

## Energy transition, the main reason for China's changing role in global energy and metals markets

01/10/2023

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### Executive summary

*While world oil prices hover around USD 100 per barrel, Chinese economic growth has continued to disappoint since the start of the year. Unlike previous episodes of negative surprises in Chinese economic activity (such as that of 2015-2016), this one is therefore not being accompanied by a decline in commodity prices. This traditional coincidence is easily explained: China is the main player on the markets for many raw materials. In 2022, it will account for 58% of global copper consumption, 80% of aluminum ore imports, 18% of oil imports and 55% of coal imports. This pivotal role is the result of strong growth in China's industrial activities over the past twenty years.*

*In fact, while a change in the pace of energy imports into China has been observed since between 2019 and 2022 (before Chinese demand for oil rebounds somewhat in the first part of 2023), this has not translated into a fall in world oil and gas prices, which have benefited from less favorable supply prospects (sanctions against Russia, OPEC decisions for oil...). This lower demand for fossil fuels in China can be explained both by weaker economic growth (which did not exceed 3% last year) and a change in the energy mix: while the share of oil in the energy mix remained stable between 2014 and 2022 (at 18%) and that of gas increased slightly (from 5% to 8%), that of coal fell sharply (by 11 points to 55%). This decline has been partly offset by renewable energies (+6 points to 8%).*

*Demand for many metals was also impacted by the energy transition, but in a different way: this year, China became the world's leading exporter of automobiles, ahead of Japan and Germany. This performance was largely due to China's growing power in the production of electric cars. The most common raw materials used in electric cars and associated motors are copper, nickel, manganese, cobalt, lithium and rare earths.*

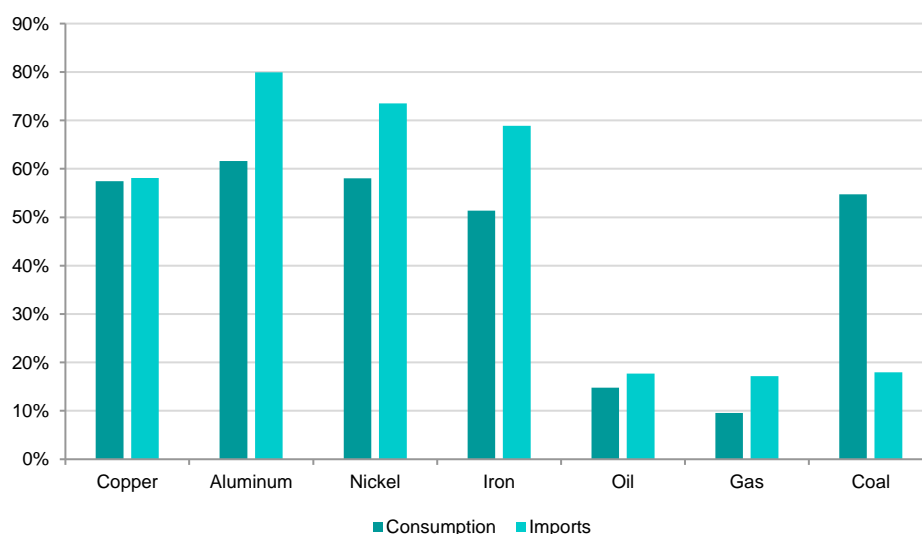
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# 1. China: An established giant on the commodities market

## 1.1 China's industrialization and growing demand for raw materials

China is a central player on the raw materials market. In 2022, the country will account for more than half the world's consumption of copper (57% of the total), aluminum (62%), nickel (58%) and iron (51%). As local production is insufficient to meet these needs, China accounts for a large share of global imports of these four metals, reaching 80% of global aluminum imports. Similarly, coal provides more than half of China's total energy consumption (55% by 2022<sup>1</sup>, graph 1). As coal is largely produced locally, China's share of global coal imports is much lower.

