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Automotive Industry Weekly Digest

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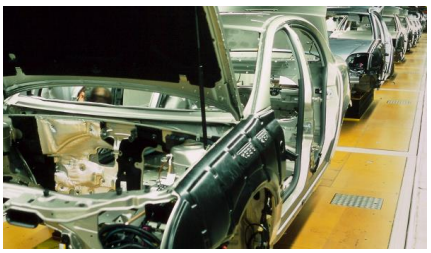
Contents

[OEM Highlights] Xiaomi plans to unveil prototype of first EV model in Q3

Xiaomi Corporation plans to unveil the prototype vehicle of its first electric model in the third quarter of this year, according to Chinese tech media CNMO. A separate report by electrive said that Xiaomi is planning four electric models – two mid-range models each in the price range of CNY150,000 (USD23,500) to CNY200,000 and high-end models in the price range of CNY200,000 to CNY300,000. Xiaomi is the third-largest mobile phone manufacturers in the global market with a market share of 14%.



Outlook and implications

Recent reports on Xiaomi's progress of making electric vehicles (EVs) only contain bits of information that can hardly help us gain details of the company's first model in terms of design, engineering, and technology features. The prototype vehicle to be unveiled in the third quarter of 2022 will certainly help shed more light on the first Xiaomi EV. In terms of its EV plan, what has been confirmed by Xiaomi is that its new manufacturing base in Beijing will house the headquarters of its automotive division and its production facility with planned capacity of 150,000 units per year in the first phase. The company said in its 2021 annual report that its automotive business unit already has a research and development team of more than 1,000 people by the end of 2021, a fast expansion from a team of 500 from the third quarter of 2021. Xiaomi also said that it remains positive on its previously announced target of beginning volume production of its first EV in the first half of 2024.

[OEM Highlights] Geely tests first methanol hybrid sedan in northern China

Chinese automaker Geely Auto is testing its first methanol hybrid vehicle in the northern Chinese province of Heilongjiang for extreme cold temperature performance. The Emgrand Methanol Hybrid, based on the fourth-generation Geely Emgrand sedan, is powered by Geely's latest-generation methanol powertrain and its Lishen hybrid technology. The sedan is fitted with a 1.8-litre naturally aspirated methanol engine providing 97 kW of power and 175 Nm of maximum torque, together with an electric motor that produces 100 kW of power and 320 Nm of torque. The engine and e-motor are connected to a three-speed Dedicated Hybrid Transmission (DHT) that provides increased efficiency at low speeds by propelling the vehicle with pure electric power. The methanol engine in the Emgrand acts as a range extender at lower speeds and sends power to the wheels only at high

speeds. Geely says its takes 8.8 seconds for the methanol-fuelled Emgrand to accelerate from zero to 100 km/h and the model can travel 100 km on 9 litres of methanol.

Outlook and implications

Geely is a major producer of methanol-fuelled vehicles in China. Its parent company, Zhejiang Geely Holding Group, has invested over CNY3 billion (USD471 million) in developing methanol vehicles and green methanol technologies over the past 17 years. According to Geely, clean methanol from renewable sources is the most realistic and effective path to reducing emissions and achieving carbon neutrality. The company also believes that methanol-powered vehicles have cost advantages over gasoline (petrol)-powered models as the price of methanol fuel in China is much cheaper than gasoline. However, despite the aforementioned advantages, there is a lack of interest from automakers in investing in methanol-fuelled vehicles. The challenges for those promoting methanol vehicles also include a lack of refuelling stations and a lack of awareness among consumers of such vehicles.

[Technology & Mobility Highlights] BYD, Lucid Motors to use NVIDIA DRIVE Hyperion platform

Chipmaker NVIDIA has struck deals with electric vehicle (EV) manufacturers Lucid Motors and China's BYD during its GTC conference. Lucid Motors will use the NVDIA DRIVE Hyperion platform in its current vehicles and its future vehicles, including its Project Gravity electric sport utility vehicle (SUV), which is due for release in 2024. BYD will build its next generation of new-energy vehicles on NVIDIA's Hyperion 8 platform.

Outlook and implications

NVIDIA Drive is an artificial intelligence (AI)-based platform that combines deep learning, sensor fusion, and surround vision to enable Level 2+ systems to Level 5 fully autonomous vehicles (AVs). NVIDIA this month started shipping its DRIVE Orin system-on-a-chip (SoC), which has more than 250 trillion operations per second (TOPS) of compute performance and has a processing performance that is seven times higher than that of the company's previous SoC, Xavier. The DRIVE Hyperion 8 architecture is currently in production and the Hyperion 9 architecture will start to ship in 2026. The Hyperion 9 will feature 14 cameras, 9 radars, 3 LiDARs, and 20 ultrasonic sensors as part of its sensor suite.

[Technology & Mobility Highlights] Xpeng adds 20-kW DC charger to fast-charging network

Chinese electric vehicle (EV)-maker Xpeng has introduced a new DC fast charger with 20-kW output to its fast-charging network. Compared to Xpeng's 7-kW charger, the new 20-kW DC charger is said to be three times more efficient and can provide 150 km of range to an EV in just one hour.

