



Automotive Industry Weekly Digest

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[EV Highlights] NIO unveils ET5 electric sedan, plans to begin ET7 deliveries on 28 March 2022

IHS Markit perspective

Implications The launch of the ET5 further lowers the price range of NIO models to attract mass-market buyers. The ET5 will compete with the likes of the Tesla Model 3 and XPeng P7 in the electric sedan market.

Outlook Given the high interest from customers, it is critical for NIO to meet its delivery timeline for the ET5, which would be just nine months from now. IHS Markit anticipates production of D-segment EVs to continue to grow in 2022 to reach more than 1.3 million units.

Chinese electric vehicle (EV) maker NIO debuted its new mid-size electric sedan, the ET5, on 18 December at the company's annual brand event, the NIO Day. The ET5 is shaped by the same family design language shown on its bigger sibling, the ET7 sedan, which will begin deliveries from 28 March 2022. The fascia of the ET5 features the "shark nose" spoiler and NIO's iconic X-bar design. Some highly recognisable design elements on the ET7, including the double-dash daytime running lights, also appear on the ET5. The model also features a 1.28-square-metre all-glass roof which NIO said protects against 99.9% of the sun's harmful UV rays. The ET5 measures 4,790 mm long, 1,960 mm wide and 1,499 mm tall, with a wheelbase of 2,888 mm. This makes it slightly bigger than the Tesla Model 3 which is 4,694 mm long and has a wheelbase of 2,875 mm.



NIO ET5 sedan

NIO

Built with NIO's sports car DNA, the ET5 is powered by two electric motors that produce a combined power output of 360kW and maximum 700Nm of torque. According to NIO, the ET5 can accelerate to 100km/h in 4.3 seconds. The ET5 will provide three range options. The standard-range model with a 75 kWh battery can deliver a range of 550 km under China's light-duty vehicle test cycle (CLTC), while the long-range model with a 100 kWh battery will have a range of 700 km. A 150 kWh ultra-long-range battery pack will also be made available on the ET5 at a later date, which will extend the range to 1,000 km. Like the ET7, the ET5 will have the same hardware needed to enable the NIO Autonomous Driving (NAD) feature. The NAD is supported by the Aquila Sensing System which consists of 33 sensors, including a long-distance LiDAR sensor, 11 high-resolution cameras, 5 mm-wave radars and 12 supersonic sensors. NIO did not specify at the unveiling of the ET5 which functions will be realised on the ET5 on delivery with the NAD. According to its website, the NAD's full suite of features will be gradually added to the ET5 to "gradually achieve a safe autonomous driving experience in scenarios such as highways, city areas, parking and battery swapping". The NAD will be available to Chinese customers via a CNY680 (USD106) monthly subscription.



Customers can already make reservations for the ET5 with a CNY2,000 refundable deposit at this stage. The 75-kWh battery version is priced at CNY328,000 before subsidies and CNY258,000 with the Battery-as-a-Service (Baas) programme. With the Baas, customers will rent a 75-kWh battery at a monthly fee of CNY980 per month, while the bigger 100-kWh battery costs CNY1,480 per month. Deliveries of the ET5 are slated to begin in September 2022. The ET5 will be produced at NIO's Xinqiao plant in Hefei, Anhui province(China).

Outlook and implications

The ET5 is the fifth and most affordable vehicle in NIO's line-up. With the Baas programme, it will start at CNY258,000 before subsidies, which puts it on a par with the Tesla Model 3. Compared to the Model 3 Rear-Wheel Drive, the ET5 certainly looks more appealing with its dual-motor configuration and the availability of features like soft close doors and flush door handles. Through the Baas programme, NIO is selling consumers the idea of buying an EV without owning the battery. Rising demand for NIO's expensive models, like the ES6 and EC6, suggests that the idea of renting a battery is gaining popularity among NIO owners. The ET5 in this sense will have the opportunity to further widen NIO's customer base and raise the subscription rate for the Baas programme itself. Initial response to the ET5 seems positive. According to William Li, CEO of NIO, first-day reservations for the ET5 have exceeded those for any previous NIO models. Given the high interest from customers, it is critical for NIO to meet its delivery timeline for the ET5, which would be just nine months from now. As to the mid-size EV segment, IHS Markit anticipates that production of D-segment EVs will continue to grow to reach more than 1.3 million units in 2022. Models like the ET5 will put pressure on traditional premium carmakers, which are being slow to introduce competitive electrified models to the market. BMW will soon begin sales of the electric version of the 3-Series sedan in China, although it shares a platform with the gasoline version of the 3-Series.

[EV Highlights] Startup NiuTron to debut first EV model in H1 2022

NiuTron, an electric vehicle (EV) startup launched its auto brand, NiuTron, on 15 December. The company, founded by Li Yanan, also the founder of electric scooter company, Niu Technology, plans to reveal its first model, the NiuTron NV, in the first half of 2022. Deliveries for the new model are slated to begin in September.



