

A significant scaling up of both production and international trade of **critical raw materials** is needed to meet projected demand for the **green transition** and achieve global **net zero** CO2 emissions targets.

A new policy paper on Raw Materials for the Green Transition: Production, International Trade and Export Restrictions, shows the price of many materials - including aluminum and **copper** - have reached record highs, driven by the repercussions of the COVID-19 pandemic, trade tensions and the continuing consequences of **Russia's invasion of Ukraine**.

While the production and trade of most critical raw materials has expanded rapidly over the last ten years, growth is not keeping pace with projected demand for the metals and minerals needed to transform the global economy from one dominated by fossil fuels to one led by renewable energy technologies.

Lithium, **rare earth elements**, chromium, arsenic, cobalt, titanium, selenium and magnesium recorded the largest production volume expansions - ranging between **33%** for magnesium and **208%** for lithium - in the last decade, but this falls far short of the four- to six-fold increases in demand projected for the green transition. At the same time, global production of some critical raw materials, such as lead, natural graphite, zinc, precious metal ores and concentrates, as well as tin, actually declined over the last decade.

"The challenge of achieving net zero **CO2 emissions** will require a significant scaling up of production and international trade in critical raw materials," OECD Secretary-General Mathias Cormann said. "Policy makers must closely scrutinise how the concentration of production and trade coupled with the increasing use of export restrictions are affecting international markets for critical raw materials. We must ensure that materials shortfalls do not prevent us from meeting our climate change commitments."

Production of critical raw materials is becoming more concentrated amongst countries, with China, Russia, Australia, South Africa and Zimbabwe among the top producers and reserve holders.

While both imports and exports of critical raw materials have also become increasingly concentrated amongst countries, trade of these materials remains relatively well diversified. This suggests that the possibility of significant disruption to **the global green transition** by disturbances to import or export flows of critical raw materials is limited. However, concentrations of exports and imports are significant in some specific cases, notably in upstream segments of supply chains for some critical raw materials, including lithium, borates, cobalt, colloidal precious metals, manganese and magnesium.

Export restrictions on critical raw materials have seen a five-fold increase since the OECD

began collecting data in 2009, with **10% of global exports** in [critical raw materials](#) now facing at least one export restriction measure. Export restrictions on ores and minerals — in essence the raw materials located upstream in critical raw material supply chains — grew faster than restrictions in the other segments of the critical raw materials supply chain, correlating with the increasing levels of production, import and export, as well as the concentration in a small number of countries.

[China](#), India, Argentina, Russia, Viet Nam and Kazakhstan issued the most new export restrictions over the 2009 to 2020 period for [critical raw materials](#), and also account for the highest shares of import dependencies of OECD countries. The OECD finds that the trend toward increasing export restrictions may be playing a role in key international markets, with potentially sizable effects on both availability and prices of these materials.

Source: OECD