such as railways and roads. These moves have promoted the local demand for construction machinery products, and sales are rising steadily. In the future, the Southeast Asian market will become a competitive market for foreign brands and domestic brands. **PSR**

Far East: Japan Report

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



*Akihiro
Komuro*

Electric Light-Duty Trucks Must Meet 5% METI Goal by FY2030

The Ministry of Economy, Trade and Industry (METI) now requires shippers that transport a large volume of freight to set a target of using 5% electric light-duty trucks by FY2030, which includes EVs and fuel cell vehicles (CVs), but not hybrids.

They will also be required to submit periodic reports on their progress toward this target. If the efforts are significantly inadequate, the committee can make recommendations to shippers and publicly announce the names of the companies involved.

Of the 800 major manufacturers, retailers, and other companies with large annual transportation volumes, those that are also involved in their own transportation or those that request exclusive transportation from a specific company are eligible for the program.

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Far East Report

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The fact that hybrids are not included in this goal effectively means that the next-generation development of light-duty trucks has been narrowed down to BEVs or FCVs.

Source: The Nikkei

PSR Analysis: The fact that hybrids are not included in this goal effectively means that the next-generation development of light-duty trucks has been narrowed down to BEVs or FCVs. However, FCVs still lack hydrogen stations, and the construction cost of hydrogen stations is higher than that of EV charging stations, so the shift to EVs will be promoted first. Light-duty trucks are numerous and can be said to be the artery of domestic logistics. With about seven years to go until 2030, the number of vehicles that will be replaced by EVs will increase every year. **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

電動小型トラック5%に 経産省、荷主に2030年度目標

経済産業省は貨物の輸送量が多い荷主に対し、電動の小型トラックの使用割合を2030年度までに5%とする目標設定を求めることを決めた。EVやFCVなどを指し、HVIは含まない。目標に対する進捗の定期報告も求める。取り組みが著しく不十分な場合は荷主への勧告や社名の公表もできる。年間の輸送量の多い大手の製造業や小売業など800社のうち自ら輸送も手がける場合や特定の企業に専属で輸送を依頼している場合に対象となる。

政府は21年策定のグリーン成長戦略で、小型トラックなど商用車は2030年までに新車販売の20～30%をハイブリッド車も含む電動車にする目標を掲げていた。

PSR 分析: ハイブリッドをこの目標に含めていないことは、事実上小型トラックの次世代開発がBEVかFCVに絞られたことを意味する。だがFCVはまだまだ水素スタンドが不足しており、水素スタンドの建設コストもEV充電ステーションよりも高額になることから、まずはEV化が進められていくことになる。小型トラックは台数も多く、国内物流の動脈と言える。このセグメントをEV化することで、トラック以外の国内商用車市場にも影響を与えることになるだろう。2030年まであと約7年、買い替えのタイミングでEVを選択するケースは年々増えていく。

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

Hyundai Plans \$14.7 Billion for Software Development

Hyundai Motor Company is getting serious about developing the software needed for automated driving, etc. It has decided to invest \$14.7 billion by 2030 and has begun building a development structure and embarking on M&A.

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Far East Report

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Hyundai Motor Company has achieved record profits through a shift in strategy in conjunction with a generational change. The company plans to further improve profitability in the software field, where customers can add functions to their cars after purchase. But acquiring human resources will be an immediate challenge for Hyundai.

The "Over the Air (OTA)" function, which updates the latest software via the Internet, will be standard on all new models released in 2023 and after. The plan is to establish a system that allows users to be charged according to function updates. The company will first introduce content such as car navigation systems, audio, lighting, and remote-control functions, and then expand into peripheral areas such as auto insurance policies, to diversify and upgrade services in response to customer needs.

The challenge is to secure software engineers. In South Korea, major companies such as Samsung Electronics, NAVER, and Kakao are competing for talented engineers, offering high compensation. Hyundai Motor, with its strong labor union influence and uniform compensation, has been unable to recruit enough.

Source: The Nikkei

PSR Analysis: This is a move that will further accelerate the smartphoneization of automobiles, which is in a sense inevitable for self-driving and CASE. While Tesla is already ahead of the curve with its software-based subscription business model, other automakers are following the trend in their own ways. The major players are:

Hyundai	Invest \$14.7 billion in software by 2030. Building a billable business model
Toyota	Increase group-wide software engineers to 18,000
Honda	Invest approximately \$38.7 billion in software and electrification by 2030
VW	Connect 40 million vehicles to in-house software infrastructure by 2030
Stellantis	Invest 6-9 billion Euros in software by 2025
GM	Earn about 30% of the target \$280 billion in sales by 2030 from software

To speed up the development process, companies must secure human resources, but it is not so easy to do so. The mainstream of software development is a system called "agile development," which aims to improve quality by fixing problems frequently. This approach does not fit well with the traditional pyramid structure of car manufacturers, which is based on a hierarchy of superiors and subordinates. Hyundai Motor Company urgently needs to create such a new environment.

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Far East Report

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The time will soon come when software quality will determine the value of an automobile. This is a new experience, and it will mean the emergence of a new evaluation metric separate from specifications, design, and price.

