ISSUE BRIEF

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CHINA'S INTERNAL COMBUSTION ENGINE AUTOMOBILE INDUSTRY

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Image source: Zhejiang Geely Holding Group.[1]

Introduction

In 2009, China became world's largest automobile manufacturing industry and since that time onwards, its research and development in automotive manufacturing is flourishing.[2] According to the latest available data, in 2021, China produced a total of 21.41 million passenger cars and 4.67 million commercial vehicles (Figure 1).[3] Out of those 21.41 million passenger cars, 3.34 million were electric vehicles and the rest i.e., 18.07 million had an Internal Combustion Engine (ICE).[4] To fulfil its climate-related commitments, China is aiming to reach carbon emissions peak by 2030 and carbon neutrality by 2060; hence, it aims to reduce the production of ICE vehicles. President Xi Jinping said that "the path, method, pace and intensity to achieve this goal should and must be determined by ourselves, and

1 "Geely Holding Showcases Next-Generation Products at Shanghai International Automobile Industry Exhibition," Zhejiang Geely Holding Group, April 18, 2023, https://zgh.com/media-center/news/2023-04-18/?lang=en.

2 Yuan Chen, C. -Y. Cynthia Lin Lawell, and Yunshi Wang, "The Chinese Automobile Industry and Government Policy," Research in Transportation Economics 84 (2020): 1, doi:10.1016/j.retrec.2020.100849.

3 "Production of Cars in China from 2010 to 2021, by Type," Statista, February 3, 2023, https://www.statista.com/statistics/281133/car-production-in-china/.

4 "Electric Vehicles - China," Statista, August 2023, https://www.statista.com/outlook/mmo/electric-vehicles/china.

will never be influenced by others."[5] Till 2021, coal was mainly used for generating more than 60 percent of energy;[6] however, the reduction in ICE vehicles production and the booming electric vehicle industry reveals China's commitment to comply with the Paris Agreement and to mitigate the negative effects of climate change (Figure 2).[7]

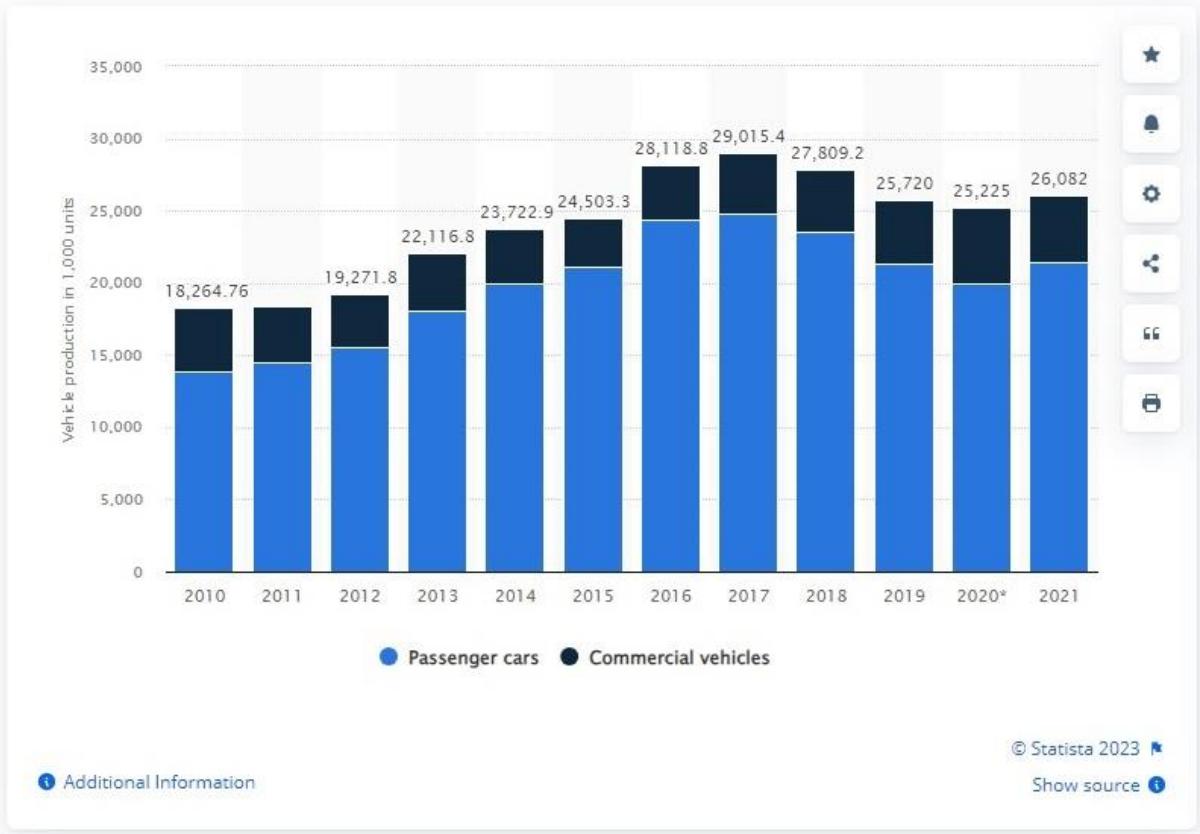

Figure 1: Production of cars in China since 2010 to 2021.[8]

