



Automotive Industry Weekly Digest

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[Forecast & Analysis Highlights] Chinese new vehicle sales increase 3.8% in 2021 – CAAM

IHS Markit perspective

Implications China's auto sales returned to growth in 2021, ending a three-year streak of declines that began in 2018. The Chinese new vehicle market showed resilience during a difficult year marked by an unpredictable COVID-19 resurgence and a distressed automotive supply chain.

Outlook We expect China's auto market to maintain its growth momentum in the next two years, with light-vehicle production forecast to hit 24.08 million units this year, up 1.7%. China's light-vehicle production volume is expected to increase further to 27.05 million units in 2023, up 12.3%.



In 2021, China's new vehicle sales grew year on year (y/y) for the first time since 2017, despite uncertainties brought by the spread of new coronavirus disease 2019 (COVID-19) virus variants and tight semiconductor supplies.

According to data from the China Association of Automobile Manufacturers (CAAM), new vehicle sales increased 3.8% y/y to 26.275 million units during 2021, while production grew 3.4% y/y to 26.082 million units. In 2021, sales of passenger vehicles (PVs) increased 6.5% to 21.482 million units in China, while production of PVs rose by 7.1% y/y to 21.408 million units. Sales of commercial vehicles (CVs) were 4.793 million units in China in 2021, down 6.6% y/y, while production contracted 10.7% y/y to 4.674 million units. In December 2021, a total of 2.786 million new vehicles were sold in China, down 1.6% y/y. New vehicle production, however, increased 2.4% y/y to 2.907 million units in the same month. The CAAM's definition of PVs includes sedans, sport utility vehicles (SUVs), multi-purpose vehicles (MPVs), and minivans.

The Chinese new energy vehicle (NEV) market witnessed another year of strong growth in 2021, with sales of NEVs doubling from 2020 to reach a new record. Total sales of NEVs, which consist of battery electric vehicles (BEVs), plug-in hybrid electric vehicles (PHEVs), and fuel-cell vehicles (FCVs), surged 157.5% to 3.521 million units in 2021. Of this total, sales of passenger NEVs increased 167.5% to 3.334 million units, while sales of commercial NEVs grew by 54% y/y to 186,000 units. Sales of passenger BEVs, the biggest category of NEVs in China's market, increased 173.5% to 2.734 million units last year.

During 2021, China's new vehicle exports increased 101.1% to 2.015 million units, of which 310,000 units were NEVs. In December 2021, vehicle export volumes totalled 223,000 units, up 54% y/y, of which 18,000 units were NEVs.



Outlook and implications

China's auto sales returned to growth in 2021, ending a three-year streak of declines that began in 2018. The Chinese new vehicle market showed resilience during a difficult year marked by an unpredictable COVID-19 resurgence and a distressed automotive supply chain.

In the final month of 2021, PV sales and production volumes grew y/y in part thanks to improved semiconductor supplies. Automakers' effort to adjust their production schedules to prioritise best-selling models and funnel available microchips to high-margin models helped dealers to fulfil orders and clear backlogs. As a result of tight semiconductor supplies, vehicle buyers are faced with longer waiting time to pick up their new cars, as well as limited choices in model selection. The recent resurgence of COVID-19 virus in cities such as Xi'an, Tianjin, and Xuchang has added uncertainties to the market's recovery in the first quarter of 2022. Despite such constraints, China's local OEMs have managed to increase their market share. According to the CAAM, Chinese brands' market share reached 44% last year, up 6 percentage points. Local OEMs also benefited most from China's push to widen NEV adoption last year thanks to their strong presence in the NEV market and their ability to adapt quickly to changing consumer demand. BYD, for instance, saw its sales surge 73% to 740,131 units during 2021, from 426,972 units in 2020, thanks to its move to roll out its new-generation plug-in hybrid technology, the DM-i technology, across its PHEV lineup. Great Wall Motor also ramped up its EV production with sub-compact, entry-level models under the Ora brand. The rise of Chinese brands will continue to exert enormous pressure on international OEMs, especially automakers competing in the standard-price vehicle segment.

The NEV market in China rallied again in 2021, hitting a new sales record. The country's transition to electrification is set to accelerate in the next few years, making China a leader in the world's transition to zero-emission transportation. According to IHS Markit's latest forecasts, production volumes of BEVs in China are expected to hit over 4.5 million units in 2023, accounting for half of global BEV output. The market's shift towards EVs is driven by the increased availability of appealing models rather than government subsidies. NEV subsidies will no longer be granted to NEV vehicle buyers from the beginning of 2023 and we expect cities such as Shanghai to withdraw some of their preferential policies on PHEVs from 2023 to shift their focus on to BEVs.