Figure 1: China's share of global raw materials consumption and imports (% , 2022)



Source: International Bureau of Metal Statistics, Trademap

China's omnipresence on commodity markets reflects a long-term trend. Whereas in the early 2000s, the advanced economies accounted for the majority of demand for raw materials, consuming just over 50% of the world's energy and around 70% of the world's metals<sup>2</sup>, **China's accession to the WTO in 2001 and the subsequent development of its manufacturing and export-led growth model have gradually changed the situation.** China's share of global coal consumption has almost doubled, from 36% in 2003 to 55% in 2022, while its share of global imports has more than tripled, from 5% in 2003 to 18% in 2022 (graph 2). This trend can also be observed on the various metal markets: China, for example, accounted for 19% of global aluminum consumption in 2003, versus 62% in 2022, and for 1% of global imports of this metal in 2003, versus 80% in 2022 (graph 3).

China's rise to prominence on the world iron ore market is largely due to its use in the steel production process, which in turn is used in construction, machinery and automobile manufacturing. But **the rate of growth in per capita iron ore consumption is in line with that observed in many industrializing economies in the past.** Put another way, **China's significant weight on the world market since the early 2000s is primarily due to the size of its population, not to abnormally high per-capita consumption.** Historically, construction accounts for more than half of China's demand for iron ore. While **the urbanization process is set to continue in the years ahead (China's urbanization rate is still far from the standards of advanced economies or other major emerging economies such as Brazil or Malaysia),** past excesses of

<sup>1</sup> Our world in data, China: energy country profile, 2023

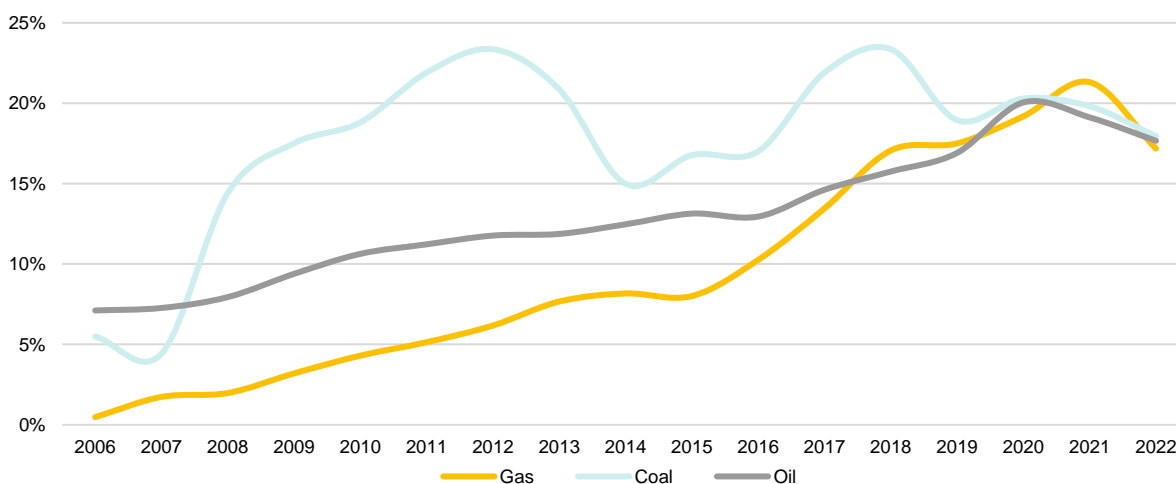
<sup>2</sup> World Bank, *The changing of the guard: shifts in industrial commodity demand*, October 2018

indebtedness in this sector are likely to weigh on iron ore demand in the years to come. Against this backdrop, the current resilience of Chinese demand for this metal may be partly due to the improved prospects of the local automotive sector (see part 2). This year, China became the world's leading exporter, thanks to its new comparative advantages in the electric vehicle segment.

Demand for other base metals is also being driven by prospects in the construction sector, as well as in the manufacturing sector, including the automotive sector. Electronics is also making a significant contribution. China is the world's leading producer and consumer of aluminum products. With a local market surplus, China has become a net exporter of this metal. Increased local production has led to a sharp rise in bauxite and alumina imports over the past 15 years. Here again, the construction sector is the biggest source of aluminum demand in China, followed by the electrical and electronics sectors, while transport, household appliances and machinery account for most of the rest. Last but not least, China sources most of its copper from abroad. Copper is mainly consumed in the energy sector, although it is also used extensively in the household appliances, transport, construction and electronics sectors.

