



German Passenger Car

Production and Sales Review and Outlook

德国乘用车产销回顾与展望

Overview of Passenger Car Production and Sales in Major European Countries

In 2021, 16.33 million units of cars were produced in major European countries, down 3.6% from the same period of 2020 and the European automotive industry continued to be affected by multiple factors such as the continuation of the epidemic and the lack of automotive chips, resulting in a stagnant supply of parts and components, which hindered the assembly and sales of complete vehicles and continued the recession in the second half of 2020. The main reason for the decrease in the number of automobile production was the slowdown of the production of Southern European countries, and the decline of 6.7% in Western European countries compared with the same period of the previous year. **As observed from the major automobile producing countries, 8.013 million passenger cars were produced in major Western European countries in 2021, including 3.096 million passenger cars in Germany (11.9% reduction), 1.662 million passenger cars in Spain (7.7% reduction), 918,000 passenger cars in France (1.1% reduction), 860,000 passenger cars in the United Kingdom (6.6% decline), and 442,000 passenger cars in Italy (2.2% reduction).**

The European automotive industry is suffering from high inflation and supply chain problems. In June 2021, the sales of passenger cars fell to the lowest since 1996. Sales in some car manufacturers plummeted by nearly half. The data from the European Automobile Manufacturers Association (ACEA) show that the sales of passenger cars in Eurozone fell 17.1% to 1.07 million units in June, and in the same month, the sales of passenger cars in EU fell 15.4% to 886,000 units. The four major automotive markets in the European Union, including Spain, Italy, Germany and France, all showed a decline in the sales of passenger cars. In 2021, the sales of passenger cars in Germany fell by 18.1%, Italy by 15%, France by 14.2% and Spain by 7.8%.

According to the observation of automobile manufacturers, German VW was the hardest hit, with sales falling by nearly 25.2% year-on-year in June. Stellantis posted the biggest decline in the first half of 2021, with sales falling by 21.1%. Volvo's sales fell 47.9% in June and 28.5% in the first half of the year. Jaguar sales fell 13.2% in June and fell 34.7% in the first half of the year. Hyundai increased by 11.5% to 470,000 units. Japanese Toyota decreased by 4.9% to 320,000 units, ranking sixth in the market share, Nissan decreased by 14.3%, Mazda decreased by 20.5%, and Honda increased by 11.7%. In addition to inflation and supply chain problems, the recovery of the epidemic in some countries, coupled with the shortage of chips, continues to plague the European automotive industry, and the sales of cars have fallen for 12 months consecutively.

Although car manufacturers such as VW and Mercedes-Benz have said that the semiconductor shortage is gradually easing, they need to slowly increase production, and they are also adjusting and increasing car prices in response to soaring raw material and energy costs. Market research firm, LMC Automotive, predicts that the automotive industry may not be able to overcome supply constraints in the short term. With the worsening economic outlook, demand for cars has weakened in recent months, and there are growing concerns that German factories may close due to energy shortages, dragging down the main supply chain. The manufacturers have chosen to increase prices and focus on selling higher-priced cars to make up for lost sales, a strategy that may be limited as inflation rises and consumers cut back on spending.

On the other hand, the German Automotive Industry Association (VDA) announced that the sales of global new cars of German automakers in the first half of 2022 would decrease by 13.7% in Europe, but increase by 3.7% to 1.02 million units in China and by 15.9% to 1.83 million units in India. **Due to the strong demand and a good parts supply chain system, German automakers' sales in China and India are growing.** **Figure 1** shows the comparison of production and sales of passenger cars in major European countries.



