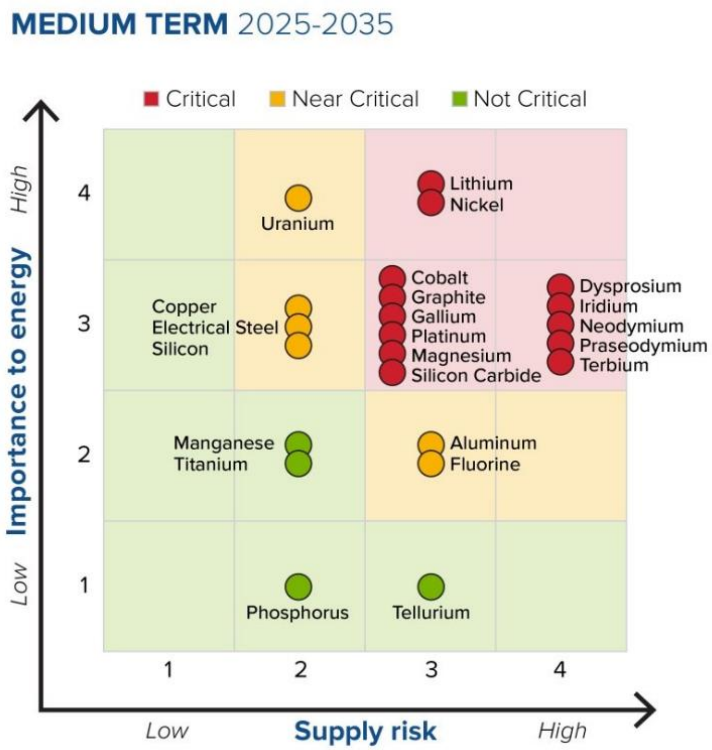
Magnesium Classified Among Most Critical Materials

Magnesium has many important uses in technology, agriculture, and health industries. As a metal, magnesium has growing applications for green energy. The lightest structural metal – 33% lighter than aluminum and 75% lighter than steel – magnesium is ideal for lightweighting applications in the transportation (land, air, and sea) sectors. Vehicle lightweighting is gaining speed, utilizing magnesium alloys in various components to create lighter vehicles to improve fuel efficiency, performance, and reduce impact on the environment. Several leading automakers have reportedly already replaced steel and aluminum with magnesium in various parts.

Automakers are also looking at creating magnesium alloy parts with advanced manufacturing processes. Mega casting enables vehicle parts to be created from a single casting instead of numerous small parts castings. Compared to aluminum, magnesium alloys enable faster production and the ability to produce more parts from the same amount of material. Lower vehicle costs can accelerate sales and fuel adoption of electric vehicles (EVs).

Due to magnesium's light weight and high strength, it is also essential in the manufacture of commercial and military aircraft. This makes the silver-colored metal vital for commerce and national security.

The global shift to EVs and clean energy is forecast to significantly increase demand for several critical minerals, especially lithium, nickel, and cobalt, as well as magnesium. As China accounts for approximately 88% of worldwide magnesium production, Western nations are pursuing domestic magnesium sources, and from geopolitical allies, to reduce supply disruptions.



In July 2023, the US Department of Energy (DOE) released its 2023 Critical Materials Assessment report, evaluating materials for their criticality to global clean energy technology supply chains. The DOE determined that magnesium is among the most critical metals from 2025 to 2035 based on its importance for energy applications and supply risks.

In addition to supply risks, the other major concern for end-users of magnesium, is that it can be produced in a more sustainable manner. Today, approximately 85% of the world's magnesium is produced by the Pigeon process in China, a labour intensive and environmentally detrimental method. The DOE reports the Pigeon process is energy intensive, generating 37 kg of CO_2 to produce 1 kg of magnesium. Furthermore, the process uses sulphur hexafluoride, a factor in global warming.

Reporting further on magnesium production, the DOE report states, "The other method of magnesium production utilizes electrolytic processes that require access to a renewable energy source, such as hydropower, to reduce environmental impact. The transition to clean energy will require that magnesium production be sited close enough to renewable power energy to power the electrolytic processes, such as hydropower. This siting practice may cause mild bottleneck concerns, as production is centered around certain geographic areas that have enough hydropower to supply magnesium production."

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