Outlook and implications

The introduction of the 20-kW DC charger will help Xpeng to improve consumer experiences with its charging services which previously only consists of its 7-kW AC charger and 180-kW DC charger. Xpeng said the new charger has been added to its destination charging network in four Chinese cities, which are Anyang, Puer, Bozhou, and Shansha and it aims to launch the new charger at more locations, such as hotels and tourism attractions. As of the end of February, Xpeng had 848 supercharging stations in China and 174 destination charging stations.

[EV & Energy Efficiency Highlights] Kia partners with Currently mobile charging service for pilot programme

Kia has announced a pilot programme with a mobile charging service called Currently to provide Kia electric vehicle (EV) owners with on-demand concierge charging service. According to a Kia statement, the service starts immediately in Los Angeles, San Francisco, and San Jose, key EV markets in California. Through to 30 April 2022, participation is at no cost to customers, an opportunity for them to use the service. Kia owners must download the Currently app and create an account. Through the app, drivers can set the time and location for a Currently technician to arrive and charge their EV up to three times every week for two months. In the statement, Greg Silvestri, Kia's vice-president of Service Operations, said, "The relationship with our customers does not end after delivery. In fact, that is just the beginning. Partnering with Currently to offer complimentary charging connects perfectly to our larger 'Plan S' strategy and amplifies our commitment to overall electrified vehicle adoption. We believe that making charging easy also makes ownership easy." While Kia is offering the service for free for a limited time, Currently had offered its service at three price points as of 16 March 2022, according to the Currently website. The Volt subscription costs USD25 per month plus a delivery fee of USD9.99 per service and gets two charge deliveries per month. The Jolt subscription costs USD60 per month, lowers the delivery fee to USD5.99, and allows four charge deliveries per month. The Bolt subscription costs USD80 per month, has the same USD5.99 delivery fee as the Jolt subscription, but allows six deliveries per month. The Currently website said that the service will charge each vehicle up to 50 miles range, although it will only charge a vehicle to 80% capacity. Although owners can select a location to receive the charge, Currently notes that it cannot be delivered on the side of a road and recommends owners call roadside assistance if an owner runs out of charge on the road. According to the Currently website, the company uses a portable charging system from a company called SparkCharge.

Outlook and implications

The partnership with Currently creates an opportunity for owners to experience a new service with their EV ownership that they may not find on their own, and which could provide peace of mind for some owners and flexibility for others. The cost appears to be significant, however; assuming the USD80 subscription, each charge delivery essentially proves to be about USD19.32 for the event, including the USD5.99 delivery fee, or about USD0.39 per mile, as the charge service provides only 50 miles. Regardless, the larger significance is that the fledgling charging industry continues to develop options designed to both alleviate range anxiety and create profitable revenue-generation opportunities. Kia’s participation demonstrates to customers that the brand is forward-thinking in terms of helping them find solutions, and at a lower cost than investing in a charging network.

[EV & Energy Efficiency Highlights] VW to form JVs with Asian companies to secure supplies of critical minerals for EVs

Volkswagen (VW) announced on 21 March that VW Group China, its Chinese operations, will form joint ventures (JVs) with Chinese companies Huayou Cobalt and Tsingshan Group to secure nickel and cobalt supplies for electric vehicles (EVs). VW, Huayou Cobalt, and Tsingshan have signed a memorandum of understanding for a JV in Indonesia, a country with rich laterite nickel ore reserves, to focus on nickel and cobalt raw material production. This three-way JV will eventually be able to supply raw materials for 160-gigawatt-hours worth of EV batteries. This corresponds to an annual output of around 120,000 tonnes of nickel and 15,000 tonnes of cobalt, according to Reuters, citing a statement from Huayou. VW's second JV will be formed with Huayou in China's southwestern Guangxi province for the refining of nickel and cobalt sulfates, and precursor and cathode material production.

Outlook and implications

The new partnerships come as automakers are bracing themselves for price hikes on EV batteries owing to a surge in the price of critical battery minerals, especially nickel and cobalt. According to VW, deliveries of VW-branded EVs nearly doubled in 2021 to 263,000 units in the global market. In China, where VW Group is building production capacity of more than 1 million EVs, demand for a high-energy-density power battery is set to soar in the next five years. Against this background, the new partnerships will enable the German automaker to achieve significant cost advantage in EV mineral supplies. By VW's own estimates, the two JVs will contribute to the group's long-term target of a 30%–50% cost reduction on each battery.

[Forecast & Analysis Highlights] South Korean vehicle production and exports grow in February

IHS Markit perspective	
Implications	Despite the ongoing global semiconductor shortage issue, South Korean vehicle production and exports rose in February because construction of facilities at some automakers, including Hyundai and GM Korea, was completed last month, contributing to higher car production, and owing to a global demand recovery from the COVID-19 virus pandemic and strong demand for alternative-powertrain vehicles.
Outlook	IHS Markit expects light-vehicle production in South Korea to grow by 3.6% y/y in 2022 to around 3.54 million units, up from an estimated 3.42 million units in 2021.

Vehicle production in South Korea improved by 1.2% year on year (y/y) during February to 263,959 units, according to data released by the South Korean Ministry of Trade, Industry, and Energy. Vehicle exports from the country also grew during the month by 5.1% y/y to 167,682 units. In terms of value, overseas shipments increased by 9.1% y/y in February to USD3.8 billion, thanks to increased exports of alternative-powertrain vehicles and high-margin vehicles, as well as a slight increase in vehicle production. Electric vehicle (EV) models like the Hyundai IONIQ 5 and Kia EV6 garnered positive reviews abroad, and demand for premium brands like Genesis also shot up overseas, expanding the share of high value-added automobiles, according to the ministry.