Outlook and implications



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Local media reports indicate that NiuTron has been engaged in research and development (R&D) activities on vehicle development in 2018. Its manufacturing plant located in Changzhou, Jiangsu province, is said to have a capacity of 180,000 units per year. The company already has a team of 1,000 people, of which mostly focus on R&D-related activities. It also shared some information on its platform to give a glimpse of what to expect from its first model. The NiuTron NV, a larger sport utility vehicle (SUV), will be based on the company's Gemini platform, which can accommodate production of both battery electric vehicles (BEVs) and extended-range electric vehicles (EREVs). The model is likely to be positioned in the premium EV segment, although its pricing strategy has yet to be confirmed by the company.



[Sales Highlights] Supply chain issues to limit global light-vehicle sales, production growth in 2022 – IHS Markit

IHS Markit perspective

Implications	IHS Markit forecasts global light-vehicle sales to increase 3.7% and production to increase 9.0% in 2022. Next year, global light-vehicle sales and production volumes are forecast to still be below the levels of 2019, as the recovery cycle from the COVID-19 pandemic has been held back by supply constraints and new virus variants. Auto demand levels are expected to remain depressed on the microchip shortage, as well as the race between vaccination programmes and new COVID-19 variants. Although the supply situation is expected to improve through 2022, the ability to replenish inventories may not come before 2024.
Outlook	IHS Markit expects the semiconductor shortages and wider supply chain disruptions to continue until 2023. IHS Markit projects light-vehicle sales globally of nearly 79.4 million units in 2021. We forecast new light-vehicle sales of nearly 82.4 million units globally in 2022 and auto industry demand to continue to be constrained next year as the challenges in the semiconductor supply chain remain. Global light-vehicle production is expected to be 75.5 million units in 2021, a paltry 1.2% improvement over levels in 2020. However, in 2022, IHS Markit forecasts a rebound in global light-vehicle production of 9.0% to 82.3 million units.



IHS Markit forecasts global light-vehicle sales to grow 3.7% and production to increase 9.0% in 2022. Next year, global light-vehicle sales and production volumes are forecast to still be below the levels of 2019, as the recovery cycle from the coronavirus disease 2019 (COVID-19) pandemic has been held back by supply constraints and new COVID-19 variants. Although the supply situation is expected to improve through 2022, the ability to replenish inventories may not come before 2024.

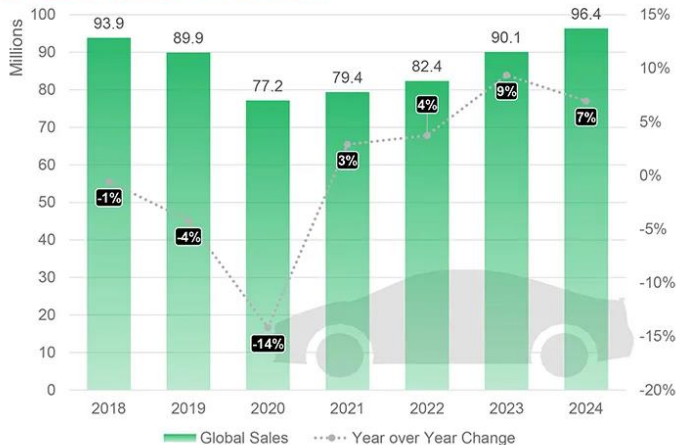
In full year 2021, global light-vehicle sales are expected to be up just 2.9% from the levels in 2020. IHS Markit remains cautious on recovery prospects, as the global auto industry grapples with unprecedented circumstances. Depressed vehicle output levels are expected to impact on vehicle lead times for some time, pressuring depleted inventories and delaying fulfilment of orders. According to Colin Couchman, executive director of global light-vehicle forecasting at IHS Markit, “The path of the pandemic remains an important driver of the 2022 auto demand cycle, especially the ‘race/ between vaccine and variants. Concerns remain as winter arrives for Northern Hemisphere nations, and the emergence of the Omicron variant represents a worrying development.”

IHS Markit expects that the conflict between the demand outlook and the production levels that automakers are able to deliver because of supply constraints to remain and to be a defining characteristic of the forecast. According to Couchman, we were expecting very significant recoveries in demand predicated on significant recoveries in the jobs market and consumer confidence. However, automakers cannot sell what they do not have



and the supply chain issues are affecting production in all regions and are pushing the sales recovery back to 2023 and 2024.

Global Sales Overview



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The auto industry in most regions faces limited recovery prospects on supply chain challenges and potential further waves of the COVID-19 virus outbreak. The European auto industry looks set for a bleak winter as widening concerns over the virus outbreak combine with ongoing supply chain woes, including concerns over Germany-based production. In the Western and Central European demand forecast is 13.9 million units in 2021, just scraping into growth territory at 0.2% year on year (y/y). In 2022, Western and Central European demand is forecast at 15.0 million units, up 7.8%. "European car consumers are expected to hunker down for a second winter of COVID-19, but the new year might struggle to deliver meaningful improvement to new car sales levels," said Couchman.