5 Nectar Gan, "Xi Says China Will Follow Its Own Carbon Reduction Path as US Climate Envoy Kerry Meets Top Officials in Beijing," CNN, July 19, 2023, https://www.cnn.com/2023/07/19/china/china-xi-carbon-climate-kerry-intl-hnk/index.html.

6 "An Energy Sector Roadmap to Carbon Neutrality in China," International Energy Agency, September 2021, https://iea.blob.core.windows.net/assets/9448bd6e-670e-4cfd-953c-32e822a80f77/AnenergysectorroadmaptocarbonneutralityinChina.pdf.

7 "The Paris Agreement," United Nations Framework Convention on Climate Change, 2023, https://unfccc.int/process-and-meetings/the-paris-agreement.

8 "Production of Cars in China from 2010 to 2021, by Type."

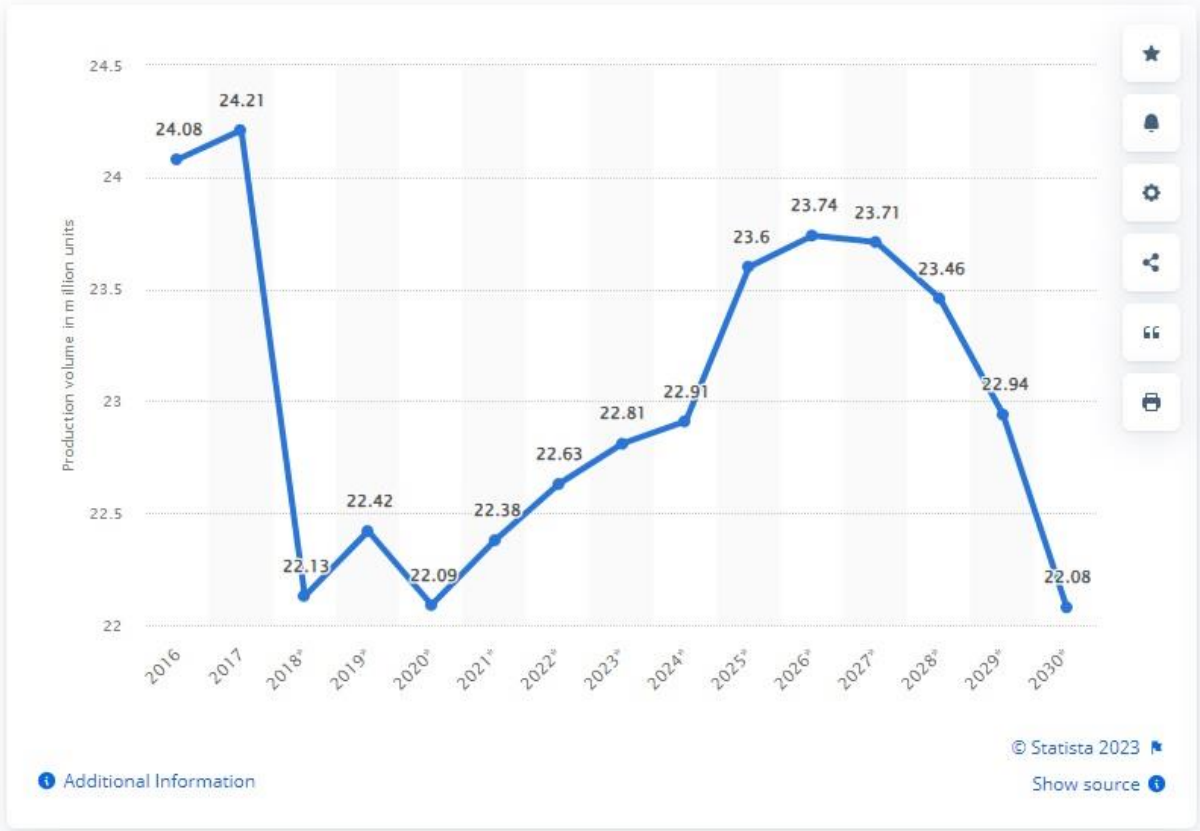

Figure 2: The gradual decline in the production of ICE vehicles in China.[9]