We expect China's auto market to maintain its growth momentum in the next two years, with light-vehicle production forecast to hit 24.08 million units this year, up 1.7%. China's light-vehicle production volume is expected to increase further to 27.05 million units in 2023, up 12.3%.

[Forecast & Analysis Highlights] Ford reports 3.7% sales growth in Greater China during 2021

Ford has reported its sales in Greater China increased by 3.7% year on year (y/y) to 624,000 units in 2021. The volume primarily comprises sales in mainland China and Taiwan. The automaker's passenger vehicle sales fell by 1.4% y/y to 237,000 units in 2021, with sport utility vehicle (SUV) sales totalling 140,000 units, up 0.6% y/y. Ford said its sedan models are gaining traction in the region as well. Sales of the Ford Mondeo increased by 34.1% y/y to 34,000 units last year, while sales of the Ford Taurus edged up by 13.5% y/y to 8,000 units. Sales of Ford and JMC-branded commercial vehicles decreased by 1.8% y/y to 264,000 units in 2021. Of this total, sales of the Transit increased by 1.4% y/y to 51,000 units, while sales of JMC-branded commercial vehicles went down



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by 2.2% y/y to 211,000 units. Lincoln achieved record sales in the region last year thanks to growing demand for the Corsair. Total sales of the Lincoln brand reached more than 91,000 units, up 48.3% y/y. “Ford starts 2022 with strong momentum from the execution of our China 2.0 plans centered on a robust portfolio and electrification,” said Chen Anning CEO of Ford China. “The steady rollout of new vehicles – including the locally built Ford Mustang Mach-E, Ford EVOS and Lincoln Zephyr – combined with the launch of Ford’s network of direct-to-customer battery electric vehicle stores positions us well for growth ahead.”



Outlook and implications

Ford posted a moderate gain last year in the Greater China region thanks to its strengthened product portfolio in the passenger vehicle market. Mainland China is Ford's largest sales market in the region, as well as its main production location in the region. Lincoln's SUV models, including the Corsair and Aviator, have helped the brand to attract SUV buyers in the Chinese market. In the premium sedan market, Lincoln will soon begin deliveries of its Zephyr sedan in mainland China. The model is set to help reposition Lincoln in the mid-sedan market of mainland China. Because of strong consumer demand for premium battery electric vehicle (BEVs), Ford is expected to begin production of several Lincoln BEVs in mainland China in the next three years under partnership with Chongqing Changan Automobile Company, including the fully electric version of the Corsair. Under the Ford China 2.0 strategy, Ford has directed more resources to support local research-and-development activities in mainland China. The Ford EVOS, for instance, is a vehicle Ford developed primarily for the mainland China market and the automaker said the development of the local version of the Mustang Mach-E incorporated input from its engineering team in Nanjing.



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[EV & Energy Efficiency Highlights] Chinese EV start-up Niotron unveils first model NV

Chinese electric vehicle (EV) start-up Niotron revealed the images of its first model, the NV, on 12 January. The model, a larger sport utility vehicle, measures 4,915 mm long, 1,950 mm wide, and 1,750 mm tall with a wheelbase spanning 2,900 mm. Two variants, a battery electric model and an extended-range EV (EREV), will be made available in the Chinese market. The model will have a four-wheel drive as standard, enabling it to accelerate from still to 100km/h in 5.9 seconds. Reservations for the NV will begin in the first half of the year, with mass market deliveries slated to kick off in China in September.



Outlook and implications

Niotron launched its auto brand Niotron on 15 December 2021. The company was founded by Li Yinan, the founder of electric scooter company, Niu Technology. According to local media reports, Niotron has secured an investment of USD500 million in the A round financing, which will help the company progress with its vehicle launch plan. Production of the NV will take place at Niotron's plant in Changzhou, Jiangsu province.

[EV & Energy Efficiency Highlights] South Korea and Saudi Arabia sign multiple business deals to jointly develop hydrogen economy

South Korean President Moon Jae-in held talks with Saudi Arabia's Crown Prince Mohammed bin Salman to co-operate on fields including hydrogen. During the talks, the two leaders have agreed to build a hydrogen ecosystem where Saudi Arabia will supply carbon-neutral hydrogen and ammonia while South Korea will support the Arab nation in operating hydrogen-powered cars and hydrogen facilities such as fuelling stations. Moon also confirmed that the two nations have expanded co-operation beyond construction, infrastructure and energy by signing 14 preliminary agreements on areas of manufacturing, energy and public health as well as hydrogen, reports The Korea Herald.





