



Australian Government

# Critical Minerals List 2023 update

December 2023



[industry.gov.au/CriticalMineralsList](https://industry.gov.au/CriticalMineralsList)

# **Critical Minerals List 2023 update**

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# Summary

The Australian Government has updated Australia's Critical Minerals List to reflect global mineral supply and demand.

It has also created a new Strategic Materials List. This list recognises:

- the vital role of some materials in the global transition to net zero and their broader strategic applications
- demand for these minerals from other countries.

Both lists will be used to allocate appropriate support for these resources.

The updated Critical Minerals List and new Strategic Materials List were determined using a comprehensive methodology developed by the Critical Minerals Office. The methodology aligns with the [Critical Minerals Strategy 2023–2030](#) and focuses on:

- the priority technologies outlined in the Critical Minerals Strategy
- Australia's geological potential for resources
- the needs of our strategic international partners
- the vulnerability of our supply chains.

To develop this methodology, we performed technical and market analysis and drew on data from Geoscience Australia.

The Critical Minerals Office also consulted extensively with industry, peak bodies, state and territory government representatives and other stakeholders. We received over 50 responses to [public consultation on an issues paper](#).

The updated Critical Minerals List consists of 30 minerals (or groupings of minerals). The changes for 2023 are:

- adding arsenic, fluorine, molybdenum, selenium and tellurium
- removing helium.

The new Strategic Materials List consists of 6 minerals: aluminium, copper, nickel, phosphorus, tin and zinc.

Minerals on the Strategic Materials List are important for the global transition to net zero and their broader strategic applications. They are also in demand from our international partners. However, available evidence does not suggest their supply chains are currently vulnerable enough to be considered critical minerals. These strategic materials have well-established global markets and transparent pricing, and can often raise finance for commercial projects.

Supply and demand of the materials needed to achieve net zero will continue to evolve and face uncertainty. The Strategic Materials List will enable the government to monitor the market developments for these minerals. It also signals that the government will continue supporting their development for clean energy, defence technologies, and broader strategic applications.

To ensure the Critical Minerals List and Strategic Materials List remain fit for purpose, the government will review them at least every 3 years. The minister also has the discretion to review the lists at any time. The government may review the lists as a response to significant changes in technology, trade or supply conditions.

# Critical Minerals List

Updating the Critical Minerals List is a key part of the government's Critical Minerals Strategy, which was released on 20 June 2023. The Critical Minerals Strategy is a framework for achieving Australia's vision for critical minerals by 2030. Our vision is to grow the geostrategic and economic footprint of our critical minerals sector by becoming a globally significant producer of raw and processed critical minerals.

Recent global events have emphasised Australia's important role in supplying the minerals needed for diverse, resilient, and sustainable global supply chains. These supply chains are crucial to the industries and technologies that support:

- the global transition to net zero emissions
- domestic and regional energy security
- Australia's defence and economic security.

The update to the Critical Minerals List:

- adds arsenic, fluorine, molybdenum, selenium and tellurium
- removes helium.

## Australia's updated Critical Minerals List

- High-purity alumina
- Antimony
- Arsenic
- Beryllium
- Bismuth
- Chromium
- Cobalt
- Fluorine
- Gallium
- Germanium
- Graphite
- Hafnium
- Indium
- Lithium
- Magnesium
- Manganese
- Molybdenum
- Niobium
- Platinum-group elements<sup>1</sup>

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<sup>1</sup> Platinum-group elements are platinum, palladium, rhodium, ruthenium, iridium and osmium.

- Rare earth elements<sup>2</sup>
- Rhenium
- Scandium
- Selenium
- Silicon
- Tantalum
- Tellurium
- Titanium
- Tungsten
- Vanadium
- Zirconium

Australia's Critical Minerals List focuses on elemental minerals (those that appear on the periodic table). The exceptions are high-purity alumina (which is distinct from aluminium) and graphite (which is distinct from carbon).

## High-purity alumina (HPA)

HPA is a niche, high-value product that is produced differently to normal alumina. It is used to manufacture:

- LED lights
- lithium-ion batteries for electric vehicles
- synthetic sapphire glass for smartphone camera lenses
- other products.

## Graphite

Graphite is a soft, crystalline form of carbon. It occurs naturally in different forms and can also be synthesised. Graphite:

- is a good electrical conductor
- has a high melting point
- has good lubricating properties.

It is used as an anode in batteries, as a refractory material (a material resistant to heat and wear) and as an industrial lubricant.