In 2022, light-vehicle sales volumes in the United States are expected to reach nearly 15.5 million units, up 2.6% from the level projected in 2021 of approximately 15.1 million units. "For 2022, the pace of sales is expected to quicken in the second half of the year. Given current inventory conditions, it is difficult to project significant demand recovery in the first half of 2022. But we expect to exit 2022 with a pace of sales more recognisable to pre-COVID-19 levels, setting the stage for better volume outlooks into 2023 and 2024," according to Chris Hopson, manager, North American light vehicle sales forecast, IHS Markit.

IHS Markit analysts predict the light-vehicle market in mainland China dropping by 1% to 23.4 million units in 2021, as supply chain shortages choke off market growth. Near-term risks are balanced and the forecast is for Chinese light-vehicle sales of 24.2 million units in 2022, up 3.3% y/y, followed by a more-substantial recovery in 2023, with sales above pre-crisis levels at 26.9 million units, up 11.3% y/y.

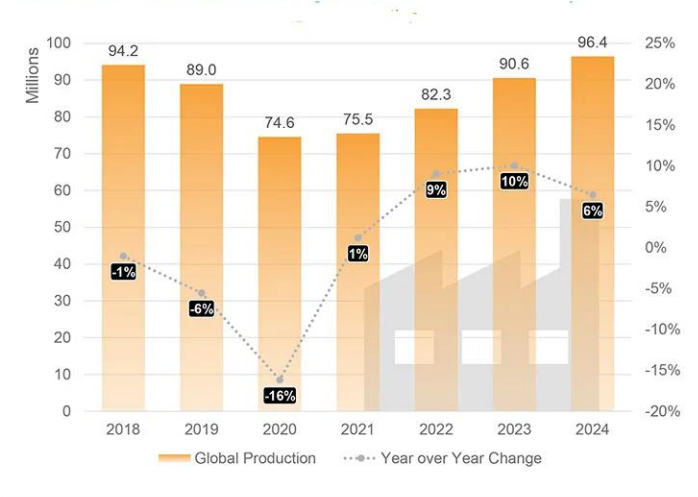
Production expected to recover slowly through 2022

Global light-vehicle production is expected to be 75.5 million units in 2021, a paltry 1.2% improvement over levels in 2020. However, for 2022, IHS Markit forecasts a rebound in light-vehicle production of 9.0% to 82.3 million units. The production outlook will continue to be affected by insufficient availability of automotive-grade microchips, at least until 2023. Incremental production capacity gains within the semiconductor sector,



heightened ‘chips-per-vehicle’ requirements, and robust non-automotive microchip demand are all expected to be factors in the light-vehicle production forecast.

Global Production Overview



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According to Mark Fulthorpe, executive director of light vehicle production forecasts at IHS Markit, “Overall, while manufacturing operations in most regions are expected to improve, capacity constraints within the semiconductor supply chain remain the single most influential feature of the forecast. As the semiconductor tide recedes, will this expose further risks to the auto recovery? Threats elsewhere within the supply chain could become more apparent as chip supplies improve, notably, logistics, worker related issues, and key raw materials shortages.” IHS Markit is tracking a number of issues that have the potential to grow into more-disruptive issues in terms of auto production, including magnesium supply, leading to potential concern over the supply and cost of aluminium, and the spread of the Omicron variant of COVID-19.

In Greater China, IHS Markit forecasts modest growth in light-vehicle production of 1.6% to 24.3 million units in 2022. In Europe, light-vehicle production is expected to be 18.5 million units in 2022, up 17.8% from an estimated 15.7 million units this year. In the North American region, the market momentum is improving heading into 2022. Our outlook based on current forecasts remains at nearly 15.2 million units, reflecting growth of just over 2.2 million units or 16.9% y/y. A more normalised supply chain is forecast to support global light-vehicle output levels of 90.6 million units in 2023, a further 10% y/y increase, and comfortably above pre-pandemic output levels of 2019. However, prior to the pandemic, global light-vehicle production had been slowing; output reached 94.3 million units in 2017, but dropped to 89.7 million units in 2019.

Electrification remains growing dynamic

Recent months have witnessed an unprecedented series of announcements by OEMs on electrification plans for the coming 5–15 years, creating what IHS Markit has called an “arms race of ambition”. Electric vehicles (EVs) are fast evolving from a regulatory compliance-related requirement into fully fledged core offerings for many OEMs. Transformational change is firmly on the agenda, and making sense of this arms race of ambition represents an ongoing challenge. However, although electrification is expected to continue to be a dominant theme in upcoming years as automakers follow up on strategic announcements, the greatest changes to the light-vehicle propulsion system make-up will come in later years. With increased numbers of new EVs available for



sale in 2022, market share and volume of the vehicle type will increase. However, many of the investment announcements made in 2020 and 2021 will have more-profound impacts on the market in the second half of the decade than in 2022.