From the user's point of view, the question is who will be responsible for any accidents or problems caused by software. It is likely that legislation on this aspect will be developed in many countries. **PSR**

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小室 明大 – 極東及び東南アジア リサーチアナリスト

現代自、ソフト更新で稼ぐ 1.9兆円投じ課金モデル構築

現代自動車は、自動運転などに必要なソフトウェア開発に本腰を入れている。2030年までに18兆ウォン（約1兆9千億円）を投じる方針を固め、開発体制の構築やM&A（合併・買収）に乗り出した。世代交代に伴う戦略転換で過去最高益を達成した現代自。顧客が車の購入後に機能を追加できるソフト分野でさらなる収益力向上を狙うが、人材獲得が当面の課題となる。

2023年以降に発売される新車種を対象に、ネット経由で最新ソフトに更新する「オーバー・ジ・エア（OTA）」機能を標準搭載する。2025年までに起亜自動車も含めた全車種にも広げ、スマホのアプリストアのような多様な機能をダウンロードできるプラットフォームを構築。機能更新に応じて課金する仕組みを確立する方針だ。まずはカーナビなどコンテンツ、オーディオや照明、遠隔操作機能などを導入し、その後は自動車保険の契約など周辺領域にも広げ、顧客の要望に応じたサービスの多様化・高度化を進めるという。

課題は、ソフト技術者の確保だ。韓国ではサムスン電子やネイバー、カカオといった大手が優秀な技術者を求め、高額報酬を提示して争奪戦を繰り広げている。労働組合の影響力が強く、報酬が均一的な現代自は十分に採用できずにいる。

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: 自動運転やCASEにとってある意味必然ともいえる自動車のスマートフォン化をさらに加速させる動きだ。ソフトウェアによるサブスクリプション型のビジネスモデルはテスラがすでに先行しているが、他の自動車メーカーもそれぞれのやり方でこのトレンドを追従している。大手の動きは以下の通り。

現代自動車	2030年までにソフトに1.9兆円投資 課金ビジネスモデル構築
トヨタ	グループ全体のソフトウェア技術者を18,000人体制に増強
ホンダ	2030年までにソフトウェアと電動化に約5兆円を投資
VW	内製のソフトウェア基盤に2030年までに最大4,000万台を接続
ステランティス	2025年までに60~90億ドルユーロをソフトウェアに投資
GM	2030年の売上高目標2,800億ドルの約3割をソフトウェアで稼ぐ

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The goal is to increase the number of EV users to 2.5 million by 2025 and reduce air pollution. The EV purchase subsidy program will be added to the list of EV policies introduced by President Joko Widodo over the past year.

開発の速度を速めるためには人材の確保が急務だが、そう簡単にはいかない。ソフトウェアの仕事の進め方は「アジャイル開発」と呼ばれる体制が主流であり、これは頻繁に問題を修正していくことで品質を向上させようというものだ。この手法は従来の上意下達型のピラミッド構造である自動車メーカーの仕事の進め方にはなじみにくいものだ。こうした新しい環境整備が現代自にとっては急務になる。

ソフトウェアの品質が自動車の価値を左右する時代がまもなく訪れる。これはまだ人類が経験していない領域であり、スペック、デザイン、価格とは別の新たな評価軸が登場することを意味する。

ユーザー目線で考えると、ソフトウェアに起因した事故や問題が起こった場合、その責任を誰が担保するのか、という点が気にかかる。もちろんそうしたことが起こらないことが前提だが、そうした面での法整備もこれから各国で進められていくのかもしれない。 **PSR**

South East Asia: Six Major Countries Report

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

EV Purchase Subsidies Planned To Promote Sales

Indonesia plans to introduce a subsidy program to encourage the purchase of EVs starting in 2023. The goal is to increase the number of EV users to 2.5 million by 2025 and reduce air pollution. The EV purchase subsidy program will be added to the list of EV policies introduced by President Joko Widodo over the past year.

Transportation Minister Boudi Karya Sumadi said the government is also considering subsidies for retrofitting internal combustion engine vehicles, but the government is carefully considering this plan because it would bring major changes to the labor-intensive auto industry. The Ministry of Transport plans to approach existing Indonesian automakers, such as South Korea's Hyundai Motor and China's BYD, to create an EV ecosystem for Borneo's new capital city, he said.

The intensified EV shift is partly because Indonesia is the world's largest producer of nickel, which is used in batteries, and the country's intention to move to a higher value-added part of the value chain by eventually ceasing all exports of nickel raw materials.

In 2022, the government ordered all state agencies to switch to electric vehicles. It ordered PLN, the state-owned electric power company, to build more charging stations to reach its goal of 2 million electric motorcycles and 500,000 electric vehicles within four years.

The Indonesian government is working to have public transportation fully electrified within five years. According to data from the Ministry of Transportation,

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South East Asia Report

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22,942 electric motorcycles and 4,904 electric cars were in use in Indonesia as of Oct. 3, 2022.