## Updates to the Critical Minerals List

### Added: Arsenic

Arsenic is used as an alloying agent in many industrial processes. It also has some defence applications. Importantly, high-purity arsenic metal is used to manufacture semiconductors.

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<sup>2</sup> Rare earth elements are yttrium, lanthanum, cerium, praseodymium, neodymium, promethium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium and lutetium.



Arsenic is listed as a critical mineral by the United States (US) and the European Union (EU). Australia has resource potential for arsenic, with many known deposits and recovery as a by-product from existing deposits.

## Added: Fluorine

Fluorine is sourced from fluorite (also called fluorspar). It can be used in batteries and for manufacturing semiconductors and solar photovoltaic cells. Its main use is as a fluxing material for manufacturing steel and aluminium.

Fluorspar is listed as a critical mineral by the US and the EU, and fluorine is listed by Japan. Australia has known resources of fluorine and the geological potential to discover more. However, there is currently no recorded production of fluorine in Australia.

## Added: Molybdenum

Molybdenum is primarily used to increase the strength, hardness and corrosion resistance of alloys. Molybdenum alloys are widely used as a refractory metal in chemical applications and in structural steel, aircraft and automobile parts.

Molybdenum is listed as a critical mineral by India, Japan and the Republic of Korea. Australia has known resources of molybdenum. We also have the potential for additional discovery and by-product development.

## Added: Selenium

Selenium is used in copper and steel alloys, manganese metal production, and solar cells and photocells.

Selenium is listed as a critical mineral by India, Japan and the Republic of Korea. Australia may have potential sources of selenium by recovering by-products from the production of other minerals.

## Added: Tellurium

Tellurium is used to produce thin-film solar cells and thermoelectric devices for cooling and energy generation. It can also be used as an alloy for steel, copper and lead.

Tellurium is primarily recovered as a by-product from the production of other minerals. It is listed as a critical mineral by the US, India, Japan and the United Kingdom (UK).

## Removed: Helium

Helium is used in a variety of industries, including healthcare, electronics and aerospace.

Its primary use is in magnetic resonance imaging (MRI). It is also used:

- as a lifting gas
- in welding
- to manufacture electronics, including semiconductors.

Currently, the only commercially viable sources of helium are natural gas fields. However, only a few natural gas fields in the world have enough helium to make separating and producing it profitable. This means global production is dominated by a few countries, particularly the US and Qatar.

Helium is not recognised as a critical mineral by the US, India, Japan, Republic of Korea or UK.



# Strategic Materials List

Our analysis and stakeholder consultation highlighted the need to recognise a broader set of minerals than those on the Critical Minerals List. These additional minerals are important for the global transition to net zero and broader strategic applications, but their supply chains are not currently vulnerable to disruption.

The Strategic Materials List has been established as a ‘watchlist’ for government. It also shows investors that the government recognises the importance of these minerals and will direct appropriate resources to them if supply chains become vulnerable.

The government anticipates our international partners will increase their demand for these minerals. The Strategic Materials List allows a higher level of monitoring and government intervention if required.

## Australia’s Strategic Materials List

- Aluminium
- Copper
- Nickel
- Phosphorus
- Tin
- Zinc

### Aluminium

Aluminium has applications as an alloy. It is needed for the global transition to clean energy. It is recyclable from scrap.

Australia is a leading global producer of aluminium and the top global producer of bauxite (which contains aluminium oxide). We are already one of the few countries operating at all stages of the supply chain.

This well-established domestic industry means that the aluminium supply chain in Australia is sufficiently robust.

### Copper

Copper is used extensively in electricity transmission and other clean energy applications. It is recyclable from scrap.

Australia has the world’s second-highest economic resources of copper and many operating mines. This indicates a well-established domestic industry and a supply chain that is currently meeting the demand of our international partners.

### Nickel

Nickel is an essential component of batteries and other clean energy technologies. It is also used in a wide range of alloys. Nickel is recyclable, particularly from battery and alloy scrap.

Australia has the world’s largest economic resources of nickel and many operating mines. This indicates a well-established domestic industry and a supply chain that is well-functioning and robust.

## Phosphorus

Phosphorus can potentially be used in batteries. Its main source is phosphate rock, which is primarily mined to produce chemical fertilisers for agriculture.

Australia has 2 significant operating mines, with more in development.

## Tin

Tin is used as a solder and alloy. It has applications for technologies including batteries and semiconductors. Tin is also recyclable.

Australia has globally significant economic resources of tin and is currently an important global producer.