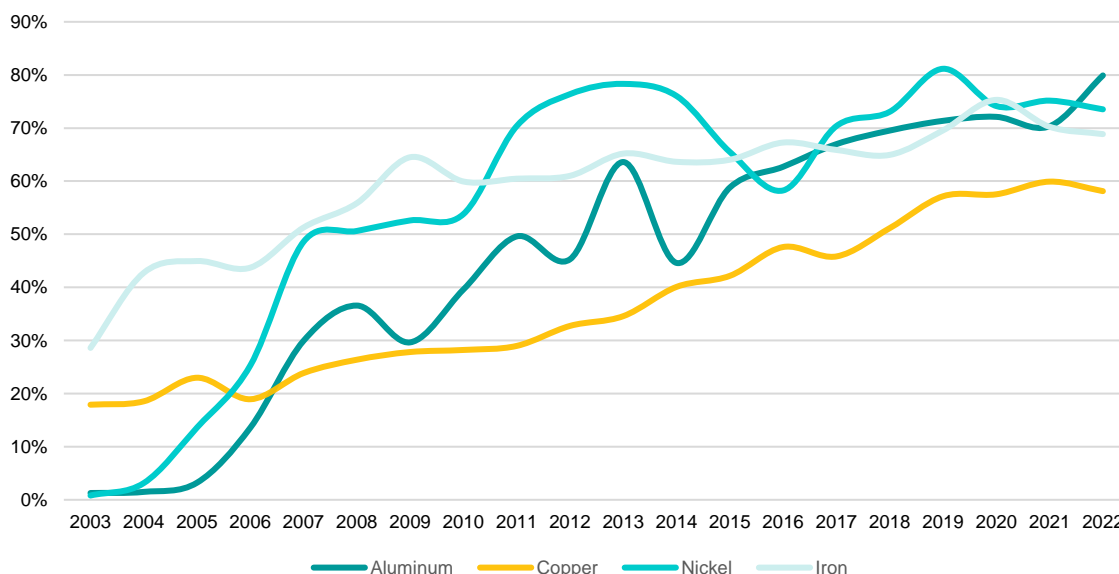
**The pace of growth in China's demand for raw materials has been more sustained than in the other major emerging markets<sup>3</sup>.** By way of comparison, India's share of global metal consumption has risen only slightly, despite strong economic growth.

**Figure 2: China's share of global energy imports (% , 2003 - 2022)**



Source: International Bureau of Metal Statistics, Trademap

<sup>3</sup> World Bank, *The changing of the guard: shifts in industrial commodity demand*, October 2018

**Figure 3: China's share of global mineral imports (% , 2003 - 2022)**

Source: International Bureau of Metal Statistics, Trademap

## 2. Slower growth has had an impact on energy imports, but demand for many metals is benefiting from activities linked to the energy transition

### 2.1 China's slowing economic growth trend could affect global demand for raw materials

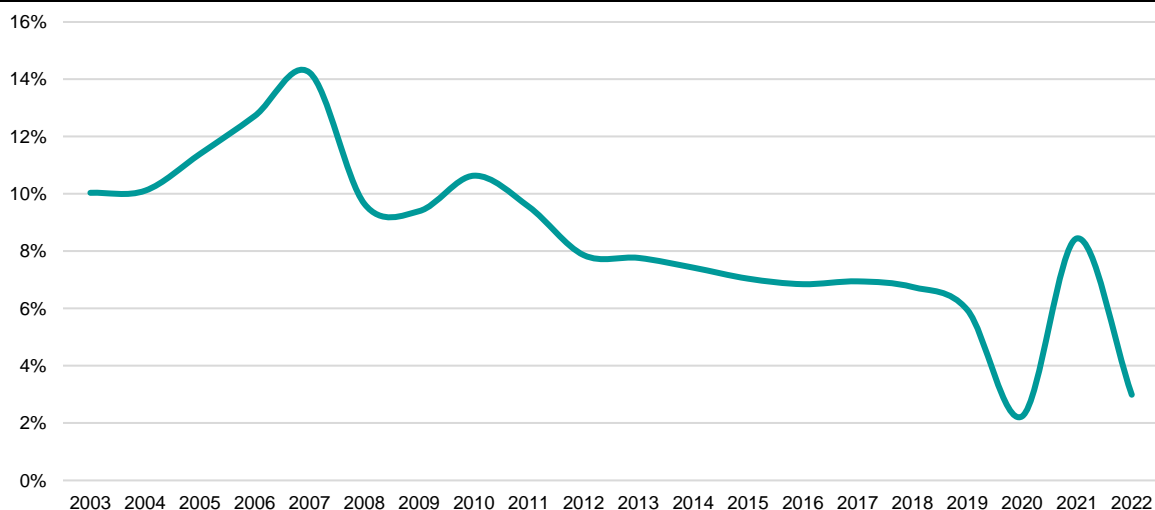
In view of these developments, **recent changes in the Chinese economy, in particular its efforts to transition towards a more sustainable growth model, could affect global commodity markets.** Indeed, as early as the 19<sup>ème</sup> Chinese Communist Party (CCP) Congress in October 2017, Chinese authorities affirmed their desire to **reorient the Chinese economic model towards more "qualitative" growth, based on greater domestic consumption and activities that consume fewer raw materials.** **This new trend can be seen in the rise in the share of services in China's GDP (52.8% in 2022 vs. 44.2% in 2010<sup>4</sup>), to the detriment of industry (39.9% in 2022 vs. 46.5% in 2010).** In addition to changes in the structure of the Chinese economy, the recent slowdown in its growth drivers must be taken into account.