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Outlook and implications

The latest development is in line with the South Korean government's aim to improve air quality in the country by bringing down particulate levels, increasing the adoption of alternative-powertrain vehicles, fostering hydrogen-related businesses as future growth drivers, and reducing the country's heavy reliance on imported oil. South Korea is one of Saudi Arabia's key strategic partners for its Vision 2030 policy, under which the country aims to reduce its reliance on oil and develop its public service sector. Saudi Arabia plans to increase hydrogen production to 400 tonnes per year by 2030, to achieve carbon neutrality by 2060.



[OEM Highlights] BMW outsells Audi and Mercedes-Benz in China during 2021

Audi, Mercedes-Benz, and BMW have announced their delivery results for 2021 for the Chinese market. BMW Group has posted a new sales record last year in China with 846,237 units of BMW- and Mini-branded vehicles delivered to customers, up by 8.9% year on year (y/y). Combined deliveries of BMW and Mini vehicles in China fell by 18.9% y/y in the fourth quarter of 2021 on a shortage of semiconductors. In a separate statement, Mercedes-Benz said that deliveries of its passenger vehicles decreased by 2% y/y in China to 758,863 units last year and that its fourth-quarter-2021 deliveries contracted by 18.6% y/y to 166,660 units. Audi, which lagged its counterparts in vehicle deliveries last year, saw its sales in the market decline by 3.6% y/y to 701,289 units. It attributed the decline to the semiconductor shortage, which the automaker said dragged its pace to deliver locally made models to customers. Figures for the fourth quarter of 2021, however, were not published by Audi in its 2021 sales report.



Outlook and implications

BMW continued to outsell Audi and Mercedes-Benz in the Chinese market despite disruptions from the ongoing global semiconductor shortage. The automaker already took the leadership position in China's premium vehicle market in 2020 with 777,379 units of BMW and Mini vehicles delivered. BMW is well poised to carry this growth momentum through 2022 with the launch of several new models, including the fully electric version of the 3-Series and the long-wheelbase version of the X5. Looking into 2022, rising demand for premium electric vehicles (EVs) in the Chinese market presents fresh opportunities to the three German premium carmakers, especially in the upper-end of the premium vehicle market where local brands lack presence. Mercedes-Benz in December 2021 began to take reservations for its electric flagship model, the EQS, in China. The market already shows strong appetite for the brand's ultra-luxury model, the S-Class, which is powered by an internal combustion engine. According to Mercedes-Benz, 36% of the S-Class vehicles were sold in China in 2021.

[OEM Highlights] BYD secures bid for lithium extraction project in Chile

Chinese automaker BYD has secured a bid for an extraction of up to 80,000 tons of metallic lithium in Chile, reports Green Car Congress. The contract was awarded to two companies – BYD with a bid of USD61 million and Chile's Servicios y Operaciones Mineras del Norte with a bid of USD60 million. The two winners can now explore, study, and develop a lithium project over the course of seven years, with a possible two-year extension. They will then have 20 years to produce the set amount of lithium.



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Outlook and implications

Lithium is an important element for production of batteries for electrified vehicles. Securing a robust supply of lithium is crucial to ensure uninterrupted production of batteries. This will enable BYD to fulfil its existing battery supply contracts with different automakers, along with fulfilling the requirement of batteries for its own new-energy vehicles.



[Technology & Mobility Highlights] CATL introduces battery-swapping service for EVs

IHS Markit perspective

Implications Chinese battery manufacturer CATL has launched its battery-swapping service brand, EVOGO, in China.

Outlook Chinese regulators' intention to expand battery-swapping infrastructure in China has played a key role in attracting new investment to the field. In November 2021, the Ministry of Industry and Information Technology (MIIT) put forward 11 cities in China to run a pilot programme, including Beijing, Wuhan, Nanjing, and Chongqing.