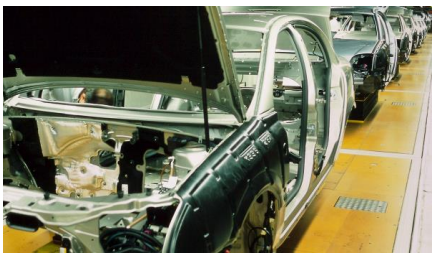
A report by Business Korea highlights that Hyundai's output last month increased by 2.4% y/y to 122,507 units, while its affiliate Kia output fell by 8.7% y/y to 100,518 units. That of General Motors (GM) Korea and Renault Samsung increased by 0.5% y/y and 30.4% y/y to 22,619 units and 10,210 units, respectively. SsangYong's output in February jumped by 3,620.6% y/y to 7,404 units.

Furthermore, sales of alternative-powertrain vehicles in the country jumped by 52.9% y/y to 30,951 units in February, while exports of such vehicles increased in both units (up by 51.9% y/y) and value (up by 66.3% y/y) to 39,256 units and USD1.2 billion, respectively. The latter exceeded USD1 billion for the first time in September last year, exceeded that amount for the sixth consecutive month in February, and accounted for more than 30% of South Korea's vehicle exports for three months in a row. The data also highlight that alternative-powertrain vehicle sales accounted for about 25.2% of the total vehicle sales in South Korea last month. South Korean automotive brands in particular saw a steeper increase of 65.9% y/y to 23,804 units compared with imported models, which climbed by 21.4% y/y to 7,147 units.

Outlook and implications

South Korea relies heavily on overseas sources for automotive chips. Automakers have been readjusting their vehicle production volumes while competing with electronics companies to acquire more chips to minimise the reduction in output. As of 11 March, IHS Markit's assessment of the supply shortage indicated an estimated production volume loss of 17,900 units in South Korea during the first quarter of 2021, 58,300 units in the second quarter, 50,200 units in the third quarter, and 49,200 units in the fourth quarter. Another 8,300 units are now at risk in the first quarter of 2022, largely affecting GM Korea's operations.

Despite the ongoing global semiconductor shortage issue, South Korean vehicle production and exports rose in February because construction of facilities at some automakers, including Hyundai and GM Korea, was completed last month, contributing to higher car production, and owing to a global demand recovery from the COVID-19 virus pandemic as well as strong demand for alternative-powertrain vehicles. As reported earlier, South Korean automakers posted a 3.8% y/y growth in their combined global vehicle sales to 567,211 units in February, split between a 1.9% y/y increase in their combined domestic sales last month to 103,274 units, and 4.3% y/y growth in their combined overseas sales to 463,937 units.



To boost the country's self-reliance in the automotive chip sector and its competitiveness in future vehicles, the South Korean government has unveiled an ambitious plan to invest around USD450 billion over the next decade in its semiconductor manufacturing industry. It is seeking to build a "K-semiconductor belt" that will stretch dozens of kilometres south of Seoul and bring together chip designers, manufacturers, and suppliers. It will spend KRW95.7 billion on research and development (R&D) for automotive chips by 2025, according to Finance Minister Hong Nam-ki. By 2030, he has promised active support for 300 'fabless' companies (firms that design and market hardware while outsourcing the manufacturing of that hardware to a specialised manufacturer) and five 'unicorn' companies (startups that are valued at more than USD1 billion) in the logic chip sector, alluding to an unlisted startup with a valuation of more than USD1 billion. The number of mid- and small-sized fabless chip companies in South Korea totalled 150 in 2020. Hyundai has also announced plans to develop its own semiconductors to reduce its reliance on chipmakers.

IHS Markit in its latest forecast has revised South Korea's light-vehicle production outlook for 2022 downwards by around 31,000 units to reflect the ongoing semiconductor supply issue and the negative economic impact from the Russia-Ukraine conflict. We expect light-vehicle production, including passenger vehicles and light commercial vehicles, in the country to grow by 3.6% y/y in 2022 to around 3.54 million units, up from an estimated 3.42 million units in 2021.

The surge in alternative-powertrain vehicle exports and domestic sales reflects growing demand for such vehicles globally thanks to the introduction of new models as well as favourable policies and infrastructure initiatives. Various governments around the world are preparing to phase out the use of gasoline (petrol)- and diesel-powered vehicles in their fight against pollution and are providing incentives to increase the adoption of alternative-powertrain vehicles. The South Korean government also aims to improve air quality by bringing down particulate levels, fostering alternative-powertrain vehicles as the country's new growth engine, and reducing