Unlike the 1990s, the contemporary ICE vehicles in China have excellent fuel efficiency, modern outlook, and features active as well as passive safety standards. For instance, in 2005, China started to standardise the fuel consumption on ICE vehicles and later established the Corporate Average Fuel Consumption (CAFC) which started standardising in 2012.[10] A study found that now, an average four-door ICE vehicle having a curb weight of 1400 kg and a 1.8L engine has an estimated fuel efficiency of 5 to 7 litres per 100 km under mixed driving conditions.[11] The Changan *Alsvin* 1.5L having 4 cylinders is claimed to consume 1 litre of petrol per 18.3 km, which is comparable to Japanese automakers.[12] The fuel consumption is further improved using hybrid and mild hybrid technologies; however, the scope of the paper is limited to ICE vehicles only.

9 "Total Volume of Passenger Internal Combustion Engine (ICE) Vehicles Manufactured in China from 2016 to 2030," Statista, February 3, 2023, https://www.statista.com/statistics/1063505/china-production-volume-of-passenger-vehicles-ice/.

10 Haoyi Zhang et al., "Effect of Chinese Corporate Average Fuel Consumption and New Energy Vehicle Dual-Credit Regulation on Passenger Cars Average Fuel Consumption Analysis," International Journal of Environmental Research and Public Health 18, no. 14 (2021): 1–13.

11 Ibid.

12 Raghad Alqaryouti, "Average Fuel Consumption of Changan Cars 2023," Motory Saudi Arabia, July 2023, https://ksa.motory.com/en/news/average-fuel-consumption-of-changan-cars-2023-12727/.

The Chinese ICE Vehicles

The Chinese automakers including SAIC Motor, Dongfeng, FAW, Changan, Geely, Beijing Automotive Group, Brilliance Automotive, BYD, Chery, Guangzhou Automobile Group, Great Wall, and Jianghuai (JAC), are sufficient to fulfil the domestic needs. The geographical manufacturing facilities of these automakers are illustrated in Figure 3. These automakers have equipped their vehicles with latest technologies including sensors related to autonomous and semi-autonomous driving.

Radar-Assisted Parking Control
Radar-Assisted Distance Control
Radar-Assisted Collision Warning and Prevention
Cruise Control
Radar-Assisted Adaptive Cruise Control
SRS Airbag
Anti-Lock Braking System (ABS)
Electronic Brake Force Distribution (EBD)
Reverse and Front Camera
Panoramic Sunroof
Remote Keyless Entry
Remote Keyless Ignition
Heated Front Seats
Heated Rear Seats
Ventilated Front Seats
Ventilated Rear Seats
Park Assist
Side Assist

Table 1: Number of modern technologies available on Chinese ICE vehicles.

Manual Transmission (MT)
Automatic Transmission (AT)
Dual-Clutch Transmission (DCT)
Continuously Variable Transmission (CVT)

Table 2: Transmission on Chinese ICE vehicles.

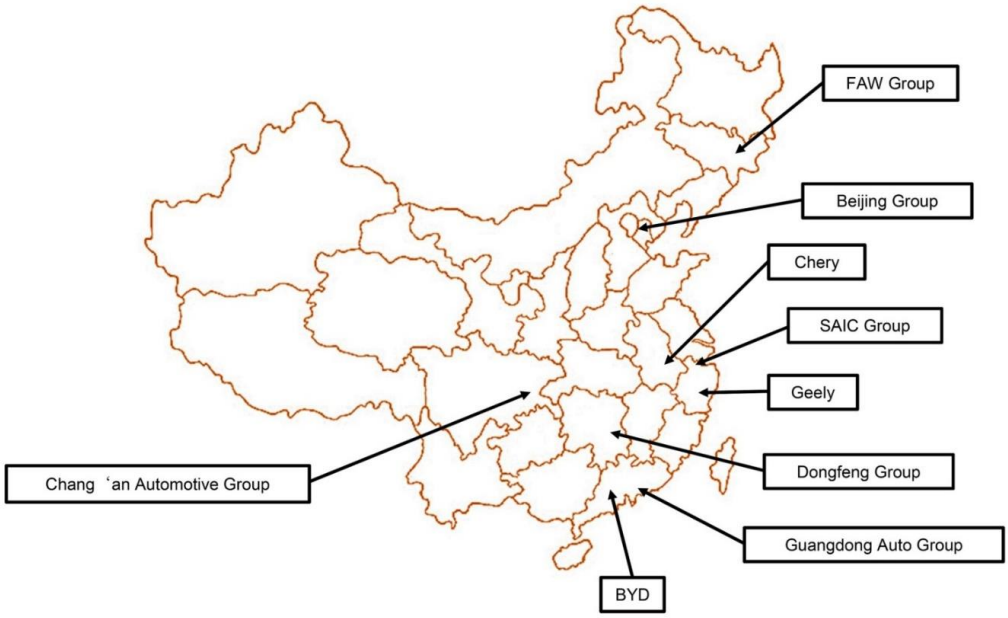

Figure 3: The geographical distribution of China's automobile production companies.[13]