Photo by Shutterstock

Chinese battery manufacturer CATL has launched its battery-swapping service brand, EVOGO, in China. Through its wholly owned subsidiary, Contemporary Amperex Energy Service Technology (CAES), CATL says that it will soon begin to provide battery-swapping services in 10 cities in China under this new brand. The battery manufacturer demonstrated its battery-swapping solution at an online launch event and provided technical details regarding the design of its battery blocks, battery-swapping station, and service app. According to electrive, the battery block, which CATL is calling 'Choco-SEB', has adopted the company's cell-to-pack technology, in which the cells are integrated directly into the battery pack. "SEB stands for Swapping Electric Block and 'Choco' is meant to refer to the SEB's appearance, which is meant to resemble a bar of chocolate," said electrive. Thanks to the cell-to-pack technology, each of the Choco-SEB blocks can provide high energy density in a compact size. The battery block's energy density is said to be 160 Wh/kg and each of the battery blocks can provide a range of 200 kilometres. According to CnEVPost, CATL says that its battery-swapping service can be adapted to 80% of the world's vehicles already on the market and those due to be launched in the next three years on pure electric platforms. The battery manufacturer also showcased its battery-swapping station at the EVOGO brand launch. The battery-swapping station occupies only three parking spaces and takes approximately one minute to change a single battery block. CATL has also announced that the Bestune NAT, a model from the FAW Group, will be the first model to feature its battery-swapping system. However, the battery manufacturer has not provided any details about the Bestune NAT at this stage.

Outlook and implications

CATL is the latest of an array of companies to announce plans to support the roll-out of EV battery-swapping stations in China. The field of battery swapping has attracted growing interest from both Chinese and foreign players in the past two years. In November 2021, British oil giant BP signed a deal with China's Aulton New



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Energy Automotive Technology (Aulton) to provide battery-swapping services in Guangzhou, Guangdong province, while Geely has also said that it will introduce a battery-swapping service brand this year. The latter has today (19 January) unveiled its first model featuring its latest battery-swapping technology, the Maple 60 S. Under its joint venture with Lifan Technology, Geely aims to launch five battery electric vehicles featuring swappable batteries by 2025 and plans to build 5,000 battery-swapping stations across China by 2025. According to China Daily, there are around 160,000 battery-swap vehicles—mainly used in the taxi, logistics, and rental sectors – and nearly 900 battery-swapping stations in China. Aulton and Chinese EV startup NIO are the two largest battery-swapping station operators in the country. Chinese regulators' intention to expand battery-swapping infrastructure in China has played a key role in attracting new investment to the field. In November 2021, the MIIT put forward 11 cities in China to run a pilot programme, including Beijing, Wuhan, Nanjing, and Chongqing. The programme is expected to promote the creation of more than 100,000 vehicles with swappable batteries and more than 1,000 battery-swapping stations within two years in the selected cities.

[Technology & Mobility Highlights] Buick rolls out OTA update to enhance driver-assistance system on GL8 in China

Buick has announced that it will launch an over-the-air (OTA) update for the Buick GL8 Avenir and ES variants in China. The upgrade will make features such as instructed lane changing available on the GL8. In addition, the upgrade will optimise lane-centring control and traffic-jam assistance on the model. The OTA update is to be pushed out automatically to applicable GL8 variants. The automaker said it will take about five minutes for customers to complete the update.



Outlook and implications

The automaker says the OTA update will allow owners of the GL8 Avenir and ES access to Buick's instructed lane-changing function and it will optimise several functions in Buick's advanced driver-assistance system (ADAS) suite, the Buick eCruise Pro. According to the automaker, the new features will allow the vehicle to change lane automatically if the turn signal is activated. When lane changing cannot be executed safely, signals and messages will be displayed on the instrument cluster to inform the driver.



[Supplier Highlight] IRP Systems partners Bosch to mass produce motor controllers for EVs

The industrialization and manufacturing of IRP's products will be led by Bosch Electronic Manufacturing Services (EMS) business unit



Source: Getty Images Plus/metamorworks

Israel-based supplier of electric vehicle powertrain solutions IRP Systems has signed a strategic agreement with one of the largest automotive suppliers Bosch for the industrialization and serial manufacturing of former's electric motor controllers, the company said on 18 January 2022.

The company said that the partnership brings together Bosch's globally know-how in automotive manufacturing and IRP's innovative e-powertrain technology to deliver top quality, robust and affordable controllers for a variety of personal mobility OEMs in Europe and worldwide. IRP Systems looks to cater to the requirements of EV makers engaged in manufacturing electric quadricycles, three- and two-wheelers.

"High quality powertrain solutions are key to the accelerated adoption of personal mobility. Leveraging unique control algorithms and electronics design, IRP's TrueDrive Dynamic controllers offer an outstanding 'in-control' driving experience, superior performance, reliability and efficiency, advanced functionality, and extensive customization options," it said in a note on Tuesday, adding that Bosch integrates all the industrial constraints of manufacturing and testing right from the design stages by offering a DfX (Design for eXcellence) service.