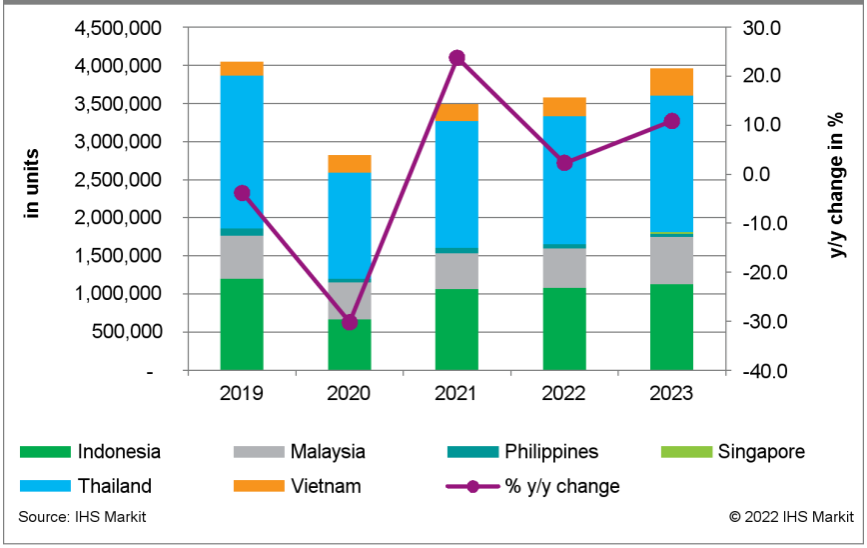
South Korea's heavy reliance on imported oil. It aims for alternative-powertrain vehicles to account for 30% of the total number of vehicles registered in the country by 2030. IHS Markit expects sales of these vehicles in the country to grow further in the coming years, boosted by government initiatives. We expect annual production of alternative-powertrain vehicles in South Korea to grow to about 1.64 million units by 2025, up from estimated 723,500 units in 2021.

[Forecast & Analysis Highlights] IHS Markit expects light-vehicle production in ASEAN region to grow by 2.3% y/y in 2022

IHS Markit perspective	
Implications	Light-vehicle production in the Association of Southeast Asian Nations (ASEAN) region is estimated to have declined by 7.3% year on year (y/y) in February to around 277,409 units, mainly due to a high base of comparison.
Outlook	In its latest forecast round, IHS Markit has downgraded its 2022 light-vehicle production outlook for the ASEAN region by 42,000 units, mainly due to the ongoing semiconductor shortage, as well as economic uncertainties stemming from the Russia–Ukraine conflict.

Light-vehicle production in the ASEAN region, including Indonesia, Malaysia, the Philippines, Thailand, and Vietnam, will grow by 2.3% y/y to around 3.58 million units in 2022, up from an estimated 3.49 million units in 2021, according to IHS Markit light-vehicle production forecasts. This total for 2022 is split between passenger vehicle output of 2.34 million units (up 2.5% y/y) and light commercial vehicle (LCV) production of 1.23 million units (up 1.9% y/y). Thailand, Indonesia, and Malaysia will account for about 91.7%, or 3.28 million units, of total light-vehicle output in the region in 2022. The remainder will come from the Philippines and Vietnam.

ASEAN light-vehicle production outlook through to 2023 – IHS Markit



Source: IHS Markit

Thailand will remain the ASEAN region's leading light-vehicle production base. It is predicted to account for 46.9% of output in the region during 2022. Production in the country is expected to total around 1.68 million units during the year, up 0.6% y/y.

Indonesian light-vehicle production is expected to grow by 1.5% y/y to about 1.08 million units in 2022. The country will remain the region's second-largest base for vehicle production with a 30.2% share.

Malaysian light-vehicle production is forecast to grow by 10.0% y/y to approximately 521,200 units this year, accounting for about 14.6% of ASEAN output.

In the Philippines, light-vehicle output is predicted to plunge by 18.5% y/y to around 52,600 units. Vietnamese production is forecast to increase by about 8.5% y/y to around 245,100 units.

Light-vehicle production in ASEAN region

Country	2021	2022	% change (y/y)
Indonesia	1,063,222	1,079,342	1.5
Malaysia	473,894	521,228	10.0
Philippines	64,531	52,600	-18.5
Thailand	1,666,885	1,676,540	0.6
Vietnam	225,897	245,102	8.5
Grand total	3,494,429.0	3,574,812.0	2.3

Source: S&P Global Mobility © 2022 S&P Global Mobility

Outlook and implications

Light-vehicle production in the ASEAN region is estimated to have declined by 7.3% y/y in February to around 277,409 units, mainly due to a high base of comparison. During the first two months of this year, light-vehicle production in the region improved marginally by 0.6% y/y to about 0.58 million units, mainly thanks to strong domestic demand in Indonesia and Thailand. In our latest forecast round, we have downgraded our 2022 light-vehicle production outlook for the ASEAN region by 42,000 units, mainly due to the ongoing semiconductor shortage. In the short term, OEMs present in the region are expected to face chip supply constraints as front-end chipmakers will struggle with production bottlenecks amid surging global chip demand, as well as capacity pressure throughout 2022, according to Jessada Thongpak, ASEAN light-vehicle production forecast analyst at IHS Markit. This pressure could expand through to 2024. Furthermore, the Russian invasion of Ukraine has worsened the economic outlook across the region, with concern over rising fuel prices and supply chain disruption, Thongpak added.

Thailand

In Thailand, light-vehicle production is estimated to have declined by 12.8% y/y in February to around 137,229 units, mainly owing to a high base of comparison. In our latest forecast, we have downgraded our 2022 light-vehicle production outlook for Thailand by 4,800 units as strong output during the first quarter of the year will be offset by a weaker outlook from the second quarter amid the semiconductor supply constraints as well as the economic consequences and uncertainties from the Russia–Ukraine conflict, according to Thongpak. Major OEMs including Ford, Honda, Isuzu, Mitsubishi, and Toyota have significantly ramped up production of their

vehicles for domestic sales and exports during the first quarter of 2022, thanks to their safety stockpiles of semiconductor supplies. However, the chip supply constraints and the chipmakers' capacity pressures will remain a major threat to production throughout the year and may continue through to 2024. The war between Russia and Ukraine has not only worsened the economic outlook but has also hit the global semiconductor supply chain given that Ukraine accounts for nearly 50% of the global supply of neon gas used in the semiconductor fabrication process, according to Thongpak.

