Critical Minerals/Reducing U.S. Import Reliance with Substitution and Recycling Technologies: U.S. Government Accountability Office Report

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07/24/2026

The United States Government Accountability Office ("GAO") issued a July report titled:

Critical Minerals: Reducing U.S. Import Reliance with Substitution and Recycling Technologies ("Report").

The Report is transmitted to the following:

- The Honorable Gary Palmer, Chairman, Subcommittee on Environment Committee on Energy and Commerce, House of Representatives.
- The Honorable John Joyce, M.D., Chairman, Subcommittee on Oversight and Investigations Committee on Energy and Commerce, House of Representatives.

The above referenced Congressmen asked GAO to describe substitution and recycling technologies that are available for deployment in the near term (two to three years) that may reduce United States import reliance on critical minerals in the semiconductor and battery industries. As a result, GAO examined:

1. The state of and potential opportunities and impacts of these technologies to lessen import reliance on critical minerals within these industries,
2. Challenges to the development and adoption of these technologies, and
3. Policy options that could support the policy goal of reducing critical mineral import reliance.

GAO selected 11 critical minerals for examination based on their import reliance and importance to the battery and semiconductor industries.

It found by way of summary that substitution and recycling technologies could help reduce U.S. reliance on these imports. However, progress is stated to likely take many years in some cases.

The Report addressed:

- Batteries (noting substitution and recycling technologies offer near-term potential to reduce cobalt, manganese, and nickel in the next 2 to 3 years, but such batteries do not perform as well in other applications, like long-haul electric vehicles, due to their lower energy density).

- Semiconductors (most substitution and recycling technologies are likely years away from maturity, and unlikely to have a near-term effect on import reliance of minerals, such as gallium and indium, because other materials do not perform as well as these critical minerals across the same conditions).

Experts are stated to have informed GAO that industry will not adopt substitutes until they can perform at the same level as current semiconductor materials in the intended application.

Technologies to recycle minerals from semiconductors also face challenges, such as an underdeveloped market. However, semiconductor manufacturing scrap is referenced as a potential source of recycled minerals, though this is not yet standard practice in the U.S. Another potential source is discarded electronics, but the critical mineral content is low, and those minerals are generally mixed and bonded with other materials. Technologies to recycle this form of electronic waste are described as in pilot-stage development.

A copy of the GAO Report can be found here.