European Electric Vehicle Market Overview ▼

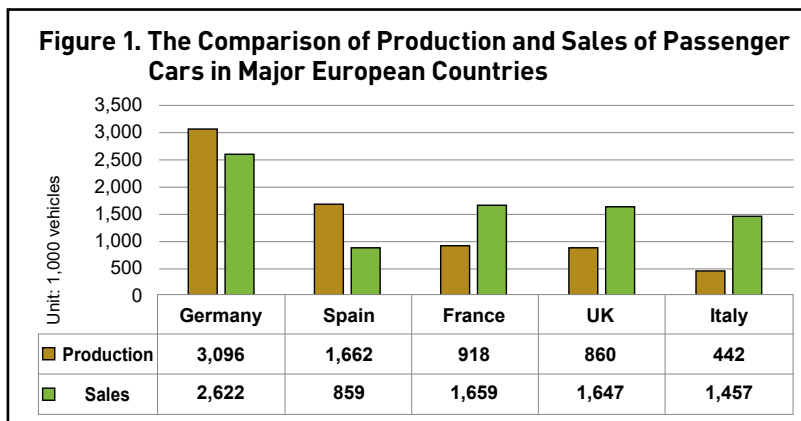
The sales of electric vehicles in Europe grew 31% in the first half of 2022. The European passenger car market continues to experience difficult times, as the latest figures released by JATO Dynamics show that the number of passenger car registrations fell by 14% compared to the same period in 2021, with 5.54 million units sold in 27 European countries. Avoiding further declines is largely dependent on the performance of sport utility vehicles (SUV) and electric vehicles, and the number of sport utility vehicles (SUV) fell only slightly by 4% over the same period, accounting for nearly 50% of the total number of registrations. Electric vehicles increased from 485,000 units in the first half of 2021 to more than 633,000 units in the first half of 2022, which increased 31%. Pure electric vehicles (BEVs) accounted for 11.4% of the total market, 4.0% higher than the market share in 2021.

The growth in BEV demand has not benefited all automakers. For example, Tesla, which had a significant lead in the market, continues to sell more registered vehicles, but its growth is lagging behind the overall market. The market share of Tesla declined from 13.8% in the first half of 2021 to 13.3% in the first half of 2022.

In addition to competition from other brands, the Model 3, which used to be the best-selling model, has also become a major influence in dividing up the Model 3 with the start of deliveries of the same brand, the Model Y, which is in fact the most-registered electric vehicle in Europe in the first half of 2022. The VW Group, with its multi-brand strength, is the top-ranked company in Europe in terms of overall sales of pure electric vehicles, but overall sales are down significantly. BMW, on the other hand, is the fastest-growing pure electric vehicle manufacturer, with a market share of 8.4% in 2022, up from 5.8% in the first half of 2021, with the iX, iX3 and i4 models launched earlier in the year receiving strong consumer response.

The Hyundai Group is also growing faster than other car manufacturers, thanks to the excellent results of the Hyundai Ioniq 5 and Kia EV6, as well as the steady sales of the Hyundai Kona and Kia Niro, which have established the Hyundai Group as an attractive and strong electric vehicle manufacturer. Stellantis also strengthened its position as the second largest BEV seller in Europe during this period, second only to VW Group in terms of overall sales, thanks to the outstanding performance of the Fiat 500e, and the third largest pure EV vendor in Europe in terms of number of registrations.

Europe is one of the world's major markets for vehicle electrification. Data show that in July 2022 European electric vehicle sales fell 4.9% from a year earlier to 157,694 units, but on the positive side, the market share of electric vehicles is still relatively high, reaching 29.1%. Sales of pure EVs grew 19% year-over-year to around 91,000 units, accounting for 11.3% of the market, while sales of plug-in hybrid vehicles declined 25.1% year-over-year to around 66,000 units, accounting for 8.6% of the market.