After growing at an average annual rate of 10.1% between 2000 and 2014, the Chinese economy has slowed over the past 10 years, recording an average annual growth rate of 6.1% between 2014 and 2022. Last year, Chinese growth didn't even exceed 3%. For more than a decade or so, Chinese economic activity has suffered from structural impediments<sup>5</sup>. Among them, demographic decline and slowing productivity are weighing on medium-term prospects, whereas abundant, cheap labor had played a major part in the Chinese miracle between 1980 and 2010. More recently, the Covid-19 crisis and the sharp contraction of the Chinese property market (which accounts for around a quarter of economic activity)<sup>6</sup>, have led to the lowest level of growth in China in 40 years by 2022 (excluding the 2.2% expansion linked to the first containment in 2020).

<sup>4</sup> Statista, *Distribution of China's gross domestic product (GDP) by economic sector, 2000 to 2022*, February 2023

<sup>5</sup> IMF, *People's Republic of China: 2022 Article IV Consultation-Press Release*, February 2023

<sup>6</sup> Reuters, *Why is China's economy slowing down and could it get worse?* September 2023

**Chart 4: China's annual GDP growth rate (% , 2003-2022)**

Source: World Bank

This structural slowdown in Chinese growth is having an effect on demand and therefore on the prices of the raw materials mentioned in the first part of this article<sup>7</sup>. In 2016, a study by the Asian Development Bank<sup>8</sup> quantified this differentiated impact on the prices of different raw materials: a one-percentage-point slowdown in the Chinese economy is associated with a particularly sharp fall in world tin prices, the least for zinc. The same difference is observed for energy products: the impact on natural gas would be around three times less than that on coal. Overall, for metals, the price drop ranges from 2.5% to just over 20% (-5% for iron, -7% for copper and -12% for aluminum). And for energy products, the drop varies between 4% (gas) and 12% (coal). Oil prices are expected to fall by 7%.