Outlook and implications

IHS Markit expects the semiconductor shortages and wider supply chain disruptions to continue until 2023. IHS Markit projects light-vehicle sales globally of nearly 79.4 million units in 2021. We forecast new light-vehicle sales of nearly 82.4 million units globally in 2022 and auto industry demand to continue to be constrained next year as the challenges in the semiconductor supply chain remain. Tentative demand recovery is expected to continue across most regions, assuming the ongoing availability of effective vaccines, although there may be major impacts from the Omicron variant. Despite the potential for the new Omicron variant to ultimately affect production through regional shutdowns or impacts on workforces, supply constraints are likely to be a more-dominant factor holding back sales.

[Sales Highlights] China's vehicle sales to jump 5.4% to 27.5 mil. in 2022 – CAAM

China's vehicle sales are expected to grow 5.4% year on year (y/y) in 2022 to 27.5 million units, according to deputy secretary-general of the China Association of Automobile Manufacturers (CAAM), reports Gasgoo. The total vehicle sales will include 23 million passenger vehicles (PVs), up 8% y/y, and 4.5 million commercial vehicles (CVs), down 6% y/y. In support of the forecast, Chen cited predictions of China's GDP growth, efficient prevention and control of the coronavirus disease 2019 (COVID-19) virus spread, and an improvement in the semiconductor supply situation.

Outlook and implications

The Chinese market's transition to electrification will further accelerate in 2022. According to CAAM data, new energy vehicle (NEV) sales accounted for 20.5% of total PV sales in November and 15.7% of total PV sales in the year to date (YTD). In addition, the market's shift towards EVs is driven by the increased availability of appealing EV models, rather than government subsidies. In the CV market, sales continued to deteriorate in November. High inventories of China V-compliant trucks remain the biggest drag on the CV market. OEMs' measures last year to clear China V-compliant trucks from inventories to prepare for the transition to the more-stringent China 6 emission standards have led to high volumes of unsold China V-compliant trucks in dealers' networks, which is dragging down sales of China 6-compliant models. Meanwhile, automakers continue to experience disruptions from the ongoing semiconductor shortage. In addition, some EV makers reportedly face shortages of batteries. Xpeng, for instance, has delayed deliveries of the base version of its P7 electric sedan in China, citing tight supplies of lithium iron phosphate (LFP) batteries. According to IHS Markit's sales forecast, light-vehicle sales in China are expected to reach around 24.25 million units in 2022, while sales in China's medium and heavy truck segment are expected to be 1.132 million units.



[Technology Highlights] Xiaomi reveals the patent for its autonomous driving technology

The patent discloses a self-driving system, device, and storage medium



Source: Getty Images Plus/ Blue Planet Studio

According to a press release on TechGenyz dated 3 December, the Xiaomi car is in full production, with the official stating that mass production will begin in 2024. Beijing Xiaomi Mobile Software Co., Ltd. recently announced a patent for "autonomous driving control methods, equipment, and storage media," according to the latest report.

The patent discloses a self-driving system, device, and storage medium. The current patent also reveals how the system controls the target vehicle to drive automatically in accordance with the standard auto-driving capabilities level. Furthermore, the technology ensures that the current road level adjusts the self-driving ability level so that the vehicle can perform the automatic driving function.

Outlook and implications

It has been clear to everyone that every major tech company is jumping on board to join the ever-expanding branch of self-driving cars. From Apple to Huawei, every company has begun developing their own self-driving technology, and consumers are eagerly awaiting the mass-production of self-driving cars.

[Technology Highlights] Renault chooses Dassault Systemes platform for product, mobility services development

Renault has announced that it has selected the Dassault Systemes 3DEXPERIENCE cloud-based platform for development of products and mobility services, according to a company statement. The platform is described as a business experience platform integrating 3D design, simulation, and information intelligence software in a collaborative virtual environment. Renault expects the collaboration enabled to improve data sharing and collaboration, speeding development time and reducing costs. Relative to the Renault plan announced in January, the project is expected to deliver value creation. Renault says this will enable sharing, in real time, "all product-related data throughout the product lifecycle, and for managing the virtual twins of its diverse product configurations." The platform will be used by design, product engineering, industrial process engineering, parts and materials purchasing, costing and quality – more than 20,000 employee are expected to use the platform,



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according to Renault's statement. Luca de Meo, CEO of Renault, is quoted as saying, "Our shift toward becoming a technology, services and energy company must be collaborative. The 3DEXPERIENCE platform connects engineering to all disciplines in one digital company. We will gain agility, speed, and effectiveness to develop new mobility faster than ever."



Outlook and implications

Renault expects the faster collaboration and data sharing to help reduce vehicle development time by about one year, as well as reducing costs. As technology development speeds up and pressure to advance electrification across the industry increases, reducing vehicle development time and ensuring rich data sharing have become crucial. For traditional automakers like Renault, with massive existing research and development sites globally, managing collaboration can be more difficult than for some smaller startup companies with fewer employees and fewer product development locations. Collaborative, interactive tools are part of the solution to speeding up development.