Indonesia

Light-vehicle production in Indonesia is estimated to have grown by 16.9% y/y in February to around 84,999 units, driven by robust domestic demand since the fourth quarter of 2021. The Indonesian government has reinstated the sales tax discount for luxury goods since 2 February. However, this time the incentive will be applicable only to four-wheeled passenger vehicles with a minimum of 80% local component content. Two segments of motorised vehicles qualify for this incentive. The first segment, low-cost green cars (LCGCs) with a maximum price of IDR200 million (USD13,927), will receive a luxury tax discount of 100%, 66.66%, and 33.33% during the first, second, and third quarters of 2022, respectively. This means that buyers of such vehicles will have to pay 0% luxury tax during the first quarter, 1% luxury tax during the second quarter, and 2% luxury tax during the third quarter. Buyers will have to pay 3% luxury tax during the fourth quarter of 2022 when the rate returns to normal based on new excise tax, effective since October 2021. The second segment that qualifies is passenger vehicles with an engine capacity of up to 1500cc and priced between IDR200 million and IDR250 million. These are vehicles with a gasoline (petrol) engine with fuel consumption of at least 15.5 km per litre or maximum carbon dioxide (CO2) emissions of 150 g per km, or a diesel engine with fuel consumption of at least 17.5 km per litre or maximum CO2 emissions of 150 g per km. Vehicles in this segment will receive a luxury tax discount of 50% in the first quarter, meaning that consumers will only have to pay 7.5% luxury tax, while buyers in this segment will have to pay 15% luxury tax from the second quarter onwards (back to the normal rate based on new excise tax, effective since October 2021). In our latest forecast, we have revised Indonesia's light-vehicle production outlook for 2022 upwards by 13,500 units to reflect the stronger-than-expected output during the first two months of 2022. However, the economic uncertainties from the Russia–Ukraine war could dampen the new vehicle market throughout the year. Furthermore, the global semiconductor shortage will remain a challenge for the OEMs present in the country from the second quarter of 2022, according to Thongpak.

Malaysia

Light-vehicle production in Malaysia is estimated to have plunged by 29.5% y/y in February to around 35,882 units, mainly because of a high base of comparison. In our latest forecast, we have downgraded our 2022 light-vehicle production outlook for the country by 4,000 units to reflect the semiconductor supply shortage throughout the year, despite the Malaysian government's decision to extend the 100% sales tax exemption on locally assembled completely knocked down (CKD) passenger vehicles and the 50% exemption on fully imported completely built-up (CBU) passenger vehicles until 30 June in a bid to boost the automotive industry.

Vietnam

The global semiconductor shortage, as well as the repeated waves of coronavirus disease 2019 (COVID-19) infections, weighed down on Vietnam's vehicle production last year. Looking at 2022, we have downgraded our light-vehicle production outlook for Vietnam by 31,800 units to reflect the anticipated demand outlook for the remainder of the year in the wake of the ongoing semiconductor supply shortage and the negative economic consequences from the Russia–Ukraine war, according to Thongpak. The estimated 8.5% y/y growth in the

country's light-vehicle production will come on the back of full production of the three VinFast electric vehicles (EVs), the VF e34, VF 8, and VF 9, as well as the start of local assembly of new and next-generation models.

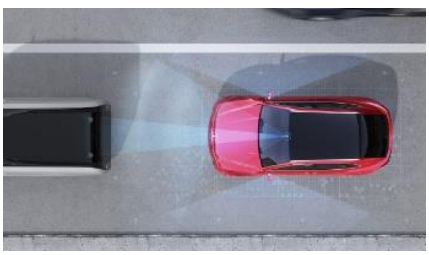
Philippines

Vehicle production in the Philippines grew strongly during the first half of 2021, mainly owing to a low base of comparison. However, the resurgence of the pandemic and the global semiconductor shortage had some negative effects on new vehicle production in the second half of the year. In our latest forecast, we have downgraded the 2022 light-vehicle production outlook for the Philippines by 15,000 units owing to the ongoing semiconductor shortage and the negative impact from the war between Russia and Ukraine.

Overall, ASEAN light-vehicle production for the full year 2022 is expected to grow, driven by improved domestic demand thanks to new model launches and various government incentives. However, the semiconductor supply issue and economic uncertainties from the Russia–Ukraine crisis will have an impact on the region's light-vehicle production. Japanese OEMs will maintain their production strongholds in Thailand and Indonesia, with further facility and capacity investment to make the ASEAN region a key global production base on the back of a strong supply chain, strong vehicle market demand, and a sustainable growth outlook. Mainland Chinese OEMs are also expanding their manufacturing and market exposure in the region to make it their manufacturing bases for right-hand-drive vehicles for the global market in the longer term, according to Thongpak. Thailand's largest energy firm, PTT, formed a joint venture (JV) with global technology company Foxconn to invest in new manufacturing facilities in Thailand to produce battery electric vehicles (BEVs) as well as an open EV platform for automakers starting in 2023–24. In Indonesia, Foxconn has also announced plans to invest in EV battery manufacturing facilities as well as the assembly of BEVs from 2025 onwards.

