INTUITION
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What's driving the commodity market?

Commodity markets are integral to the health of global GDP growth since they underpin the basic building blocks of cities, the latest hi-tech inventions, food security as well as our energy needs. Put simply, we could not survive without commodities. Global commodity markets are complex and constantly evolving in line with future technologies, yet they are prone to price shocks from global events like Covid-19 and the Russian invasion of Ukraine. Due to its abundance of agriculture and fossil fuel-related commodities, the United States has always benefitted from strong commodity prices. However, as the World transitions from fossil fuels to renewables, it is becoming evident that the US is lagging China as far as the commodities which will drive the future are concerned, particularly Rare Earth Elements (REEs). By examining which minerals are required to produce new, greener technologies like Electric vehicles (EVs), it is easy to see why the race is on between the world's two largest economies as well as the major listed miners, to secure these and many other critical resources.

Nick Rogers

SPEED READ

- **Electric Vehicles (EV) require up to 6x more minerals than traditional cars and can be on average 340 kgs heavier.**
- **EVs can contain over 1 mile of copper cabling per car.**
- **The largest EV battery manufacturers are all headquartered in Asia whilst 80% of all battery-cell manufacturing occurs in China.**
- **China accounts for 85% of the world's refined Rare Earth Elements (REEs), critical for new or future technologies like EVs, precision-guided munitions, drones, and smartphones.**

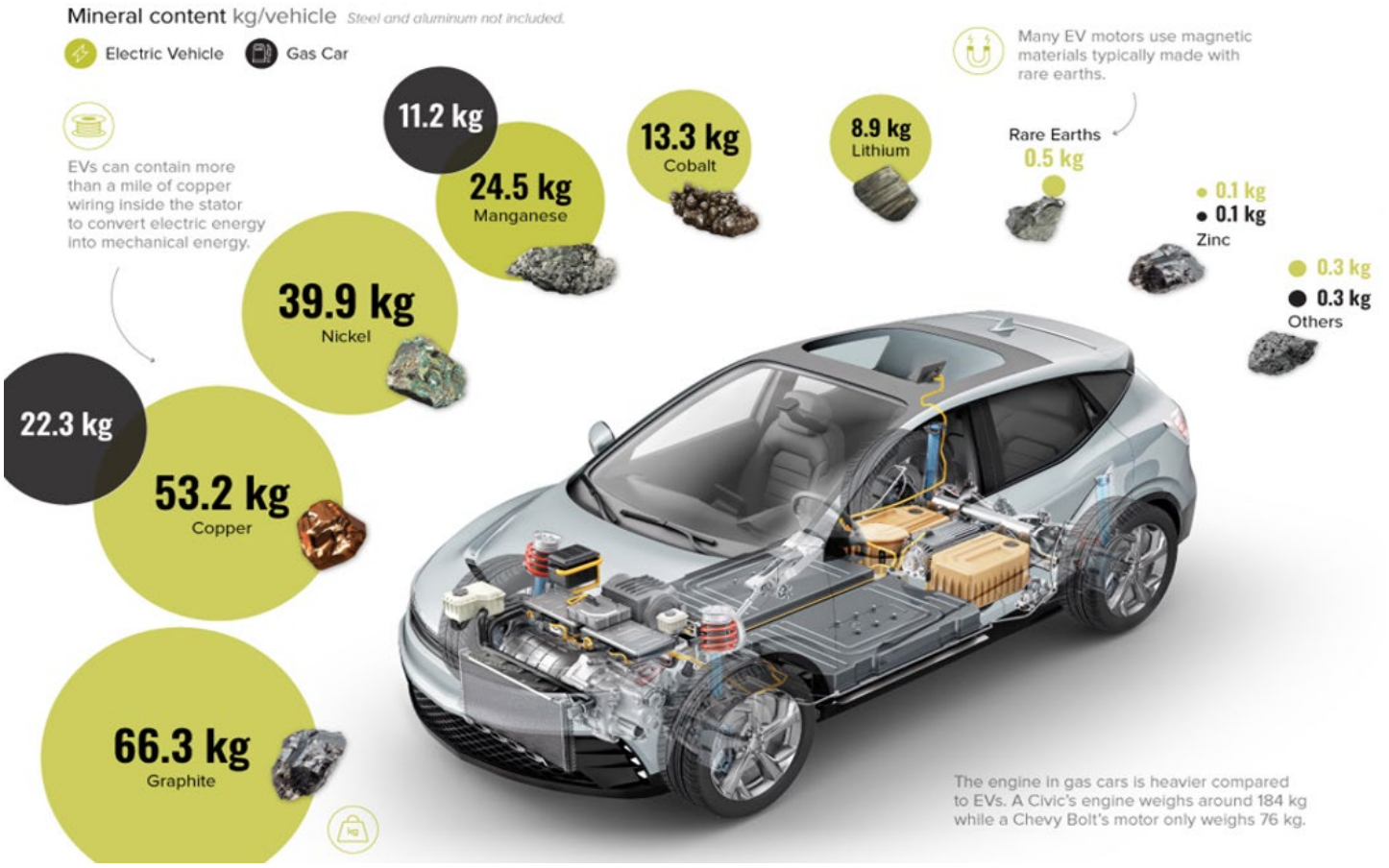
Firstly, it is worth recapping the opening chapter of Economics 101 – the law of supply and demand. Integral to setting the price of a commodity, this law explains the interaction between the desire or demand for a product and the supply of that product. For instance, if the supply of a product is low and the demand is high, it follows that such a product is scarce and insufficient for the number of people who want it. Hence, it will lead to an increase in the price (followed by an increase in production to meet demand) of the product and vice versa.