Source: OICA; Industrial Technology Research Institute (ITRI) (2022/12)

In terms of sales volume, Germany, the U.K., Italy and Norway all saw a decline in EV sales in July 2022 compared to the same period in 2021, with Norway being the more electrified country, declining more than 30.3%, and Italy declined 23.1%, while France, Sweden and the Netherlands saw EV sales growth of 9.4%, 11% and 1.1%, respectively, compared to the same period in 2021. In terms of sales volume, **seven European countries saw significant declines in EV sales in July compared to June, with Norway declining the most (55.1%) and Germany declining the least (10.1%);** France, the U.K. and Sweden declined 40.2%; and Italy and the Netherlands declined very similarly, both by more than 33%. In terms of market share, with the exception of France, Germany, the U.K., Sweden, Italy, Norway and the Netherlands all had lower EV market shares than in June. However, when compared to the same period in 2021, EV market share declined in the UK, Italy and Norway, but grew in Germany, France and Sweden. It is worth noting that Norway's share of the market saw a rare decline from 84.7% to 83.0%, but Sweden's EV market share increased significantly to 50.1% from 37.6% in the same period in 2021.

VW's data show that the volume of vehicle sales in the first half of 2022 fell by one-fifth compared to the same period in 2021, mainly due to a sharp decline in sales in Europe, but the sales of electric vehicle were boosted by the growth of the Chinese market. Total global sales fell 22.4 percent in the second quarter of 2022, with Central and Eastern Europe, including Russia, being the hardest hit with a 49.3 percent decline. Although VW's sales in Russia accounted for only about 2.1% of the total sales in 2021, the war between Russia and Ukraine has caused disruptions throughout the European automotive industry, and factors such as supply chain bottlenecks and inflation have also affected sales throughout Europe. VW suspended trade and production in Russia in March 2022, and has recently offered bonuses to Russian factory employees willing to leave before the end of the year. Sales in Western Europe fell 25.7 percent in the second quarter, while sales in China and North America declined at a smaller rate of 16-18 percent.

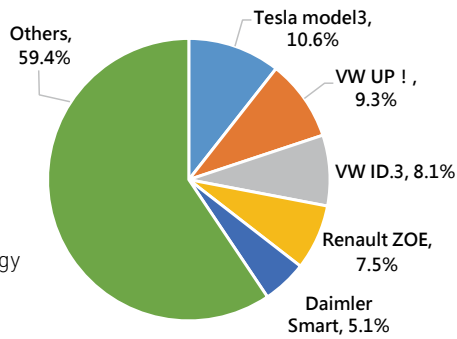
VW's pure electric vehicle sales of 217,000 units, or 5.6% of total vehicle sales, benefited from significant growth in China, where VW tripled its pure electric vehicle sales to 64,000 units annually in the first half of 2022. Despite this, VW's EV sales in China are still far behind Tesla's, with VW's sales in May 2022 about five times lower than Tesla's and even 10 times lower than those of Chinese EV maker BYD. The VW Group's ID.4 outsold all other electric vehicles worldwide by 67,000 units, followed by the 26,000-unit ID.3 and the 25,000-unit Audi e-tron.

German Electric Vehicle Industry Policy ▼

The European Union has announced a goal of reducing CO2 emissions by 55% by 2030, and the Transport & Environment Agency (T&E), an organization under the European Environment Association (Europäischen Umweltverbände), says that 33 million electric vehicles will be needed to replace conventional vehicles in the EU by then, and in order to achieve the carbon neutrality target, even 44 million electric vehicles are needed. With 280 million vehicles in the EU, only 2.6% of them are powered by pure batteries, and there are not enough



Figure 2. Shares of Germany Main Manufacturers of Pure Electric Vehicles Sales in 2021



Source: Marklines; Industrial Technology Research Institute (2022/12)

charging facilities for electric vehicles. It is estimated that the EU will need to bet 80 billion euros by 2030 to increase and popularize related infrastructure in response to the advent of the electric vehicle era.

Under the leadership of Chancellor Olaf Scholz, the new German government plans to inject 60 billion euros (67 billion U.S. dollars) into the climate fund through additional budgets to fund climate goals for the next four years. As part of its commitment to phase out coal-fired power generation by the end of 2030, Germany's new government wants enough renewable energy to supply 80% of its demand. The government has pledged to achieve zero carbon emissions by 2045, and to accelerate the economic transition to the electric vehicle industry.