[Supplier Highlight] NVIDIA launches NVIDIA DRIVE Map for autonomous vehicles

NVIDIA's AI-based crowdsourced mapping is combined with the accuracy of DeepMap survey mapping



Source: Getty Images

NVIDIA has introduced a new mapping platform 'NVIDIA DRIVE Map' for the deployment of highly automated vehicles, according to a company press release on 22 March 2022. NVIDIA DRIVE Map is a multimodal mapping platform designed to enhance safety while allowing higher levels of autonomy.

NVIDIA's AI-based crowdsourced mapping is combined with the accuracy of DeepMap survey mapping. The DRIVE Map is built using two map engines—ground truth survey mapping engine and crowdsourced map engine—to create and maintain a collective memory of an Earth-scale fleet.

The company said that three localization layers of the camera, lidar and radar and DRIVE Map would offer the redundancy and adaptability required by the most advanced AI drivers. A camera localization layer includes attributes such as lane dividers, road markings, road boundaries, traffic lights, signs, and poles.

Outlook and implications

NVIDIA's new map platform launch is in line with its acquisition of a high-definition mapping startup DeepMap in January 2021. Autonomous vehicles require centimeter-level precision to locate itself, navigate and execute turns. Proper localization requires constantly updated maps. Moreover, these maps must also reflect current road conditions, for example, a work zone or lane closure, and be scalable across autonomous vehicle fleets for fast processing and minimal data storage.

[Supplier Highlight] Otonomo partners with Henshin and wefox for connected car data related services

Partnership to initially focus on developing new fleet vehicle insurance market scenarios

Source: Getty image/ metamorworks

Otonomo Technologies has tied up with Henshin Group and wefox to develop vehicle data sets for enterprises providing insurance, rental and leasing services to fleet operators, a company press release on 17 March read. Henshin is a mobility and energy tech company that developed MOVENS open-source platform while wefox is a European digital insurer.

The partnership will initially focus on developing new fleet vehicle insurance market scenarios such as Pay-As-You-Drive (PAYD), Pay-How-You-Drive (PHYD), and Pay-As-You-Go (PAYG). It will help with offline data collection when vehicles do not have access to good connectivity.

"Our partnerships are one of our key strengths and we are pleased to add MOVENS, a highly successful mobility services company, to our growing list of partnerships. In addition, we're excited that wefox will immediately benefit from our optimized vehicle data and look forward to working with both companies to usher in the next era of insurtech innovation," said Ben Volkow, CEO and cofounder of Otonomo.

Outlook and implications

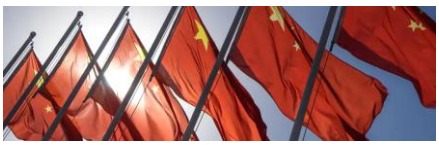
The use of data is rapidly becoming a critical aspect of the automotive industry, with not just insurance companies relying on data but automakers and suppliers looking at data for customer patterns so that they can offer enhanced services. Otonomo's cloud-native platform uses artificial intelligence (AI), sensor data from more than 50 million connected vehicles to develop insights for vehicle insurance, emergency services, mapping, traffic management, electric vehicle (EV) management, predictive maintenance, and smart city applications. wefox, will not have to rely on aftermarket devices but use the combined MOVENS-Otonomo platform.

[VIP ASSET] China sets green hydrogen production target in national development plan

China has unveiled its long-awaited national blueprint to develop a clean hydrogen industry, setting out a near-term production target while pledging to increase the low-emission fuel's usage across various sectors.

With the world's largest GHG-emitting nation aiming for peak CO2 emissions by 2030 and carbon neutrality by 2060, some Chinese provincial governments—including Sichuan and Hebei—have already published hydrogen development plans for the 2021-2025 period.

On 23 March, China's top economic planner National Development and Reform Commission (NDRC) and energy regulator National Energy Administration (NEA) released a development plan to build a hydrogen supply chain in 2021-2035, laying out a series of policy guidelines at the national level for the first time.



"We are making it clear that we are going to create a system where we will have clean, low-carbon, and low-cost hydrogen production," said Wang Xiang, deputy director of the NDRC's high-end technology department, in a press briefing.

China is aiming to produce 100,000-200,000 metric tons (mt) of the so-called green hydrogen from renewables per year by 2025, which will help reduce CO2 emissions by 1-2 million mt/year, according to the plan. This would be far less than 1% of China's annual emissions of nearly 14 billion mt of GHGs.

Figures from the China Hydrogen Alliance, a Beijing-based trade group, suggest that the country currently produces around 33 million mt/year of hydrogen, nearly all of which is from coal regasification, gas reforming, or various industrial processes. The output is generally categorized as gray hydrogen.

"Our focus is to produce hydrogen from renewable energy and limit production from fossil fuels," Wang said. "We have the largest installed capacity of renewables, so we have great potential in raising our clean, low-carbon hydrogen supply."

S&P Global Commodity Insights data shows 124 MW electrolyzers were commissioned to produce hydrogen in China at end-2021, though it's not known whether they are fully powered by renewable energy. Another 1 GW in electrolysis capacity is due to come online in 2022 and 2023.