## Zinc

Zinc is part of many clean energy technologies and is also used as an alloy. It is recyclable at all stages of production and use.

Australia is the world's third-largest producer of zinc and has the largest economic resources.

Australia has multiple operating zinc mines in a well-established domestic industry.

# Overview of methodology, analysis and stakeholder consultation

This update to the Critical Minerals List is based on robust analysis and stakeholder consultation, including:

- technical and market analysis
- engaging and collaborating with Australian Government science agencies
- consulting industry, state and territory government representatives, peak bodies and other experts.

## Critical minerals criteria

Our methodology assessed minerals against criteria that are consistent with the vision and objectives of the Critical Minerals Strategy. A 'critical mineral' is a mineral:

- essential to modern technologies, economies or national security, specifically the priority technologies set out in the Critical Minerals Strategy
- for which Australia has moderate to high geological potential for resources
- in demand from our strategic international partners
- that is vulnerable to supply chain disruption.

As per the Critical Minerals Strategy, priority technologies where critical minerals are essential to supply chains include:

- batteries and battery components
- rare earth permanent magnets
- catalysts for hydrogen production
- semiconductors for microchips and solar PV
- defence technologies
- high-performance alloys and metals.

## Assessing criticality

Geoscience Australia advised the Critical Minerals Office on Australia's current mineral criticality. This advice is part of a broader capability Geoscience Australia is developing. It uses a broad range of datasets to systematically assess minerals' economic and strategic significance and supply chain vulnerability.

Metrics of supply chain vulnerability that were used to inform the update include:

- Australian imports and exports
- mineral production
- concentration of global trade.

Geoscience Australia also advised on Australia's geological potential for each mineral considered in the update.

## Strategic materials criteria

The Strategic Materials List identifies minerals:

- that are important for the global transition to net zero and broader strategic applications, specifically the priority technologies set out in the Critical Minerals Strategy
- for which Australia has moderate to high geological potential for resources
- in demand from our strategic international partners

However, unlike critical minerals, the domestic supply chains are not currently vulnerable to disruption and are robust enough to meet current demand. This is due to multiple operating Australian mines and/or sufficiently diverse and resilient import markets.

## Consultation process

The Critical Minerals Office received over 50 written submissions in response to a public issues paper. We also consulted with:

- all state and territory governments except the Australian Capital Territory
- Australian Government science agencies, including the Commonwealth Scientific and Industrial Research Organisation (CSIRO), the Australian Nuclear Science and Technology Organisation (ANSTO) and Geoscience Australia
- Australian Government financing bodies such as the Northern Australia Infrastructure Facility (NAIF), Export Finance Australia (EFA) and the Clean Energy Finance Corporation
- other relevant Australian Government departments and agencies.

The publicly available stakeholder submissions are on the [consultation page](#).

## Key themes from submissions

### Criteria for critical minerals

Stakeholders told us that the criteria for a critical mineral should include the mineral's importance to renewable energy and net zero ambitions.

It should consider the potential for either:

- value-added processing, technology development or domestic manufacturing in Australia
- Australia building on its existing research and development activities or chemical, metals and minerals processing expertise.

### Multiple categories or lists

Many stakeholders thought that categories or separate lists could help differentiate between the criticality of minerals and Australia's potential to either:

- develop or enhance downstream processing, value-adding and supporting domestic manufacturing
- target differentiated support for less-developed minerals.

However, some respondents preferred the simplicity of a single list.

## Reviewing the lists

Many stakeholders supported regular reviews balanced with stability for investment certainty. They suggested review intervals ranging from 2 to 5 years.

Some suggested out-of-cycle reviews:

- where there had been significant changes in the market for a mineral, such as supply–demand balance
- in response to relevant global, strategic, technological, economic or policy changes
- when requested by industry.

## Future reviews

The government will review the Critical Minerals List and Strategic Materials List at least every 3 years. The minister has the discretion to review the lists at any time, and the government may make interim amendments if there are significant changes to technology, trade, domestic capacity or geopolitical developments.

This will ensure the government can appropriately target and prioritise support for critical minerals projects that contribute to the vision and objectives of the Critical Minerals Strategy.

This approach gives certainty to investors and businesses, including for critical minerals projects that have received government funding.

The Critical Minerals Strategy will be comprehensively reviewed in 2026. Progress against its objectives will be reported in the Department of Industry, Science and Resources' annual reports.

For more information, contact the Critical Minerals Office at [criticalminerals@industry.gov.au](mailto:criticalminerals@industry.gov.au).