[GSP] ASEAN sales and Production Commentary -2021.12

ASEAN sales

November 2021: +7.3%; 277,066 units vs. 258,136 units

YTD 2021: +13.5%; 2,397,226 units vs. 2,112,870 units

Light-vehicle sales in the Association of Southeast Asian Nations (ASEAN) recorded about 277,000 units in November, marking an increase of 7.0% compared with November 2020. In January-November, the market increased by 14.0% to about 2.40 million units. The ASEAN market will likely increase by 9.0%, to about 2.69 million units, in 2021.

Thai light-vehicle sales in November decreased by 7.4% year on year (y/y) but increased by 9.4% m/m to 71,700 units. Sales improved in November thanks to declining new COVID-19 cases, the rising inoculation rate, gradual relaxed restrictions, and the country's reopening. New daily COVID-19 cases have improved since late August and had gradually decreased from 20,000 cases per day to about 3,500 cases per day at the beginning of November. The vaccination rate (at least one dose) was about 70.5%, and the full-vaccination rate was 60.9% of the total population as of 10 December. Since early September, the government allowed many businesses to operate and lifted curfew time. It has also reopened the country and welcomed back fully vaccinated tourists from low-risk countries since 1 November.

November Thai consumer confidence increased for the third time in a row after seven months of declines, when the COVID-19 situation hit hard. Government measures to stimulate the economy, visits by foreign tourists, and year-end festivals will hopefully spur more confidence and spending in December 2021. However, fragile purchasing power; Omicron, the new COVID-19 variant; and political uncertainty may dampen consumer confidence and spending in the future. The 2021 economic outlook has improved from the COVID-19 situation and 2021 GDP growth may reach 1% from the latest forecast of 0.7% by the Bank of Thailand (BOT).



Vehicle sales during January-November hit 656,300 units, which marked a -1.8% y/y decrease. Y/Y sales growth in the first half of 2021 was mainly due to strong momentum from pent-up demand since late fourth quarter of 2020; the motor show in March, which could draw some demand; and the low base in 2020 due to the strict lockdown measures. In the second half of 2021, negative y/y sales growth is expected through the end of the year. This is due to the fourth wave of COVID-19 with the more contagious Delta variant; the cloudy economic outlook; the higher base in the second half of 2020, when the market had quickly recovered; and the even worse global chip shortage problem. The ongoing challenging issues on the demand side include the risk of next wave and new variants of COVID-19, the insufficient aid provided to consumers, small and medium-sized enterprises (SMEs), the unemployed, and the slow recovery of tourism businesses that have suffered high costs and lost tremendous income. Another crucial obstacle is now also on the supply side—the semiconductor shortage issue



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is causing a tremendous automotive production slowdown or downtime in Thailand and globally through the end of the year. On a positive note, global trade has pushed exports to again become one of the key contributors to the Thai economy in 2021, with growth of 12% in 2021. Plus, the Motor Expo and new production launches and promotions will draw some demand in December. All in all, the 2021 sales forecast is expected to be 0.73 million units, marking a 5.4% y/y decrease. The automotive main segment driver in 2021 is the country's product champion—the pickup truck segment. Unemployment in big cities has forced people to return home to small towns to start small local businesses, using pickups for operation. The fast-growing e-commerce business and in-home delivery services have also supported pickup demand. xEVs continue to add interest to consumers, in line with the global trend of electric car popularity during the COVID-19 outbreak. Concerns over PM2.5 pollution problems in Thailand also contribute to their popularity. Many newcomers are entering the Thai automotive market. Foxtron from Foxconn, a company under cooperation between PTT Plc and Taiwan-based multinational electronics manufacturer Hon Hai Precision Industry Co., Ltd., will be set up to develop an electric vehicle (EV) production facility in Thailand. Furthermore, new Chinese manufacturers including Changan and Chery are expected to start production and debut their products in 2024. In addition, IHS Markit expects BEV consumer incentives will be announced soon. The incentive will include both exemption for import taxes for CBUs from any countries of origin, and the cash rebate, in order to make BEV pricing more competitive and will be widely used. The official announcement is expected to be in late 2021 and will be effective from January 2022.

In the short term, the COVID-19 pandemic will continue pressuring the economy, businesses, and consumer behaviors. In addition, the ongoing semiconductor issue will also hinder automotive production and sales growth. The K-shaped recovery is expected among business sectors, while the high household debt is expected to reach 90% of GDP as the upward pace and consumer purchasing power will decelerate in late 2021. Sales recovery is expected to be delayed further, and sales will return to the pre-pandemic level later than 2023. Sales should also be supported by the new elections in 2023, the urban expansion after the completion of the megaproject on public transportation, and substantial overseas investments to join the Eastern Economic Corridor (EEC)—Thailand's new flagship economic zone. The urban expansion will continue as many companies could allow more remote working and relocation away from crowded big cities; bordering provinces have also gained free-trade and labor opportunities according to the creation of the ASEAN Economic Community. The government's EV scheme will contribute to Thai market demand in the mid- to long term. The new players and the global battery price decline will lead to more affordable and wider target consumers in the future. In the longer term, IHS Markit forecasts the automotive industry to grow at a slower pace as penetration levels and public transportation—especially the Skytrain in Bangkok—expand. In addition, there are more concerns about limited roads, and high traffic congestion in big cities will be a threat in the future.