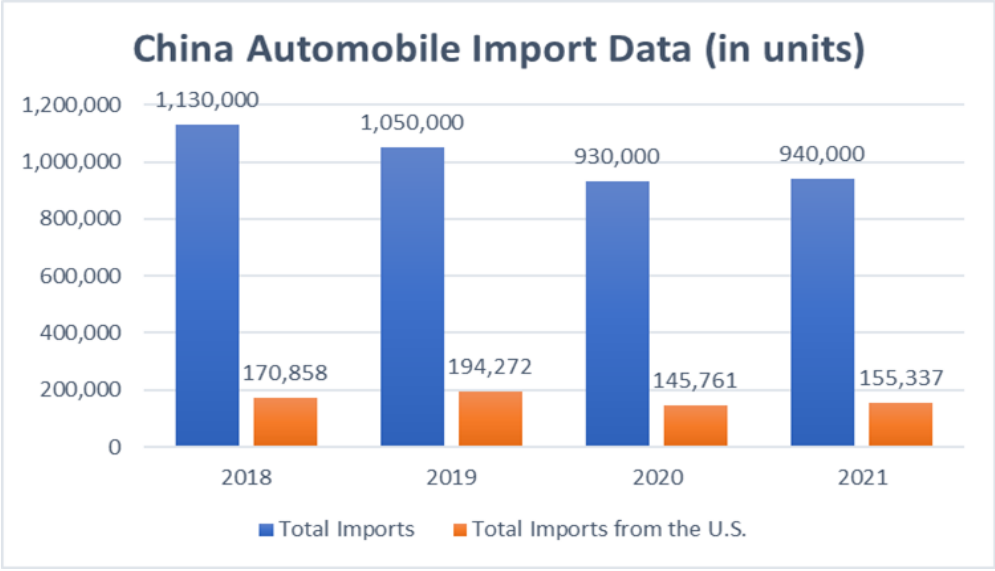

Figure 4: The declining imports of foreign automobiles in China.[14]

13 Chen, Lin Lawell, and Wang, "The Chinese Automobile Industry and Government Policy," 3.

Analysis and Examination

The Chinese ICE vehicles are important component of its automobile industry and the indigenisation of such vehicles is leading to the declining foreign imports (Figure 4). The majority of manufacturing facilities are located in the Eastern and Southern China (Figure 3). Despite the growing tendency towards the electric and hydrogen-powered vehicles, the ICE vehicles in China are expected to stay in production even after 2030. It is noteworthy that BYD ended the production of ICE vehicles in mid-2022 and is focusing on electric and plug-in hybrid vehicles. Nonetheless, its manufacturing facilities will continue to provide spare parts for ICE vehicles and the petrol driven engines.

The researcher had the privilege of driving number of Chinese ICE vehicles available in Pakistan including Cherry *Tiggo 8 Pro*, BAIC *BJ40*, FAW *V2*, Changan *Alsivn* and *Oshan X7*, MG *HS*, and DFSK *Glory 580 Pro*. These vehicles are readily available in Pakistani market and have little or no trouble related to the availability of spare parts. It was noticed that all of the Chinese ICE vehicles available in Pakistan have in-line cylinder layouts and not a single vehicle offered v-type engine. Further, these ICE vehicles are fully equipped with most of the modern technologies mentioned in Table 1. The build-quality and ride-quality of these vehicles are comparable to any international automaker. Though, in one's own experience, none of these vehicles offered air suspension or any kind of body control to improve vehicle stability.

Russia-Ukraine Crises and China's Automobile Industry

Automobile manufacturing is one of Russia's main industries. In 2021, almost a total of 1.4 million cars were produced in Russia; however, the Russia-Ukraine crises, and the ensuing escalation in February 2022, resulted in Western sanctions on Russia.[15] Consequently, the Japanese, German, French, American, and Italian automakers pulled out of Russia and "banned exports of luxury cars to Russia in March 2022." The international automakers including Mercedes Benz, Audi, Volkswagen, BMW, Toyota, Nissan, General Motors, Skoda, and Renault Group left the Russian automaking industry on temporary as well as permanent basis.[16] Resultantly, in May 2022, Russia produced less than 4,000 vehicles which were quite insufficient to meet its domestic automobile needs (Figure 5). This supply and demand gap in Russian automobile industry was readily filled by the Chinese automakers.