Outlook and implications

According to the company, the industrialization and manufacturing of IRP's products will be led by Bosch Electronic Manufacturing Services (EMS) business unit, which is headquartered in Mondeville, France. Notably, EMS, which was established in 2020, supports customers from small to large series in the automotive, industrial, health, energy, networks, and aerospace markets.

"We are thrilled to collaborate with a market leader such as Bosch on the industrialization of our products. This collaboration will help IRP to serve our European customers much better, with local manufacturing and superior supply safety. It will also enable us to significantly enhance our delivery capacity in order to accommodate the growing demand in our products worldwide," said Moran Price, IRP Systems cofounder and CEO.

"For more than a century, no automobile has been built without at least one Bosch part," said Claude Alemany, head of Bosch EMS and Mondeville plant general manager. "This collaboration, spear headed by the Bosch Israel team, enables Bosch to take part in complementary e-mobility markets and strengthen its position as a key



player in the electronic manufacturing sector. This kind of collaborative effort is a good example for how Bosch's expertise can be decisively beneficial to innovative companies that are looking to scale up their offering."

"The value proposition of Bosch EMS for the Israeli ecosystem is substantive," added Tal Dekel, Open Innovation manager at Robert Bosch Technologies Israel. "Making Bosch's design and manufacturing capabilities, as well as our logistics competences available to companies that are in growth will allow them the secure delivery of high-end innovative products."

[Supplier Highlight] Dow to showcase innovative and sustainable technological solutions at Automotive World 2022

New solutions showcased will enable growth of sustainable materials and components for mission critical systems



Source: Getty/vkyryl

Dow to showcasing a suite of innovative technologies tailored for the sustainable development of auto sector at Automotive World 2022, to be held at Tokyo Big Sight from 19 to 21 January, according to a press release by Yahoo. Automotive World 2022 combines various industry leading conferences and exhibits featuring important topics in the automotive industry.

Patrick McLeod, chairman and CEO of Dow Toray Co. Ltd., global director of Geographic Development of Dow Consumer Solutions, said, "We are incredibly proud to be highlighting our solutions for customers at Automotive World 2022, one of the world's leading exhibitions for advanced automotive technologies. With 100 years of experience in the transportation industry, Dow continues to refine and expand our product portfolio to support customers' transformation toward EV and AV—providing greater reliability, safety and performance. By working together with our customers here in Japan—a key global hub for mobility solutions—we are helping them to meet their goals with new solutions that also offer enhanced sustainability."

Outlook and implications

Dow's highlight at the Automotive World 2022 includes the company's material science expertise for vehicle electrification, serving as the official materials science partner of Jaguar TCS Racing. Other exhibits at the expo include advanced driver assistance systems (ADAS) materials for electronic control units (ECUs) products for batteries and power electronics to regulate thermal, adhesion, sealing to achieve reliable protection and shielding properties, automotive lighting solutions to help enable safer driving conditions along with materials used in other business verticals.



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On showcase for ECU and battery solutions, DOWSIL EC-6601 Electrically Conductive Adhesive next-generation material developed for reliable performance and electromagnetic compatibility (EMC) can be used in various transportation, communications and consumer electronics applications. For ECU and ADAS heat control, Dow will display the company's DOWSIL TC-45XX CV series of silicone thermal conductive gap fillers entail levels of thermal conductivity to regulate operating temperatures offering reliable cooling solutions for engine or transmission control unit (TCU) by leveraging DOWSIL TC-4515 CV, DOWSIL TC-4525 CV and DOWSIL TC-4535 CV, part of DOWSIL TC-45XX CV.

Dow's interior solution portfolio includes new DOWSIL EA-4700 CV adhesive silicon solution that eliminates heat cures with fast drying characters utilized for growing automotive interior substrates with properties allowing the adhesive to bond quickly to traditional metals and plastics such as, aluminum, polybutylene terephthalate (PBT), and polyphenylene sulfide (PPS).



[VIP ASSET] EV production shifts by 2030 to follow consumer needs and OEM investment



Photo by Stephanie Brinley/IHS Markit

Key findings

- The automotive industry's transition to electric vehicles (EVs) is accelerating with an increased emphasis on electric powertrains as a result of commitments globally to wide-ranging policy changes, as well as automakers' EV investment announcements, which continued in 2021.
- Although massive strides are expected to be made by 2030, there will remain a long way to go in the transition to EVs. Assessments of expected changes up to 2030 help to provide an understanding of how the industry is likely to develop, but the key players and perhaps key production regions may shift again between 2030 and 2040.
- Global EV production is likely to be concentrated among the top automakers by 2030: these are expected to account for 76% of EV production but represent only 10% of all EV producers. However, change is coming in terms of which companies will be the top automakers.
- EV availability is expected to be more widely distributed across vehicle size segments by 2030 as EVs evolve to meet consumer needs.

