

CANGO Auto View: Worldwide Chip Shortage's Effects on the Auto Industry

SHANGHAI, Oct. 22, 2021 /PRNewswire/ -- Cango Inc. (NYSE: CANG) ("Cango" or the "Company") is issuing a bi-monthly industry insight publication called "CANGO Auto View" to bring readers, drivers and passengers up to speed on the automobile market's emerging trends.

Below is an article from the Company's 5th edition for September 2021.

Auto Industry Faces a Chip Squeeze

The Covid-19 pandemic has wreaked havoc in the global supply chain and created shortages across all industries, including a semiconductor chip shortage. The automobile production industry was hit particularly hard by this shortage, the latest wave of which is attributable to several factors including Covid-19. In addition to capping automobile production and sales, the "chip squeeze" is deeply affecting the whole auto industry chain in China. Chip shortages since July 2021 have caused greater disruptions than those during last year or last quarter.

Disruptions to Imports and Manufacturing

Automakers around the world are scrambling to manage the chip shortage issue, which has persisted since early 2020 without a proper solution to date. According to a non-exhaustive survey, more than 30 auto manufacturing factories stopped production this year. In addition, Kia, a traditional auto OEM brand, announced that it will stop production in its US factory. Kia was forced to stop production in early May 2021 due to the chip shortage. Given the severity of the shortage, it is no surprise that even strong traditional auto brands are having difficulty coping with the challenges.

Industry experts generally believe that the latest round of Covid outbreaks in Malaysia are responsible for the most recent wave of chip shortages. Malaysia is the largest chip production base in Southeast Asia and plays an important role in the global chip industry. More than 50 global chip companies, including Infineon, Intel, ASE, STMicroelectronics, Huatian Technology, Tongfu Microelectronics, Suzhou Good-ark (Chinese companies), Inari, MPI, Unisem, Globetronics have packaging and testing plants in Malaysia. Other companies, such as Renesas and Global Wafers, operate wafer plants there.

Publicly-available information shows that Malaysia accounts for as much as 13% of global chip packaging and testing capacity, and the Covid outbreaks there further strained the already-reduced auto chip supply. Chinese automotive chip manufacturers have received notices requesting production line staffing reductions to assist pandemic prevention efforts. Local automotive multilayer ceramic capacitor (MLCC) production lines, including those of AVX and Murata, have also encountered pandemic-related production restrictions.

At present, China's domestic companies with production and design capabilities include BYD Microelectronics, Unigroup Guoxin Microelectronics, Black Sesame Technologies, SemiDrive Technology and Horizon Robotics, with relative specialties in production, design, and algorithms. Due to the small proportion of local production capacity, less than 10% of the auto-grade chips in China are sourced locally.

Limitations on the availability of raw materials are creating an additional bottleneck in the local supply of automotive chips. For instance, KrF photoresist is an important material for the manufacture of 8-inch and 12-inch wafers commonly used in automotive chips. Industry experts believe that the quality of photoresist determines the precision and yield of chip manufacturing. The photolithography process accounts for about 30% of the total cost of the entire chip manufacturing process, and about 40%-50% of the total manufacturing time. Moreover, photoresist has a shelf life of just six to nine months, limiting storable inventory. Due to high technical barriers and strict process requirements, China largely depends on imported high-end and high-quality krypton fluoride (KrF) photoresist for its domestic chip manufacturing.

Chip manufacturing involves a huge and complex industry chain, and proprietary core technologies belong to an array of global players. The U.S. dominates software design, the Netherlands has the lithography machine technology, and Japan has the photoresist technology. Japan has a virtual monopoly on the photoresist market because Japanese companies, including JSR, Tokyo Ohka Kogyo, Shin-Etsu Chemical and Fuji Electronics, account for more than 83% of the global market share.

Shin-Etsu Chemical recently notified several top fabs in mainland China that due to reduced KrF photoresist production capacity and the demand surge caused by the global expansion of fabs, their supply of KrF photoresist is limited. It also suspended shipments of KrF photoresist to some small and medium fabs. As a result, domestic fabs such as SMIC, Huahong and Silan Integrated Circuit will be in short supply of KrF photoresist.

