

June 30, 2023

Dear Client:

In the world of critical resources, there is one domain that has seized the attention of both industry and government: rare earth metals (REMs) -- specialty minerals vital to the manufacture of all high-tech devices and renewable energy technologies. Of particular concern is China's firm grip on the global supply of REMs: more than 90% of REMs are currently produced in China, and they have just flexed their strategic leverage in an escalation of the country's tit-for-tat trade war on technology.

China announced restrictions on the export of two critical materials, gallium and germanium, metals that are crucial to the manufacture of semiconductors, EVs, smartphones and fighter jets. The U.S. has taken increasingly aggressive measures to keep China from gaining the upper-hand in all next-generation technologies, which includes substituting China from our critical minerals supply chain. There is just one problem: China is already so dominant in minerals processing that the U.S. cannot achieve its clean energy targets or produce next generation technologies without them. In other words, REMs increasingly drive the world economy forward.

The term "rare earth elements" (REEs) describes 17 different elements, each with a unique set of properties that makes them very difficult to substitute. The unique properties in these heavy metals permit an extraordinary wide range of enabling technologies and as such are widely distributed through most consumer and industrial products. Trade flows in these small and niche markets are tricky to track, but China is overwhelmingly the top source of both metals -- accounting for 94% of gallium supply and 83% of germanium, according to a European Union study on critical raw materials. Despite their name, most rare earths are relatively abundant -- although they are not always easy to extract and are ecologically-fouling to an extreme. There was zero production on U.S. soil as recently as 2017, according to the U.S. Geological Survey.

Classified as "minor metals," gallium and germanium aren't found on their own in nature. Instead, they're produced in small concentrations as a byproduct from refineries focused on other, more mainstream raw materials like zinc (used mainly as a coating to protect iron and steel from corrosion) or aluminum (cans, airplane parts). The markets for gallium (used in TV/phone screens, solar panels, and radars) and germanium (used in fiber-optics and space -- most satellites are powered with germanium-based solar cells) are tiny when compared with other commodities like copper or oil -- but their use in strategic industries mean that the curbs could still have far-reaching impact.

The metals aren't particularly rare or difficult to find, but the environmental cost to mining and manufacture is so high that its production -- along with dozens of other rare earth elements and critical raw materials exist only in China, where environmental oversight famously doesn't exist. China's dominance raises concerns about geopolitical and economic risks. The concentration of rare earth metal production in a single country poses vulnerabilities for industries and governments heavily dependent on these resources. Like the pandemic-linked supply-chain snafus, it becomes imperative for countries to diversify their sources, develop domestic supply, and maintain partnerships that ensure resilience and reduce the vulnerability to disruptions. This threshold has now been breached, so we should expect a step-up in Federal subsidies in this vital area relatively soon.

Regards,



Adam S. Abelson  
Chief Investment Officer  
U.S. Large Cap Equity Strategy