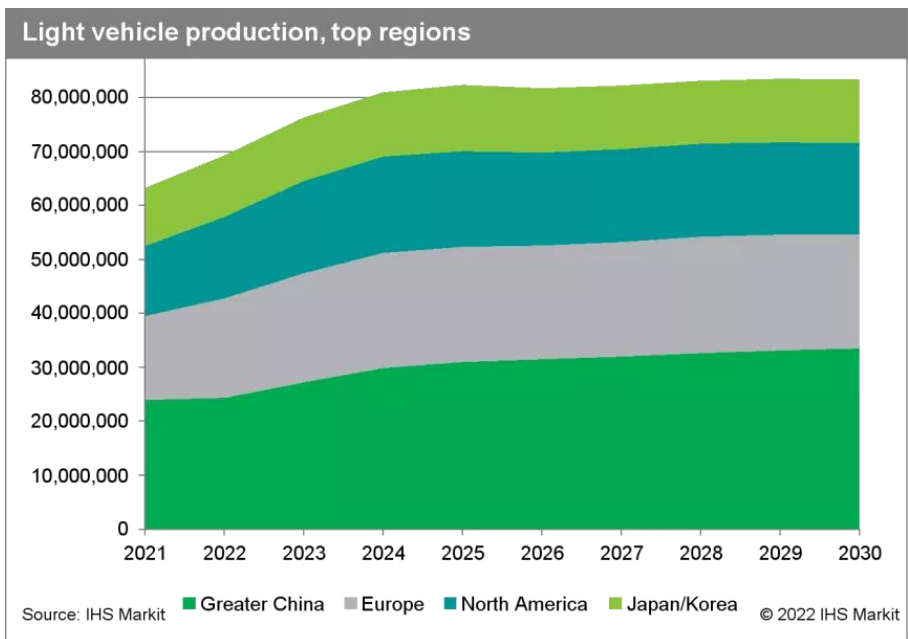
In 2021, several automakers strengthened their commitment to the auto industry's shift to electric vehicles (EVs), encouraged by increasing pledges from governments and businesses globally to achieve carbon neutrality. They were also encouraged by national commitments to the goals of the 2015 Paris Agreement and the enhanced commitments made at the 2021 United Nations Climate Change Conference (COP26) in Glasgow. In this report, IHS Markit looks at how these new commitments and changes in the auto industry as well as the global dynamic have – or have not – changed expectations on a potential transition to battery electric vehicles (BEVs) as the dominant propulsion system. Similar to a 2017 report, we look at how we forecast the positions of the top automakers in the EV space and the changes within vehicle segments and the potential pace of EV adoption. In this report, we compare our expectations for 2021 (based on the December light-vehicle production and sales forecasts) with our expectations for 2030.

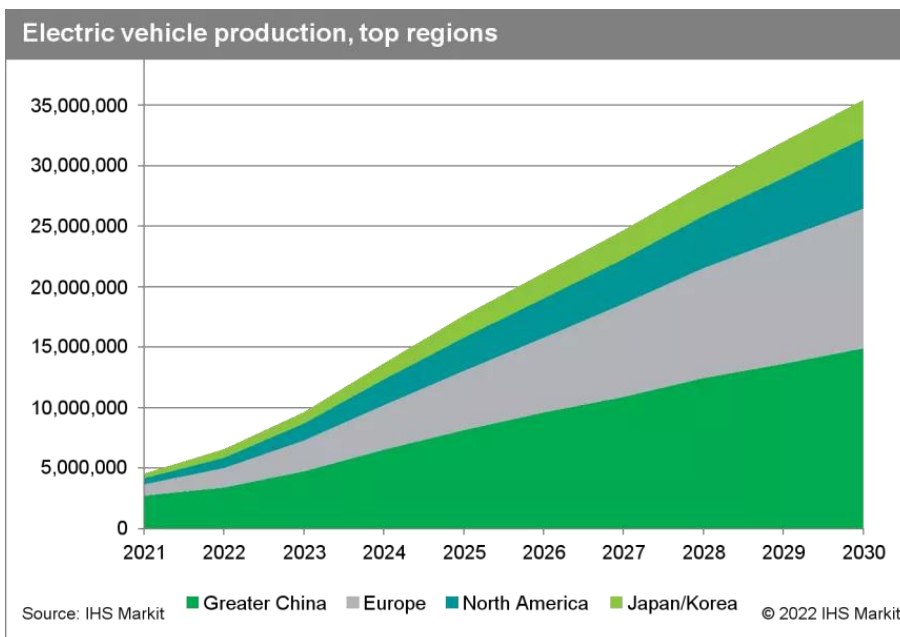
Where will EVs be produced?