According to research institutes, China is home to approximately 14 photoresist-related companies and photoresist manufacturers. Fewer than seven have achieved mass supply, including Beijing Kempur, Suzhou Ruihong, Weifang Suntific, Jiangsu Aisen Semiconductor, and Jiangsu Hantuo. They focus on producing UV negative/positive photoresists and i-line and g-line photoresists. The local sourcing rate for high-end KrF photoresists is less than 1%, from companies including Beijing Kempur, Fujian Hongguang Semiconductor, Jiangsu Hantuo, and Shanghai Core Carving Micromaterial Technology, among others. Until domestic manufacturers increase their production of KrF photoresist, these supply disruptions will persist.

Deeper Issues at Play

If we look beyond the global pandemic and geopolitical changes, we see that the automotive-grade chip shortage is also due to chip manufacturers' unwillingness to prioritize the auto industry's chip needs, an issue that will have to be addressed with a different strategy. Automotive-grade chips account for just 10% of the global semiconductor chip market, which totals an estimated US\$300-400 billion. Automotive chips do not require top-notch process technology, but they must meet higher safety and stability standards compared to industrial-grade chips and consumer-grade chips. Therefore, when chip manufacturers' supplies and production capabilities are limited and companies from various industries must compete to have their chip orders prioritized, automakers and auto parts suppliers are in a relatively disadvantaged position given their smaller proportion of orders and high safety requirements.

To address this issue, China's Ministry of Industry and Information Technology set up a working group for the promotion and application of automotive semiconductors. They met with local governments, vehicle companies and chip companies to formulate targeted measures to improve the automotive chip supply. The State Administration for Market Regulation also announced that it will investigate auto chip distributors suspected of bidding up prices based on price monitoring and clue collection. Supervision and law enforcement will be strengthened in the future, to strictly prohibit and punish illegal activities such as hoarding, price rigging, and collusion.

These measures will improve the situation, but the chip manufacturing process from R&D to mass production is so lengthy that the benefits will only take effect in the medium to long term.

Coping Strategies for OEMs

Automotive-grade chips' long supply cycle creates unique challenges for OEMs. Unlike other auto parts, chips require three to four years to move from R&D to dealer coordination and proof of reliability. Changing suppliers strains the software capabilities of car companies, limiting its practicality, and is an ineffective solution in the face of industry-wide shortages.

Industry leaders are looking for long-term, effective alternatives. Dong Yang, former standing vice-chairman and secretary-general of CAAM and vice chairman of China EV100, said, "The way to reduce costs in the past was to produce globally and sell in larger markets, so that manufacturing could be completed in low-cost places and zero inventory could be achieved. However, this method has proven problematic. We must consider the impact of global disasters and geopolitics and localize productions closer to their end market. It is not about manufacturing with the lowest cost, but diversifying production among more countries, as long as prices can absorb the cost increases. We should also maintain an appropriate level of inventory instead of pursuing zero inventory."

When Will it End?

At present, the chip crisis directly impacts OEMs' daily operations. IHS Markit, a market research company, released its latest report on August 19, 2021. It forecasts that the chip crisis will cause a production reduction of 6.3 to 7.1 million vehicles (excluding Toyota) in 2021, and that the semiconductor shortage will continue through the first quarter or possibly even the second quarter of 2022.

The China Automotive Technology & Research Center's data company created a projection model for the shortage according to its relevant knowledge and professional analyses. Based upon this model, the company mentioned in its April 2021 industry service report that "the shortage of automotive chips will not be effectively alleviated by the end of 2021 and the production of passenger vehicles will be forced to reduce by about 10% throughout the year." The company has maintained this view in subsequent monthly reports.

While there is no clear end in sight to the worldwide chip shortage, the entire auto industry is working along with the government to develop effective strategies to solve this complex problem and ensure future stability.

About Cango Inc.

Cango Inc. (NYSE: CANG) is a leading automotive transaction service platform in China connecting dealers,

financial institutions, car buyers, and other industry participants. Founded in 2010 by a group of pioneers in China's automotive finance industry, the Company is headquartered in Shanghai and engages car buyers through a nationwide dealer network. The Company's services primarily consist of automotive financing facilitation, car trading transactions, and after-market services facilitation. By utilizing its competitive advantages in technology, data insights, and cloud-based infrastructure, Cango is able to connect its platform participants while bringing them a premium user experience. Cango's platform model puts it in a unique position to add value for its platform participants and business partners as the automotive and mobility markets in China continue to grow and evolve. For more information, please visit: www.cangoonline.com.

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