China's export restrictions on rare earths causes alarm for automotive industry

Beijing's control over rare earths is emerging as a powerful bargaining chip in the US-China trade conflict. The production of refined rare earths is even more concentrated than battery metals, and this leads to continued supply chain risks for the automotive sector in a new reality of protectionism

An excavator works in a quarry for the extraction of rare earth elements

Rare earths are at the heart of US-China trade tensions

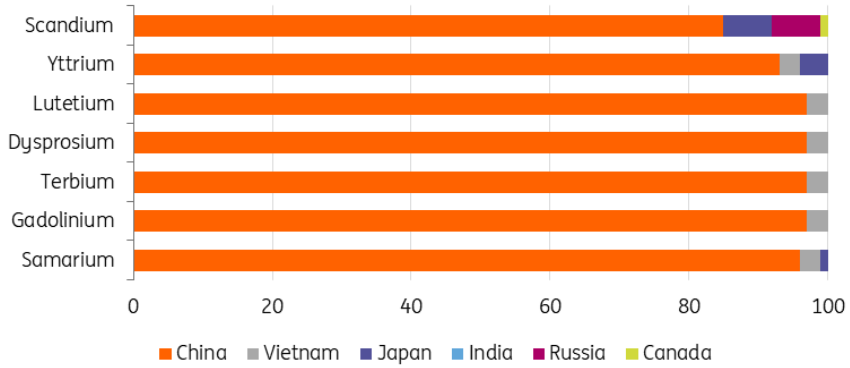
With nearly 70% of global rare earth production and more than 90% of processing taking place in China, the world remains heavily reliant on the country for rare earth element (REE) supplies. Following the sweeping US import tariffs introduced on 2 April, China introduced export licences for seven rare earth elements and permanent magnets, leading to a decline in shipments. The US does not have any refined production of these elements.

China's dominance appears to be instrumental in trade negotiations with the US, but it also poses a risk for importing companies globally, as there are no immediate workarounds.

The US wants a roll-back of the export controls as part of the trade negotiations, and China has said it would 'fast-track' licences for European companies. But it remains a potential supply chain bottleneck.

Seven rare earth metals on Beijing's restricted list

Country breakdown of refined output in 2024, %



Source: Project Blue, ING Research

Rare earths supply hiccups lead to serious concerns in the automotive industry

Rare earth elements are a group of 17 minerals, including neodymium, dysprosium and lanthanum, which are used for various applications. China controls not only mining but also the majority of global refining capacity, accounting for an average of 92% of refined production. This huge dependency poses new supply chain risks in the automotive sector, which uses rare earths and magnets for several vital purposes (see below). As such, they are crucial for both electric and conventional vehicles.

The big three US carmakers – GM, Stellantis and Ford – as well as German car manufacturers (represented by VDA) and European automotive suppliers (CLEPA) have expressed serious concerns about China's recent export restrictions.

Following the introduction of these export curbs in April, importing carmakers and their suppliers now require permisson to receive REE shipments from China. According to CLEPA, only a portion of these license applications have been approved so far. The situation could lead to supply shortages across the automotive value chain.

Some manufacturers are feeling the impact of depleted stocks already – Suzuki, for example, has cut production of its Swift model in Europe, and Ford previously announced production cuts for its SUVs in Chicago.

Rare earths used in automotive are mainly elements with strong magnetic characteristics such as Neodymium (Nd), Samarium (Sm), and Dysprosium (Dy) plus Cerium (Ce), Gadolinium (Gd), Lanthanum (La), Lutetium (Lu), Praseodymium (Pr), Terbium (Tb) and (Yttrium (Y)). The materials have various applications in both EVs and combustion engine vehicles. They are used in parts including electric motors, sensors, steering systems, fuel injection systems, catalytic converters (exhaust), regenerative braking systems and driver assistance systems (ADAS). China has restricted exports of seven of them[1].