14 "China - Country Commercial Guide," International Trade Administration, U.S. Department of Commerce, April 7, 2023, https://www.trade.gov/country-commercial-guides/china-automotive-industry.

15 "Automotive Industry in Russia - Statistics & Facts," Statista, June 29, 2023, https://www.statista.com/topics/5493/automotive-industry-in-russia/.

16 Ibid.

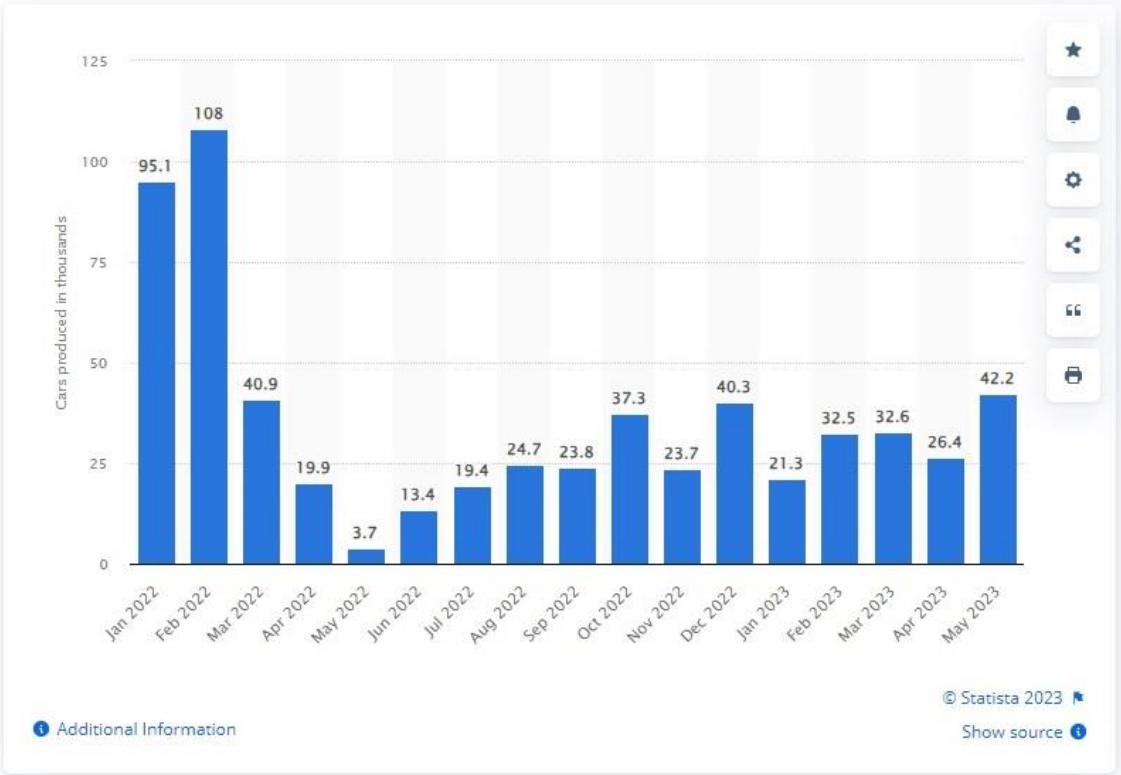

Figure 5: The production of automobiles in Russia in 2022-23.[17]

Conclusions

China produced almost 22 million passenger cars in 2021 and currently is the largest automaker in the world. Its ICE vehicles industry is producing world-class automobiles and has significantly improved its vehicles especially in terms of passenger and pedestrian safety, luxury, technology, and fuel efficiency. Consequently, for the past two decades, the import of foreign vehicles in China is on the decline. It is noteworthy that China is relying on its domestic automakers to fulfil the national needs, but it is also acquiring foreign automakers. For instance, Sweden's Volvo was acquired by Geely and Britain's Morris Garages (MG) was acquired by SAIC Group.

The Chinese automakers are also manufacturing ICE vehicles in Pakistan and have created numerous jobs. These vehicles have also provided buyers with considerable buying choices. These vehicles are relatively affordable and the service and spare parts are available countrywide. There is a need to highlight the Chinese automaking industry in Pakistan and to dispel the disinformation campaigns.

17 Ibid.