According to a coalition agreement between the Social Democrats, the Greens and the Free Democrats, EV subsidies (€6,000-9,000 per vehicle) will continue until 2025, but the agreement does not specify whether the subsidies will be extended, and at the same time, it states that existing taxes on gasoline, heating oil, coal and natural gas consumption (which cushion the total cost of ownership of conventional engine vehicles) will not be increased. **In October 2019, Germany adopted the 2030 Climate Action Program, which plans to have 10 million electric vehicles on the road and more than 1 million electric vehicle charging stations by 2030.**

German Electric Vehicle Market Overview ▼

In 2021, Germany sold 1,084,000 electric vehicles, which is 1.3 times the sales volume in 2020, including 335,000 pure electric vehicles, accounting for 30.9% of electric vehicle sales. The top 5 vehicle manufacturers and models in terms of sales volume are Tesla model 3 (35,626 units), VW UP! (30,797 units), VW ID.3 (26,693 units), Renault ZOE (24,746 units), Daimler Smart (17,413 units). The top 5 sales accounted for 40.3%. **Figure 2** shows the percentage of sales by major manufacturers of pure electric vehicles in Germany in 2021.

Despite the breakthrough in electric vehicle sales and licensing in 2021, the total number of electric vehicles running in Germany every day is approximately 1.35 million (45% of which are pure electric vehicles and 55% of which are complex electric vehicles and plug-in complex electric vehicles), which is still a low percentage in Germany's 52.16 million vehicles, and there is considerable development potential and space. Thanks to the support of industrial policies and purchase subsidies, the market has great potential for future development.

Opportunities for Taiwan Manufacturers from German Automobile Production and Sales ▼

Electric vehicles are not only the mainstream of the market in the future, but also lead the related industries into a new change. After the electrification of cars, is it a crisis or an opportunity? The electrification

of automobiles has become an irreversible trend, and conventional vehicles are considered an outdated technology. As the power source of vehicles moves from fuel to electric power, it is not only the overall system architecture of the vehicle that is changing. Electric vehicles are an innovative industry that incorporates IT, and with that comes diversification of manufacturing models, making the market for electric vehicles increasingly hot.

Compared to traditional internal combustion engine powered vehicles, which use traditional components such as engines and transmissions as the power system, the power source of electric vehicles is the power battery, electric motor and the importance of the so-called "three electric" drive, for the original responsible for a number of automotive components industry, does it mean that the market will significantly weaken the demand, resulting in market shrinkage?

Looking at the structure of a traditional car to an electric vehicle, there are three key differences: the motor replaces the engine, the battery replaces the fuel tank, and the reduction gearbox replaces the transmission. In the past, an engine required 1,200 components. Replacing a conventional engine with an electric motor significantly reduces the number of components required to more than 100. The need for engine system components such as cylinder blocks, pistons, crankshafts, exhaust valves and camshafts also changes. Since there is no need for an engine and intake/exhaust system, the transmission is also relatively simplified as a reduction mechanism.

This means that the traditional milling, drilling, enameling, threading, grinding, and other complex metal cutting processes (including various types of fasteners and locking parts) will change because fewer items need to be processed. In order to adapt to the various types of special machines, automated production lines, tools, fixtures, and jigs derived from this process, we adjust the design and application appropriately. The demand for automotive parts and components industry applications has changed.

Although the electrification of automobiles has eliminated key components such as engines and transmissions, other components have increased, including gearboxes (gear sets), aluminum alloy wheels (forged or cast), light alloy (aluminum alloy) body panels, three-electric systems such as power battery temperature management systems and brackets, power motor rotors and stators, aluminum alloy (drive) control boxes, and other related components. Taiwan automotive parts manufacturers have considerable manufacturing and sales performance and energy, and there are many hidden champions with great potential. Taiwan and Germany have formed a complementary relationship in the manufacturing and processing of components. On the surface, it seems that the popularity of electric vehicles will have an impact and pressure on the changes in the components industry; however, the so-called crisis is an opportunity. The electric vehicle industry will be full of challenges and opportunities in the future. □

Article by James Hsiao
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