We have explored developments regarding the location of EV production in previous reports. Despite the increasing number of announcements from OEMs on manufacturing investment and increasing planned production volumes, there has not been a dramatic change in where EV production will be concentrated. The primary reason why increased investment is not changing the location of EV manufacturing is that production is concentrated in areas where light-vehicle markets are largest. It is also down to the generally slower EV adoption in the US market compared with the regulatory-driven advancement of EV adoption in China. Although there have been several announcements regarding EV production in North America in recent months, some of these lack clarity and detail, and the investments will affect production more significantly from 2027. Although some plants are due to come on line between 2024 and 2026, we assess a potentially slow ramp-up to the planned production capacity. In addition, some announcements have merely indicated an intent to add EV manufacturing in a region, without specifying the plant or the timeline.

In terms of global output, the dominance of production in the Greater China region is unchanged at the top line. In 2021, more light vehicles were produced in that region overall, while the area also recorded the highest number of EVs produced. The top three regions (Greater China, Europe, and North America) produce about 70% of all light vehicles. As production of EVs is just beginning to blossom (vehicles with electric propulsion systems made up about 6% of 2021 light-vehicle production), 91% of such vehicles were produced in one of these three regions. Greater China accounted for 58% of EV production in 2021, followed by Europe with 20% and North America with nearly 12%. In 2030, we forecast that EV production will account for about 36% of global light-vehicle production, with 87% of that concentrated in the three top regions. Particularly in this phase of EV expansion and adoption, the increase in EV production will take place in high-volume production areas first. The fourth-largest region will be Japan/South Korea, reaching 8.9% of global EV production in 2030, as Toyota and Hyundai in particular increase their EV efforts.





Although North America, and the United States in particular, remains a highly coveted market, in terms of EV production it will continue to lag behind Greater China and Europe, as it also does for overall light-vehicle production. In 2030, we forecast that EV production in North America will account for about 15.5% of total global EV production, up from 11.8% in 2021. By comparison, the region is forecast to account for 16.5% of overall global light-vehicle production in the same year. We forecast that EV production in Europe will grow from 20.5% of global EV output in 2021 to 31% in 2030. With Europe and North America increasing their production of EVs, EV production in Greater China will drop from 58% of global EV output in 2021 to 40% in 2030. However, production is growing dramatically in all regions and behind these percentages is strong volume growth. In 2030, we forecast that Greater China will be home to production of 14.9 million EVs, Europe 11.6 million, and North America 5.8 million units.

Top 10 EV automakers: Who's who in 2030?

The participants making up the top 10 EV manufacturers in 2021 look notably different from the expected top 10 for 2030. In 2021, several Chinese automakers were on the top 10 list, but as time goes on the outlook is for larger traditional automakers to dominate the list. In 2021, the top EV producers included BYD, the SAIC-General Motors (GM) joint venture (JV), Great Wall, SAIC, GAIG, and Changan. These will be replaced by GM, Ford, and Toyota. Automakers at the top in both 2021 and 2030 include Volkswagen (VW), the Renault-Nissan-Mitsubishi Alliance, Hyundai, Daimler, Stellantis, and Geely. In addition, the overall number of automakers producing EVs will increase between 2021 and 2030, from 74 to 89. The top 12 EV manufacturers are forecast to produce nearly 80% of all EVs in 2030, compared with 75% in 2021. Although volume increases are dependent on the new and established players increasing EV output, the general effect will remain that the top dozen EV manufacturers will account for most production. In 2030, the output of the top 12 EV producers will average 2.5 million units, while the output of the smaller 77 automakers will average about 99,000 units per automaker. This is similar to what we expect for total light-vehicle production, although for EVs we are looking at reduced scale. In terms of total light-vehicle production, the top 12 automakers account for a fairly consistent 77% of the total, and only 10% of the number of automakers. In 2030, we forecast that the top 12 light-vehicle EV manufacturers will account for nearly 79 million units of production (or about 6.6 million units each), with the remaining automakers averaging about



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231,000 units each. Certainly, actual automaker output does not fall into averages this easily, but the data describe the increasing, and intense, competition being created in this first EV transitional stage.