China's installed renewable capacity reached 1.063 TW at the end of 2021 and will continue rapid expansion in the coming years, according to the government. Renewable projects generated 2,480 TWh of electricity in China last year, or 29.8% of the power mix. Beijing's goal is for non-fossil fuels' share to reach 39% by 2025.

"There are already enough projects in the pipeline to support the targeted level [of green hydrogen production]," said S&P Global's Megan Jenkins, senior research analyst at ENR, adding that she however observes some demand uncertainty.

Who is to use hydrogen?

Like some other countries, China views the road transportation sector as an initial demand source for green hydrogen.

Last year, the central government it would provide subsidies for the value chains of automobiles powered by hydrogen fuel cells around Beijing, Shanghai, and Guangdong. Each of the metropolitan areas can receive up to ¥1.5 billion ($235 million) for fuel-cell vehicles and ¥200 million for hydrogen supply during a four-year demonstration period.

China is targeting to have 50,000 hydrogen fuel-cell vehicles by 2025, according to the national hydrogen plan. S&P Global's Platts Analytics estimated there were around 7,700 such vehicles last December.

But analysts believe Beijing needs to further refine the current subsidy scheme, which does not favor green hydrogen over gray hydrogen. Matching up green hydrogen production with the vehicle demand centers is also difficult, said Jenkins. "A lot of these green hydrogen projects are located in remote regions on giant renewable energy mega-bases."

In the national plan, the government said it will promote the buildout of logistics infrastructure, set quality and safety standards, and increase the number of refueling stations with a daily hydrogen dispensing capacity of more than 1,000 kg.

China also plans to promote the usage of green hydrogen in the power storage, utility, industrial, aviation, and maritime transportation sectors.

"We will actively explore how to apply fuel cells to vessels and aircrafts, and we will begin research and development of large airplanes that can be fueled by hydrogen," the plan said. "We will promote the low-carbon transition of ammonia and synthetic methanol production with hydrogen."

Stronger capacity

China has more than 300 companies involved in the hydrogen supply chain, mainly in the coastal areas, according to the government. Looking forward, the government wants to enhance the industry's technological capabilities and reduce its electricity costs.

[VIP ASSET] Russia–Ukraine conflict: is palladium a potential black swan for already stretched auto supply chains?

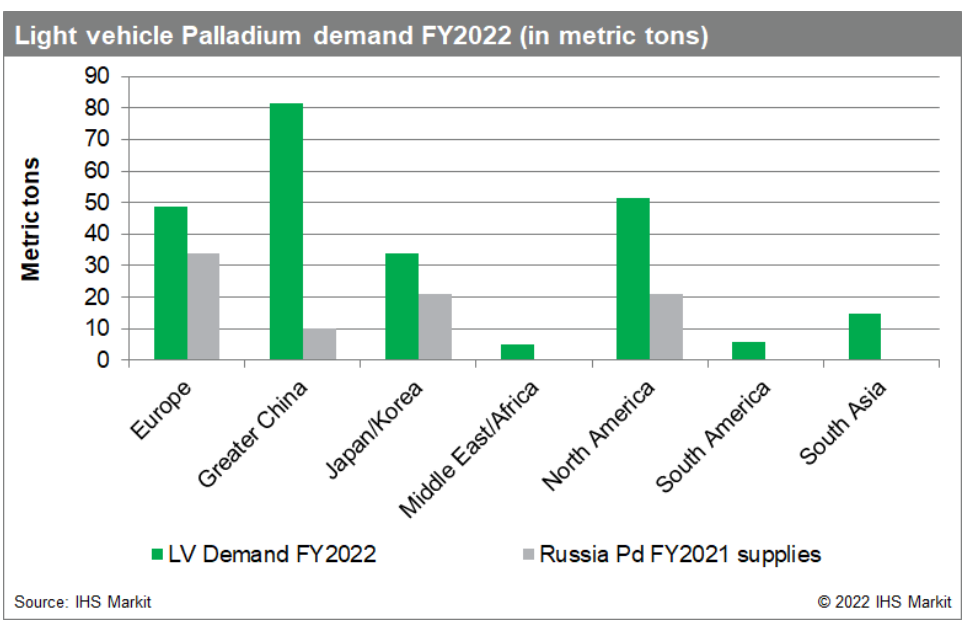
While alternative sourcing locations or substitute materials may exist, they won't be enough to avert production disruption should supply become constrained. In a pessimistic scenario some 7.5m units could be impacted in 2023.

Several supply disruption concerns have been reverberating through the automotive industry since Russia's invasion of Ukraine, however few have the disruption potential of palladium, a critical raw material used in catalytic converters for emission abatement.

Palladium supplies are de facto already facing some logistical disruption since palladium is usually transported via passenger flights due to its high value and relatively low weight (only about 200 tons were produced in 2021). The closure of the airspace in most of Europe and North America to Russia-operated aircraft is forcing Russian palladium exporters to find alternative routes. Back in March 2020 when passenger flight capacity became constrained due to travel constraints, Russian exporters set-up dedicated cargo flights, however this is now also impeded by airspace closures.

To be clear, palladium exports from Russia are currently not directly sanctioned. However, the sanction environment, disruption to payment systems as well as the international business community's concerns of reputational and financial risk with doing business with Russia, are increasingly isolating Russia supply lines. Shippers, buyers, insurance providers and trade financing banks are among those reluctant to be exposed to Russia business dealings. Palladium is no exception.