The world's first commodity market can be traced back to c8500 BC within the agricultural sector as early human settlements necessitated the need to trade livestock and crops. Today, agriculture provides jobs for around 40% of the world's population and is the number 1 global 'employer'. It is a major industry in the United States, which is a net exporter of food. Grains make up 45% of the world's diet and the US is by far the largest producer and exporter of corn (maize). The second-largest US crop is soybeans, and the country is just behind Brazil in terms of global production (2019: Brazil 114 million tons (mtpa), US 96mtpa, China 18mtpa). Soybean restrictions were integral to President Trump's trade war with China, illustrating the ability to use commodities as a bargaining tool for power. The world's largest economy enjoys a strong competitive advantage in key agricultural commodities at a time when high food prices are wreaking inflationary-induced damage across global economies.

> "The historical reliance on fossil fuels has provided the US, Russia and the Middle East with vast wealth but China is challenging the status quo."

Let us now turn to energy. Fossil fuels, including coal, natural gas and oil currently supply about 80% of the world's energy. Here, again, the US has an abundance, accounting for 20% of global energy

EV INFOGRAPHIC



Electric Vehicles require a far wider range of minerals for their motor and battery than a traditional car.

reserves. America has been the largest producer of oil and natural gas since 2018. It is thus fair to conclude that in terms of historically relevant natural resources, the US has enjoyed a relative cost advantage over other nations.

Over the past 2 years, we have written extensively about the structural shift toward renewable energy as world leaders turn up the pressure to achieve "Net Zero" Carbon emissions by 2050. This has led to a surge in the mining and production of "new" energy resources which will enable the expansion of EVs, wind turbines and solar, all core to achieving those lofty targets. If we examine what minerals are core to the production of an electric vehicle, it becomes clear that the cost advantage is changing as one looks to the future. The historical reliance on fossil fuels has provided the US, Russia and the Middle East with vast wealth but China is challenging the status quo.

Graphite is the largest component in lithium-ion batteries by weight, with graphite comprising 20% - 30% of each battery. Copper is the second-largest component, due to its excellent conductivity. One EV can contain over 1 mile of copper wiring. Magnets, made from Rare Earth Elements (REEs), are a core component in electric motors. A motor operates when a coil of copper wire, encircled by strong magnets, spins. The electric current induced in the coil emits a magnetic field, which opposes the magnetic field emitted by the strong magnets. This creates a repulsive effect, much like putting two north-pole magnets next to each other. This repulsion causes the coil to spin/rotate at a high speed. This coil is attached to an axle and the rotation drives the wheels of the vehicle. This is where things get interesting. REEs like cobalt, lithium, neodymium, vanadium and gallium are not just specific to EVs, but also critical to numerous other future technologies like defense (e.g. aircraft, drones, sensors, precision-guided munitions) and commercial applications, like cellphones, laptops and even nuclear reactors. The US is severely lacking resources in REEs, placing it at a significant competitive disadvantage. The US Commerce Department has confirmed that the country imports more than 50% of its annual consumption of 31 of the 35 REE minerals designated as critical by the Department of the Interior. The US has only one rare earth mine and has no processing capability. China, on the other hand, has spent the past 3 decades investing in strategic REE mines around the world, thus securing long-term agreements to ensure that raw materials flow into the country.