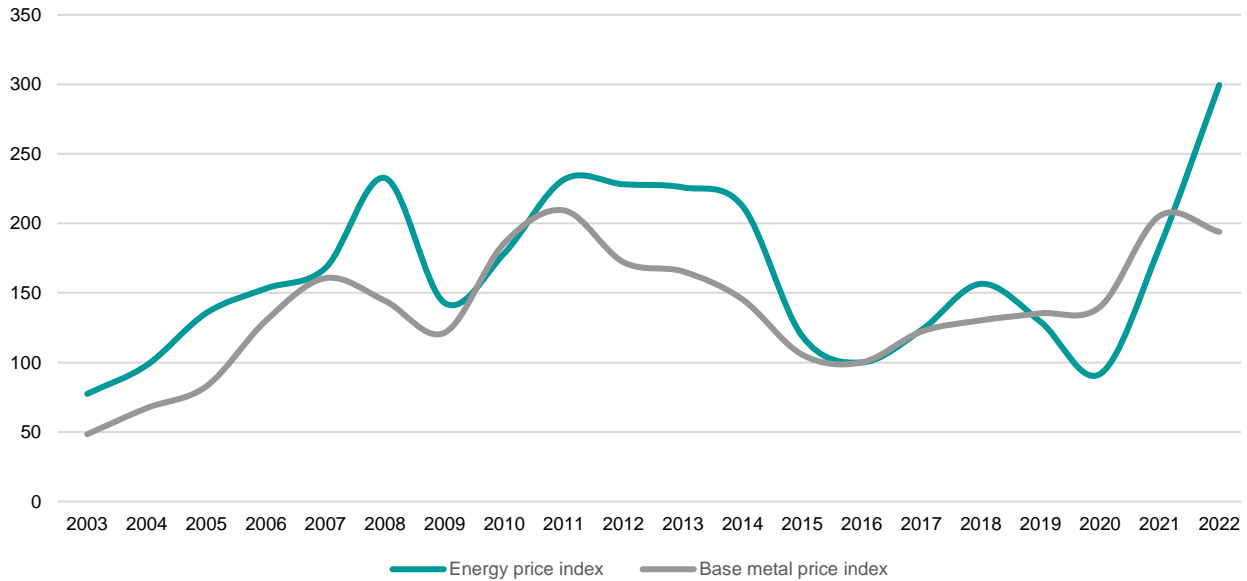
In fact, while a change in the pace of energy imports into China has indeed been observed since between 2019 and 2022 (graph 6, before Chinese oil demand rebounds somewhat in the first part of 2023), this has not translated into a fall in world oil and gas prices, which have benefited from less favorable supply prospects (sanctions against Russia, OPEC decisions for oil...).

**This lower demand for fossil fuels can be explained both by weaker economic growth and a change in the energy mix: while the share of oil in the energy mix remained stable between 2014 and 2022 (at 18%), and that of gas rose slightly (from 5% to 8%), that of coal fell sharply (by 11 points to 55%). This decline has been partly offset by renewable energies (+6 points to 8%).**

<sup>7</sup> Ivan Roberts, Trent Saunders, Gareth Spence and Natasha Cassidy: "China's Evolving Demand for Commodities", Reserve Bank of Australia

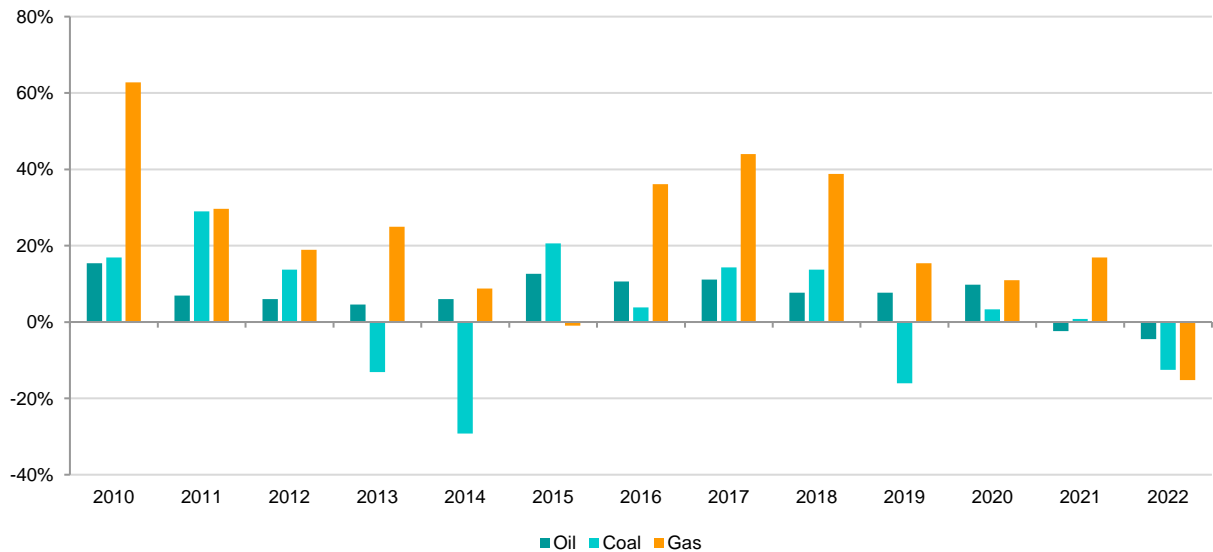
<sup>8</sup> ADB Economics Working Paper Series: The Impact of a People's Republic of China Slowdown on Commodity Prices and Detecting the Asymmetric Responses of Economic Activity in Asian Countries to Commodity Price Shocks, No. 493 (2016)