In November 2021, Indonesia vehicle sales increased 61.0% y/y to about 81,000 units because of the low base of comparison in November 2020 when the automotive industry was not under auto stimulus package and supported by the continuous decline of COVID-19 positive cases, automotive incentives, consumer confidence



recovery, and attractive campaigns during the auto show. The positive cases were at their highest point during mid-July (more than 50,000 cases per day), then they rapidly dropped to less than 10,000 cases per day during the beginning of September. Now, the COVID-19 situation in Indonesia is in control with the new daily infection cases less than 500 on December 9. The auto stimulus package will be extended by the government until the end of year, especially with no luxury sales tax applied for sedans and two-wheel drive cars with engines less than 1,500 cc. Indonesia's consumer confidence index increased to 118.5 in November 2021, the highest since January 2020, due to an improving perception of economic conditions amid a rise in incomes and job opportunities. The GAIKINDO Indonesia International Auto Show (GIIAS) on 11-21 November was a stimulus to increase sales figures as the OEMs displayed new products as well as provide various promotions for customers. For year-to-date (YTD) performance, the Indonesia market increased 66.0% y/y to about 736,000 units. We revised up the 2021 Indonesian forecast because the COVID-19 situation has rapidly recovered, leading to easing lockdowns in Jakarta and Java, and the government announced to extend excise tax discounts until the end of this year. All in all, the market is expected to close with 0.78 million units, or a 58.0% y/y increase. The main factors influencing the 2021 performance are government stimulus packages to counter further effects of the pandemic, especially for the automotive sector; more crucial model launches in popular segments to attract consumers' interest; and the vaccination program against COVID-19 to boost consumer confidence and spur the economy (the country started mass vaccinations during the third week of January 2021, and the two-dose vaccine will be free for all Indonesian citizens); and the corporate income tax cut since 2020 to attract investment and create more jobs. In addition, the president has issued the Presidential Decree on the Task Force for Investment Acceleration, aiming to improve the country's ease of doing business in order to encourage economic growth and provide employment opportunities. However, the efficiency of some vaccines against more virulent strains as well as the low vaccination rate among ASEAN countries remain issues of concern. In the short to medium term, Indonesian car sales should continue to rise owing to robust demand, product refreshments, expectations of a further corporate tax cut, and public infrastructure improvement. The chip shortage should affect car supplies and sales in the short term, but demand could rebound in the medium term after the situation starts to recover. For the longer term, the market should grow from a rising middle class. Considering that the penetration rate is still low in the country, plenty of opportunities remain for further growth in the years ahead. However, mass rapid transit (MRT) programs may result in consumers prolonging the decision to buy a new car, since the MRT can accommodate many people at the same time through business areas that currently face severe traffic jams.

ASEAN production

November 2021: -3.1%; 320,426 units vs. 330,668 units

YTD 2021: +23.5%; 3,110,253 units vs. 2,519,145 units

The Association of Southeast Asian Nations (ASEAN) region's light vehicle production in November 2021 contracted 3.1% year on year (y/y) with 320,426 units given the high base effect of 2020. November recorded 3.11 million units, up 23.5% y/y. In the December forecast, ASEAN's full-year 2021 production forecast was revised up by 112,300 units significantly driven by the stronger-than-expected actual outputs recorded in November and OEMs' ramped-up production during December in the wake of pent-up demand boosted by government's tax reduction schemes in Indonesia and Malaysia. In the meantime, most major OEMs in Thailand including Ford, Honda, Mitsubishi, and Toyota accelerated their production during November-December given the robust domestic and export demand, while semiconductor shortages have improved since late third quarter across the region. ASEAN's 2021 production is now anticipated to record 3.3 million units, an increase of 20% y/y,



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post-2020's historic low at 2.82 million units. However, the global auto industry will continue to face the semiconductor supply chain constraints throughout 2022 given the surging demand for chips in all industry sectors. Therefore, we have cut the recovery outlook in Q4 2022 from the previous forecast but the region's total production will rebound to reach 3.5 million in 2022 and surpass 4 million units, the pre-pandemic level, again in 2024.



[Partnership Highlights] Iveco partners with Plus to launch autonomous trucking pilot in Europe, China

Iveco has partnered with Plus to launch autonomous trucking pilot in Europe and China, according to a company statement. Under this partnership, Plus will integrate its autonomous trucking technology into Iveco's latest-generation S-WAY heavy-duty truck. The companies will jointly test Level 4 trucks with a safety driver on board across a wide range of environments and driving conditions. Shawn Kerrigan, COO and co-founder of Plus, said, "We have always emphasized the need for expansive testing to validate that an autonomous driving system is able to handle diverse weather, terrains, and driving scenarios. This pilot will accelerate our efforts to start production of autonomous trucks that combine Plus's production-ready, high performance, full-stack Level 4 autonomous driving technology with IVECO's deep engineering expertise and focus on safety and sustainability".