This increases the risk of palladium supply disruption to the automotive industry. About 40% of the global palladium production is sourced from Moscow-headquartered Norilsk Nickel, the world's largest palladium and nickel supplier. The automotive industry absorbs some 90% of the annual palladium production.



Palladium is not the only concern for critical raw materials and inputs impacted by Russia's invasion of Ukraine. Semiconductor-grade neon, which is used in lasers for microchip production and of which Ukraine accounts for half of the world's supply, has been red-flagged even though it has not yet further hampered already severely disrupted semiconductor supply lines. Aluminium production, for which Russia contributes some 6% of global production, is also under scrutiny. The tightness of supply due to US sanctions against Russia's Rusal in 2018 coupled with new potential disruptions resulted in prices doubling vs. pre-pandemic levels. Nickel is also in focus due to its usage in stainless steel production used in exhaust systems as well as battery cathode manufacturing, as we pointed out in an earlier article. Concerns for several of these raw materials may gravitate more around pricing spikes rather than material disruption to automotive business continuity like palladium.

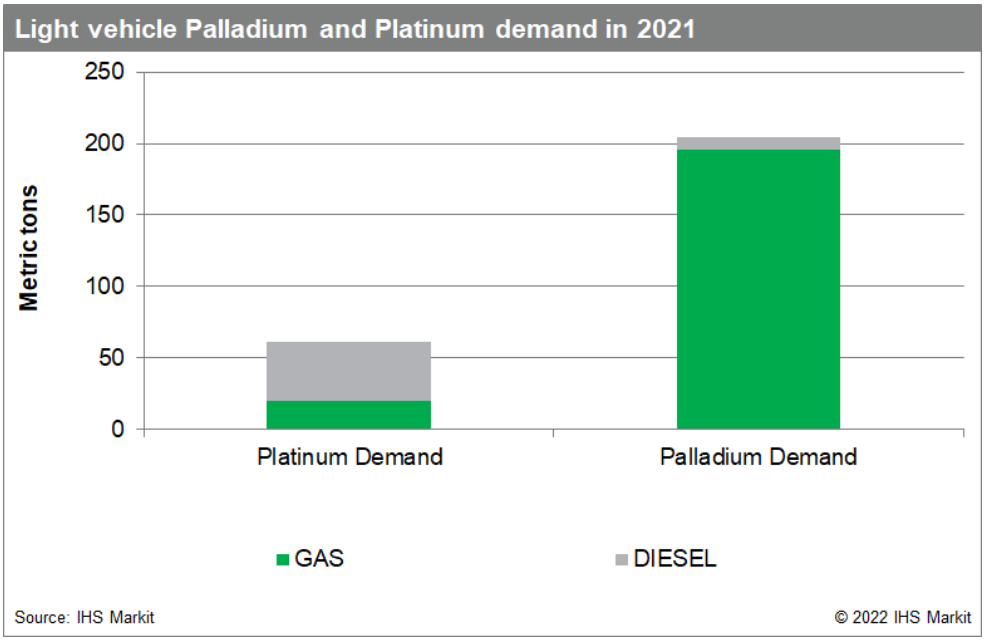
Palladium-Platinum choice affected by pricing and technological trade-offs

In order to understand palladium's market exposure, it's important to highlight the symbiotic relationship it has with other metals in the platinum group metals (PGM) category. Palladium and platinum were initially used as catalysts to convert carbon monoxide, nitrous oxides and any unburned hydrocarbons into carbon dioxide and water. A thin layer of these metals coats a honeycomb-like structure made of metal or ceramics integrated within the catalytic converter. As regulators turned their attention to NOx (nitrogen oxides) levels, rhodium was also added to the catalyst mix in order to "reduce" (remove oxygen) from NOx.

The proportions and quantities of platinum, palladium and rhodium in a catalytic converter vary based on many factors including the fuel type, the stringency of local emission standards, vehicle size, OEMs' aftertreatment strategy (size, number of stages of the aftertreatment system and their physical positioning relative to the engine) and the spot prices of the materials.

Between three to seven grams of PGM are used in a standard catalytic converter. Platinum has better thermal properties in oxygen-excessive conditions like those found in Diesel aftertreatment systems and is therefore the material of choice in Diesel engines. Exhaust temperatures average about 200°C in a Diesel engine, while a gasoline engine exhaust temperatures achieve 500°C. The lower the temperature the more PGM content will be required to trigger and execute catalysis.

Both platinum and palladium can be effective in gasoline engine catalytic converters, so the choice is normally made based on material cost or OEM specific strategies. A three-way catalytic converter (which deals with carbon monoxide, nitrogen oxides and hydrocarbons) used in a vehicle with a gasoline engine uses about 1.8 grams of platinum, 1.6-1.7 grams of palladium and 0.2 grams of rhodium. Hybrid vehicles contain more precious metals than non-hybrids since the engine is engaged for less time, meaning that aftertreatment systems need to be effective at lower temperatures.



While total palladium production is only slightly higher than platinum's (200 tons vs 180 tons respectively in 2021), the demand of palladium for catalytic converters is about three times higher than that of platinum. Pricing pressure has built up for palladium due to continued market deficits, while platinum production runs surpluses. Rhodium is a byproduct of platinum production and its production level is dictated by the profitability that miners achieve in platinum production. For each unit mined, about 60% of the content is platinum, 30% is palladium and about 9% rhodium.

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