

Will there be enough critical minerals for growing EV adoption?

Electric vehicles (EVs) require more minerals than comparable internal combustion engine vehicles, largely because of their batteries, which use materials such as lithium, nickel, cobalt, manganese, phosphorus and graphite that are not traditionally used in the automotive industry. This has important implications for automotive supply chains, increasing reliance on a new set of critical minerals. That raises questions about the availability of these minerals and whether sufficient reserves exist to meet the needs of a rapidly expanding EV market.

Battery mineral reserves – comprising mineral resources that can be legally extracted in an economically viable way with current economic conditions and technologies – are more than sufficient to meet projected demand for the coming decades. This is the case even in the Net Zero Emissions by 2050 Scenario (NZE Scenario), which has the greatest critical minerals needs. Global lithium reserves stand at around 37 million tonnes, or roughly two-and-a-half times the cumulative projected demand in the NZE Scenario between 2026 and 2040, and far more than four times the projected demand in the Current Policies Scenario (CPS) and Stated Policies Scenario (STEPS) over the same period. For nickel and cobalt, reserves are one-and-a-half to two times projected 2026-40 demand in the NZE Scenario.

Moreover, critical mineral resources – the total mineral resource available, including reserves and deposits not yet economically viable to extract – are significantly larger than reserves for all battery minerals. Over time, additional resources and reserves are likely to be identified. For example, global lithium reserves grew by about 75% between 2020 and 2025. Recycling of end-of-life batteries will also supply a growing share of demand, reducing pressure on primary materials. Overall, the geological abundance of these minerals does not pose a fundamental constraint on the long-term development of the EV industry or other sectors that depend on them.

However, this does not mean that critical minerals are free of challenges. First, minerals must be extracted and processed at a pace that keeps up with demand, requiring sustained investment in the timely development of sufficient projects across the supply chain. For example, copper, a cornerstone of electrification, is expected to face significant supply tightness in the coming years, contributing to record-high prices. Second, the supply of many critical minerals is highly geographically concentrated, which increases exposure to supply security risks. In 2024, China was the leading refiner for 19 out of 20 strategic minerals, with an average market share of around 70%. Importantly, these minerals are essential not only for EVs but also for a wide range of energy-related and strategic applications, including defence.

GLOBAL LITHIUM DEMAND BY SCENARIO (CUMULATIVE, 2026-2040) COMPARED TO GLOBAL RESERVES AND RESOURCES