Source: kamobs.com

PSR Analysis: Indonesia's EV policy is being pursued quite aggressively. The EV penetration rate is still at a low level, but with the support of these policies, it has the potential to take off in the next few years.

With urban congestion and the resulting air pollution at very high levels, it will be important to see how the market reacts to these policies. The test will be whether EVs can overcome these problems, which have not been solved by other policies so far. I think it will be very difficult to achieve the goal, but in any case, EVs will not remain at the current level and will continue to spread. **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

2023年にEV購入補助金を導入、販売促進へ

インドネシアは、2023年からEVの購入を促すため補助金制度の導入を計画している。2025年までにEV利用者を250万人とし大気汚染の軽減を目指す。今回のEV購入の補助金制度はジョコ・ウィドド大統領が過去1年間に導入したEV政策のリストに追加される。ブディ・カリヤ・スマディ運輸相は、政府が内燃機関車の改造に対する補助金も検討していると明らかにしたが、労働集約的な自動車産業に大きな変化をもたらすため、政府はこの計画を慎重に検討しているという。運輸省は韓国の現代自動車や中国のBYDといったインドネシアの既存自動車メーカーにアプローチし、ボルネオ島の新首都のためのEVエコシステムを構築する予定だという。

EVシフトの強化の背景には、インドネシアがバッテリーに使用されるニッケルの世界最大の生産国であり、最終的にニッケルの原材料輸出を全てやめることで同国がバリューチェーン上でより付加価値の高い部分に進みたいという目論みもある。

政府は今年はじめ、すべての国家機関に電気自動車への移行を命じた。国営電力会社PLNに対しては、4年以内に電動バイク200万台と電気自動車50万台の目標を達成するために充電スタンドを増設するように指示した。

インドネシア政府は、公共交通機関が5年以内に完全に電化されることを目指す。運輸省のデータによると、10月3日現在、インドネシアには22,942台が電気オートバイ、4,904台の電気自動車を利用されている。

出典: kamobs.com (一部筆者により元記事内容を改編しました)

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South East Asia Report

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In terms of refueling time, hydrogen has a definitive advantage over batteries. It takes just a couple of minutes for a hydrogen vehicle to be refueled, irrespective of size, compared to the hours it takes to recharge an electric vehicle.

PSR 分析: インドネシアのEV政策がかなりアグレッシブに進められている。現時点ではまだEVの普及率は低いレベルに留まっているが、これらの政策の後押しを受けて今後数年で飛躍する可能性を秘めている。2輪にもEV購入の補助金が策定されるということだ。

都市部での渋滞とそれによって引き起こされる大気汚染は非常に深刻なレベルにあり、こうした政策をうけて市場がどのように反応するかが大事になる。これまで様々な政策をもってしても解決できなかったこの問題をEVが乗り越えられるか、試されている。私は目標達成がかなり厳しいと見ているが、いずれにしても現状のままにはとどまらず普及は進んでいくだろう。 **PSR**

India Report

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



*Aditya
Kondejkar*

India Bets on Green Hydrogen


The electric vehicle market in India is mostly dominated by lithium-ion battery technology, which powers two-, three- and four-wheeler vehicles. But this situation comes with its own set of challenges.

For instance, each battery chemistry has a different energy density, peak power output and charging time. Hence, the industry is working on alternative green solutions, and the government of India is aggressively working on hydrogen as a fuel option.

In terms of refueling time, hydrogen has a definitive advantage over batteries. It takes just a couple of minutes for a hydrogen vehicle to be refueled, irrespective of size, compared to the hours it takes to recharge an electric vehicle.

The union cabinet approved US\$ 2.4 trillion (Rs 19,744 cr) for National Green Hydrogen Mission. The mission has four components aimed at enhancing domestic production of green hydrogen and promoting the manufacturing of electrolyzers — a key constituent for making green hydrogen. The initial target is to produce 5 million tons of green hydrogen annually.

Source: *Business Standard* [Read The Article](#)

Along with the government, other industry stakeholders are taking significant steps to develop hydrogen fuel.  Ashok Leyland (one of the largest CV makers) is working with Reliance Industries on the development and supply chain of hydrogen-powered engines.

Ashok Leyland plans to install fuel-cell engines in an existing fleet of 45,000 trucks that RIL has hired to transport refined products and other marketing goods as a first stage in the strategy. Also, Adani (diversified business portfolio)

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India Report

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and TotalEnergies (French energy and petroleum company) have entered into a partnership to jointly create the world's largest green hydrogen ecosystem.

The potential of the country towards the production of hydrogen is attractive to many companies. European aircraft manufacturer Airbus is looking to source green hydrogen from India as well as Australia and Latin America.

"India is an amazing location with huge potential for the production of (green) hydrogen at a very exciting cost," says Glenn Llewellyn, VP Zero-Emission Aircraft at Airbus.

In the 16th edition of the motor show Auto Expo Toyota, MG motors, Tata motors, Hyundai, and VECV, showcased their hydrogen-powered vehicles across several segments. It's evident that OEMs are seriously exploring the option of Hydrogen powered vehicles. **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 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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