For example:

- Indonesia is the largest producer of nickel at 1 million metric tons per annum (mtpa) vs only 120 mtpa in China, which places China in 7th place. But China controls 97% of Indonesia's nickel processing capacity.
- Australia is the top lithium miner at 55,000 tons but China, which produces only 14,000 tons, accounts for more than 70% of the world's lithium refining capacity.
- Almost 80% of rare earth cobalt ore leaves the DRC for China.
- Virtually all the world's graphite is refined in China.
- China produced 50% more copper than the US in 2021 ranking it third in the world.
- Furthermore, the recent merger of three state entities to create China Rare Earth Group Co. Ltd, is the largest move of its kind in the world. This 'megafirm' will control 60-70% of Chinese REE production or 30-40% of global supply. More importantly, China accounts for 85% of the global refined REEs.
- Last February, the Pentagon announced a $30 million strategic investment in the largest REE mining and processing company outside of China, namely Australia's Lynas Rare Earths. As geopolitical tensions rise between the two global superpowers, it is clear that China has the upper hand when it comes to these specific commodities of the future.

Diversified Miners: Commodity Exposure			
	Anglo American	BHP Group	Glencore
Copper	20.3%	30.0%	42.0%
Nickel	2.2%		5.0%
Platinum	24.9%		
Zinc			18.0%
Manganese	3.1%		
EV Related	**50.5%**	**30.0%**	**65.0%**
Iron Ore	19.8%	46.8%	
Coal	15.4%	20.3%	19.0%
Diamonds	14.3%		
Other		2.9%	16.0%
Total	**100.0%**	**100.0%**	**100.0%**

JSE Listed Miners are pivoting strategically towards "new energy" minerals

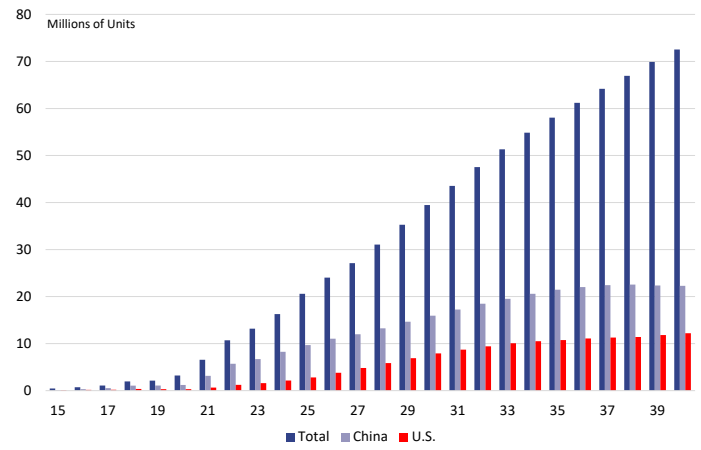
The International Energy Agency (IEA) estimates that annual investment in clean energy and electricity networks must increase to US$2.7 trillion by 2030 or 3x the equivalent investment in 2019. By 2030, analysts at Rystad Energy

The EV market is not just Tesla any longer. This is the Hauwei AITO M5 made in China.

project that copper demand will outstrip supply by more than 6 million tons saying, "A deficit of this magnitude would have wide-reaching ramifications for the energy transition as there is currently no substitute for copper in electrical applications." Global mining companies have been very quick to react to the opportunities on offer with copper production now accounting for 20% of Anglo American's revenues, 30% for BHP Group and 42% for Glencore.

In conclusion, the extreme global commodity prices we are currently experiencing will only begin to normalise once COVID-19 lockdowns and geo-political tension in Ukraine ease. However, metals geared towards decarbonization stand to have prolonged periods of sustained strong demand and pricing. Despite the near-term volatility, Investors should remain invested in those companies that are well-placed to benefit from these structural changes whilst countries like the US will need to increasingly form strategic alliances to ensure that past competitive advantage is maintained and strengthened.

GROWTH IN EV SALES



Sales of EVs are set to soar as the rest of the world chases early adopters, the US and China.

Topic: **Topic to be confirmed**

The next topic for our Insight seminars will be announced in due course.

Natal Midlands	
Date:	15th September 2022
Venue:	Oasis Conference Centre, 72 Main Road, Howick
Morning Time:	10am for 10.30am
Evening Time:	5.30pm for 6pm

Johannesburg	
Date:	20 September 2022
Venue:	Rosebank Union Church, Cnr William Nichol and St Andrews Road, Hurlingham
Time:	7am for 7.30am

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