[1] Samarium, Gadolinium, Terbium, Dysprosium, Lutetium, Scandium, Yttrium

No global shortage, rather a supply bottleneck and concentration risk

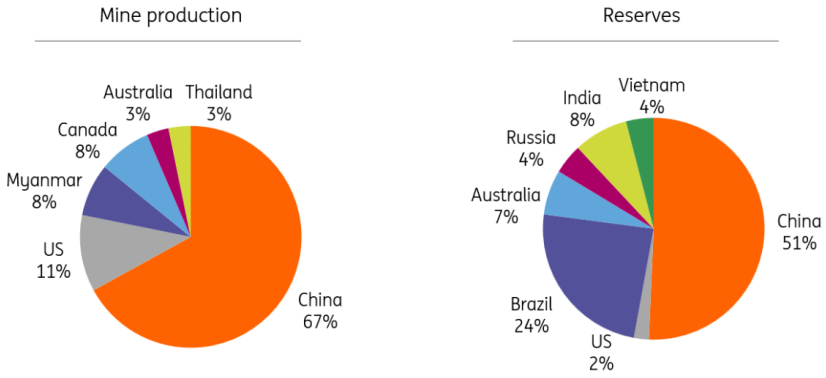
Concerns about rare earth element shortages are not driven by a lack of global supply. In fact, production has outpaced demand in recent years. Surprisingly, this has not yet triggered sharp price increases.

The real issue lies in the extreme concentration of supply – an even greater concern than for battery materials like lithium. China has the largest reserves in the world. At 44 million tonnes, China has more than half of the estimated global reserves.

Rare earths are not actually rare. For example, cerium is more abundant than copper. Rare earths are relatively abundant in the Earth's crust, but mineable concentrations are less common than for most other mineral commodities, making extraction more costly. It is this complex and costly extraction and processing that make rare earths strategically significant. This gives China a strong negotiating position, not only with the US but also with Europe.

China leads in rare earths mine production and reserves

Rare earths mine production and reserves in 2024



Source: USGS, ING Research

Supply risks won't go away amid new reality of protectionism

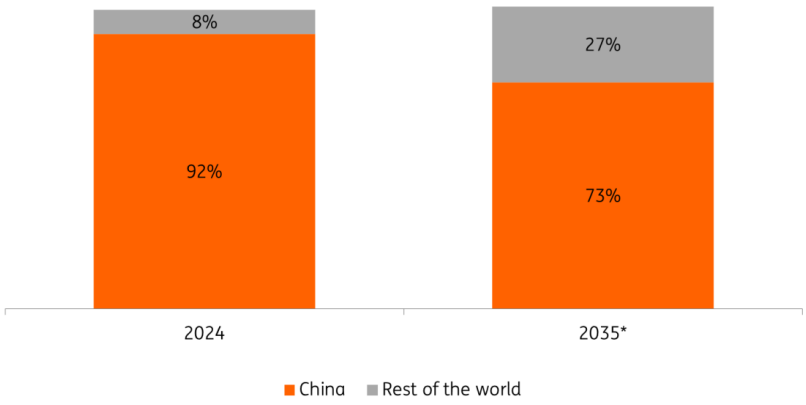
Although China has pledged to accelerate the export license approval process, the situation remains a potential supply chain bottleneck, especially in a world increasingly shaped by protectionist policies. This comes on the heels of previous disruptions, such as chip shortages and cable harness supply issues.

Diversifying away from Chinese sourcing is extremely difficult and, at best, a limited long-term solution. Europe currently produces no rare earths, and the US has only recently begun small-scale production of neodymium and praseodymium. However, both regions hold only a fraction of global reserves, limiting their ability to scale up.

Electric vehicles typically require more rare earths than conventional cars. China's rapid EV expansion has likely reinforced its dominance in this space. As Europe ramps up its own EV production, its dependence on China – for both rare earths and batteries – is expected to grow.

China's grip on rare earths production is strong and not easily loosened

China's share in global refined production of rare earth elements and forecast



Source: IEA, ING Research *Base case forecast IEA

Long-term outlook: no quick workaround. Innovation and recycling part of the structural solution

Automotive stakeholders are calling for de-escalation and constructive cooperation with China. In the longer term, innovation in component design may help reduce reliance on rare earths. For example, Mercedes-Benz has announced efforts to "significantly reduce" the amount of rare earth metals used per vehicle by developing new material compositions. However, such changes will take time to implement. In the meantime, increased recycling of rare earths could offer a more structural opportunity to manage supply risks.

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