Outlook and implications

Iveco is already working on automated systems with other companies, and the partnership with Plus will accelerate the development of highly automated trucks. Plus focuses on developing Level 4 autonomous technology to make commercial freight transport safer, more efficient, and less expensive for its customers. Plus recently delivered the initial production units of its PlusDrive autonomous solution to Chinese truck-maker FAW. The company plans for more than 100,000 vehicles to be in service with its PlusDrive solution by the end of 2025.

[Partnership Highlights] SsangYong signs MoU with BYD on EV battery development

SsangYong has said it has signed a memorandum of understanding (MoU) with Chinese automaker BYD to develop car batteries and produce battery packs for its models, reports The Korea Herald. BYD's wholly owned battery unit, the FinDreams Industry Co. will participate in the battery development project. SsangYong plans to install the car battery developed under the partnership on the U100 EV, which will begin mass production in 2023.





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Outlook and implications

The partnership with BYD will help speed up SsangYong's plan to launch production for the U100 EV and the collaboration may be extended to the development of EV-only platform in the long term, according to SsangYong. The troubled automaker has been under receivership since April as its parent company Mahindra & Mahindra failed to attract an investor due to SsangYong's worsening financial status. The South Korean automaker has been struggling to revive its business in the past decade; its production output fell 20% year on year in 2020 to 106,836 units.



[VIP ASSET] Chinese national carbon trading market off to a good start amid hopes of further reforms



17 December 2021 Max Tingyao Lin

China's fledgling national emissions market enjoyed a trading boom in recent weeks, but industry experts say Beijing needs to push ahead with further regulatory reforms to achieve decarbonization targets.

Trading volume in China Emissions Allowances (CEA) is up to nearly 87.4 million metric tons (mt) of CO₂e in December, according to the Shanghai Environment and Energy Exchange, which manages the national market. Daily volume hit 20.5 million mt of CO₂e 16 December, the current record high.

Since trading started 16 July, cumulative volume has totaled 131 million mt of CO₂e. Those CEAs changed hands for CNY 5.36 billion (\$840 million).

Observers said the recent buoyancy comes as electricity firms rush to acquire carbon credits to meet their year-end emissions targets.

The national emissions trading scheme (ETS) covers 2,162 Chinese utilities that reported at least 26,000 mt/year of CO₂ for any calendar year from 2013 through 2019. Each company has an emissions quota calculated every year based on carbon intensity rules in China.

According to the government's regulatory design, Refinitiv estimates that 95% of the power companies had to hold sufficient allowances to stay compliant in their yearly cycle by 15 December, while the rest need to do so by 31 December.

Yuan Lin, lead carbon research analyst at Refinitiv, said the Chinese carbon market is off to a strong start despite utilities only being allowed to carry out spot trades in the current iteration.

"The liquidity level is beyond our expectations," Lin told Net-Zero Business Daily.

But the increase in demand failed to provide much of a boost to carbon pricing. CEA closed at CNY 44.20/mt (\$6.93/mt) 16 December, compared with an opening price of CNY 48/mt on the first day of trading.

Experts say the price weakness results from ample CEA supplies, with the government opting to allocate emissions under a loose cap initially, rather than hold auctions.

Also, China's utility sector is dominated by state-owned enterprises, and each of them owns many power plants covered by the ETS. Consequently, there have been many intra-group trades that tend to drive down the price, thinktank SinoCarbon Innovation & Investment Analyst Zhibin Chen said.

Spillover effects



The voluntary carbon market for China Certified Emission Reductions (CCERs), generated from Beijing-sanctioned carbon offset projects, is also seeing increased liquidity due to demand from electricity generators.

Under the current ETS rules, 5% of the emissions quota can be met by CCERs, which are generally priced below CNY 40/mt.



"Many emitters prefer the use of cheaper offsets to fulfil their compliance requirements," said IHS Markit Research Analyst Xiaonan Feng.

Refinitiv estimated 39 million of CCERs changed hands in November, around two and a half times the total volume traded in October.

"I believe the national ETS will provide a major demand boost for CCERs. It is happening right now," Chen said.

Xiaolu Zhao, global climate change director of non-profit Environmental Defense Fund, expressed concern that the ETS currently allows the use of CCERs from all official projects regardless of decarbonization methods and timespans.

"We hope the Ministry of Ecology and Environment will release detailed rules soon to ensure high quality offset credits are encouraged to be used," Zhao said.

The Chinese central government has stopped approving new CCER projects since 2017, citing a need to enhance the regulatory framework.

This, coupled with the introduction of the ETS, has sharply reduced spot CCER availability, according to Lin. "After the [current] compliance phase ... there will be barely any spot CCER supply in the market. The government has to open CCER registration again in early 2022," she said.

There is speculation that Beijing will seek to harmonize the CCER regulation with international rules for carbon offset projects developed under the Paris Agreement's Article 6.4, which are due to be hammered out in UN Framework Convention on Climate Change meetings next year, and that China could create a domestic market for offsets from projects in Belt-and-Road countries.