Top 10 EV automakers, 2021

	2021	% of 2021 total
Tesla	898,103	19.4
Volkswagen	427,078	9.2
SAIC-General Motors-Wuling	426,659	9.2
Renault-Nissan-Mitsubishi	368,794	8.0
BYD	301,813	6.5
Hyundai	254,049	5.5
Stellantis	220,480	4.8
Great Wall	130,782	2.8
SAIC	122,409	2.6
GAIG	115,901	2.5

Source IHS Markit, December 2021 forecast release

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[VIP ASSET] Fuel for Thought – January 2022 – Consumer Electronics Show Recap (2022)



This year's CES was certainly unusual, between the numerous exhibitors "going virtual" at the last minute and the sheer variety of announcements that transpired. Yet mobility topics were front and center, with companies highlighting some of the innovations consumers will see in six months, and possibly even some they will see in six years.

Electrification continued as a central theme among the products, concepts, and innovations the industry showed this year. Starting off, Mercedes-Benz unveiled the VISION EQXX Concept. It is of course electric, but the main point was its efficiency. It is estimated to get 648 miles on a single charge, but that is not from a massive battery. It is from an efficient powertrain that is capable of more than 6 miles per kWh (roughly double the efficiency of the best EVs on the market today) coupled with a coefficient of drag (Cd) of 0.17 and a solar panel rooftop. The vehicle presents a "vision" of what the competition will be in the future. It will no longer just be about electrification, but about how one uses the electrons they have on-board.

Next came debuts from General Motors (GM) and BMW, both bringing production-ready EVs to CES. GM used CES to show the upcoming 2024 Chevrolet Silverado EV. It offers some 400 miles of range, DC fast charging up to 350 kW, and 10,000 lbs towing capacity to make a serious contender defending GM's market share, as full-size pickups transition to electric drive in the near future. Coupled with other innovative features, such as a 17-inch free-form display, the capability to provide up to 10.2 kW of power to auxiliary devices, and a rather nifty multifunction tailgate and cargo area, and it will stand out from the Silverado internal combustion engine (ICE) counterparts.



BMW, meanwhile, showed its iX M60, which will hit production lines soon, and illustrated a much more performance and excitement-oriented approach to electrification. With 610 hp, 811 lb-ft of torque, and 280 miles range, the iX will fit nicely among the competition from Mercedes and Audi on the market already. Plus, BMW used its new EV to showcase some interesting technologies - namely a concept exterior using E-ink displays that allows the vehicle to shift from black to white, and any shade of grey in between. While some see it as a party-trick, BMW is experimenting with how a color-changing exterior might help if a vehicle is lost in a parking lot, trying to communicate with pedestrians, or optimizing solar heating conditions in warm or cold environments.

More electrification came from myriad start-ups, most notably VinFast, who showed its VF8 and VF9 EV crossovers on the world stage. While the specs were competitive, it was its sales and marketing strategy that



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caught the most attention. VinFast has priced its VF8 and VF9 at US\$41,000 and US\$56,000, respectively, and has opened them up for reservations. Interestingly, according to the company, reservation holders who make a deposit of USD200 today will receive many benefits for being an early reservation holder. They will get a USD3,000 or USD5,000 credit toward the purchase of a VF8 or VF9, in addition to a free mobile charger, access to the ADAS and connectivity services packages for life, a seven-day vacation in Vietnam, and the company will plant a tree. Is this what it takes to attract customers today in the EV marketplace?

While not technically a start-up, Sony used CES 2022 to debut its Vision-S 02 concept SUV, to follow on the original Vision-S sedan it showed in 2020. It will integrate countless Sony technologies from CMOS sensors, 5G connectivity, integrated video services, 360° audio, gaming experiences, and more. However, the more notable news is that Sony has officially founded Sony Mobility Inc. to explore the commercial launch of Sony's EVs to global markets. This marks yet another example of a technology firm jumping into mobility with an electric offering.

Electrification was next presented as an answer to everything commercial, especially in logistics and last-mile delivery. While Doosan Bobcat debuted an electric skid steer, it was the announcements from GM again that made the biggest news. BrightDrop—an entity of just over a year old—went from a concept and idea to production and deliveries in record time. However, at CES 2022, it brought its commercial customers FedEx and Walmart in to discuss their needs for electrification. FedEx has received 5 EV600s to date and has another 2,000 on order and potentially another 20,000 on top of that. Meanwhile, Walmart has 5,000 EV600s reserved, as it expects to bring its in-house last-mile delivery to 30 million households by the end of 2022.

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