**Figure 5: Trend in raw materials prices (index, 2003 - 2022)**



Source: FRED economic data

**Figure 6: Annual growth rate of Chinese energy imports (% , 2010 - 2022)**



Source : Trademaps

## 2.2 Sustained demand and prices on metals markets, driven by the needs of the energy transition

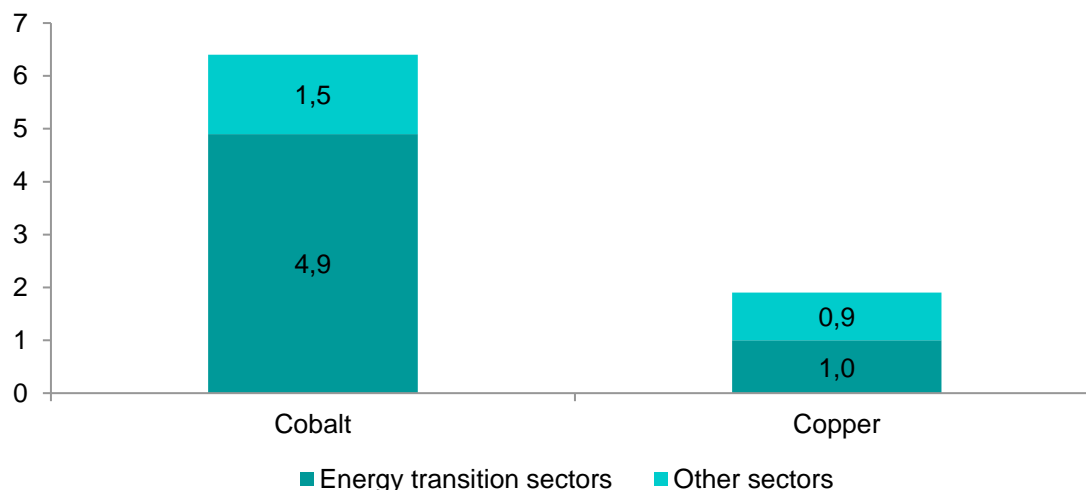
Demand for many metals has also been impacted by the energy transition, but in a different way: **this year, China became the world's leading exporter of automobiles**, ahead of Japan and Germany. This performance was largely due to China's growing power in the production of **electric cars**. **The most**

**common raw materials used in electric cars and their associated motors are copper, nickel, manganese, cobalt, lithium and rare earths.** On average, an electric vehicle and its motor require around 66 kg of graphite, 53 kg of copper, 40 kg of nickel, 24 kg of manganese, 13 kg of cobalt, 9 kg of lithium and 0.5 kg of rare earths<sup>9</sup>. In addition to finished electric vehicles, China is also dominant in the electric battery input sector (accounting for 60% of the market in 2021).

Against this backdrop, according to forecasts by the International Energy Agency, echoed by the IMF in its October 2021 World Economic Outlook, global demand for metals such as cobalt and copper is set to rise sharply over the coming years, against the backdrop of the emergence of new outlets linked to the energy transition. These forecasts assume that the goal of zero net carbon dioxide emissions by 2050 will be achieved. According to the IEA's "zero net emissions by 2050" scenario, growth in demand for metals would initially be very high between now and 2030, then gradually slow down, as the switch from fossil fuels to renewable energies requires substantial initial investment. Unsurprisingly, metal demand growth is much lower in the IEA scenario based on policy stability in a world without energy transition targets.

**By the 2030s, global copper demand is expected to be twice as high as average consumption in the 2010s. Half of this increase would come from industries involved in the energy transition process (see graph 7). For cobalt, the expected increase in demand would be even greater (more than sixfold, largely due to the energy transition).** This difference in growth between the two is not surprising, as copper is a mature market used in a large number of products, while cobalt is more recent. Its market is therefore more emerging.

**Figure 7: Demand for cobalt and copper (ratio of average consumption in the 2030s to average consumption in the 2010s)**



Sources: IEA, IMF

<sup>9</sup> Source: "Comparison of EV motors, the EV sector's demand of commodities and the Chinese market influence - A brief review", Geological Survey of Finland Mineral Economy Solutions, June 2023