But Feng said the government is unlikely to have a strong appetite for folding carbon credits from foreign offset projects into the national scheme. "The primary purpose of the ETS is to promote decarbonization domestically instead of elsewhere," she said.

With more Chinese firms setting voluntary emissions targets, demand for carbon offsets from companies outside of the ETS is also growing. Lin estimates annual CCER demand amounts to 200 million mt of CO₂e, including 150 million mt for compliance needs and 50 million mt for voluntary buyers.



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Lina Li, a senior manager specializing in carbon markets at Berlin-based thinktank adelphi, predicted that such Chinese buyers will prefer domestic offsets recognized by Chinese authorities to international voluntary credits such as Verified Carbon Units.

"Unless for some reasons like international public relations," Li said, then "some firms would be looking for more internationally recognized offsets."

More rigorous rules

While the companies covered by the ETS account for 40% of China's CO2 emissions, or nearly 4.4 billion mt/year, most of which are from coal-fired plants, experts believe the current rules are not designed to trigger large-scale decarbonization efforts.

For one, non-compliant firms currently only face a fine of up to CNY 30,000, even though Beijing is proposing to increase this threshold to CNY 500,000.

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[VIP ASSET] Chip shortage: Automakers' plan to ensure supply of chips and guide their design

Direct collaborations between automakers and chip manufacturers as a result of the semiconductor shortage



Source: Gettyimage/nasakid

Ford Motor took a step toward in addressing the chip shortage challenge in November, announcing a collaboration that will allow GlobalFoundries (GF) to increase supplies of semiconductors for Ford for its current vehicle lineup, as well as research and development (R&D) purposes. Ford already purchases chips from the company, but the new collaboration allows for more direct discussions, which could speed up manufacturing and purchasing. This is also an example of the OEMs working to avoid longer-term supply issues of the legacy nodes common to automotive.

Following nearly a year of supply chain issues, chip executives say automakers are looking for new ways to purchase parts and have more direct relationships with the semiconductor supply chain. To ensure consistent



chip supplies, the companies are now directly communicating with leading chip manufacturers, such as Taiwan Semiconductor Manufacturing Co, GF, and UMC. The direct OEM-foundry model, in which OEMs design their own chips, bypassing traditional design companies, and work directly with foundries, offers both opportunities and challenges.

This article discusses carmakers' supply chain engagement plans.

Automakers and tier-1 suppliers desire greater control over their chip supply

The importance of supply chain diversification has been highlighted by COVID-19, earthquakes, weather events, and fires. Specialization and geographic concentration, which have historically aided foundry success, are now at risk. As a result, capital expenditure and process technology development demand skyrocket. Leading foundry players, such as TSMC, Samsung, and GF, will compete for customers more aggressively than in the past.

For most of its history, the industry has relied on a distinct approach to buying car parts, procuring components from suppliers right at the moment they are needed. It is referred to as just-in-time (JIT) manufacturing and is designed to streamline production and eliminate the costs of keeping warehouses stocked with parts waiting to be used. However, the shortcomings of that system were made clear this year, as the automakers faced a lack of the chips and had little if any inventory to weather even short-term disruptions in their supply chains. That, coupled with greatly reducing semiconductor orders in response to the initial wave of COVID-19, pushed the automotive industry near the bottom of chipmakers' customer lists, leaving them with limited inventory in their supply chain. The JIT approach put the automotive industry in a precarious situation.

That shortage is threatening to cut USD110 billion in sales from the industry and forcing automakers to overhaul the way they get the electronic components that have become critical to the contemporary car design. The crisis has also forced auto executives to rethink their supply chain strategies and consider doing chip design in-house as computing and software become central to modern vehicles. The next section discusses how automotive CEOs plan to revamp their supply chain strategy.

A. Buy chips directly from foundry

In November, Ford CEO Jim Farley called the chip shortage "the biggest supply shock" he had ever seen and stated that the company would become more deeply involved in semiconductor production, dealing directly with chipmakers rather than relying on so-called tier-1 suppliers to act as middlemen.

Therefore, the automaker has announced a "strategic collaboration" with GF. "If everything progresses as we hope, Ford and GlobalFoundries will team up to grow the supply for Ford's current vehicle lineup, and also do R&D work together," said Chuck Gray, vice president of embedded software and controls for the Dearborn, Ford, plant.

Ford already uses GF's fabricated chips, but the crisis forced the two companies to speak directly and forge a closer relationship, according to Mike Hogan, the chipmaker's head of automotive.

Ford's Farley says he is now negotiating contracts directly with chipmakers—bypassing his traditional auto suppliers—while building up inventory of the precious pieces of silicon and even redesigning models to accommodate the semiconductor companies. The agreement is one of the first direct collaborations between a major automaker and a chip manufacturer as a result of the semiconductor shortage.



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Similarly, BMW Group has signed a direct agreement with semiconductor developer INOVA Semiconductors and GF, ensuring the supply of several million semiconductors per year. This agreement exemplifies the commitment to develop a more resilient supply chain partnership approach to rebalance supply and demand for chips in the automotive industry, as well as efforts to accelerate technological innovation.

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