CRITICAL MINERALS FACT SHEET SERIES

#1 What are Critical Minerals

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WHAT MAKES A MINERAL 'CRITICAL'?

Critical minerals are elements, metals, or materials which are crucial for modern technology, but which have vulnerable or uncertain supply. Similar terms include 'transition minerals' and 'strategic raw materials' or 'battery metals.' These are not chemical or geological terms but political and economic constructs.

Each country has its own slightly different list, but there are two criteria that makes a mineral critical:

A material's Importance to economic and technological development, especially including:

- Low-carbon technologies like lithium-ion batteries, and powerful lightweight. permanent magnets used in electric vehicle motors and wind turbines.
- Touch screen displays and lighting, medical devices, and other electronics.
- Specialty alloys for aerospace and military applications.

And that has vulnerable supply chains. Supply chains may be 'vulnerable' if:

- The extraction or processing is concentrated in a small number of countries or corporations.
- Rare, difficult or expensive to extract or produce.
- If minerals are largely produced as by products of other metals.

THE PUSH FOR CRITICAL MINERALS

New critical mineral mines are being driven by the urgent need to decarbonise the global economy through rapid escalation of renewable energy and lithium batteries for electric vehicles. Replacing fossil fuels with renewable energy is imperative, and **will result in less mining**, overall. However, the development of new mining regions, and new types of mineral processing will affect communities and ecosystems in new ways.

The **International Energy Agency** predicts that demand for renewable energy, energy infrastructure and electric vehicles will drive exponential demand. By 2040 annual global demand for lithium could be 42 time more than 2020 levels, nickel 19, cobalt 21, graphite 25 and REE by 7 times. While critical minerals are crucial ingredients for a transition away from fossil fuels towards renewables, **these demand predictions have been challenged for their assumption of replacing every fossil fuel vehicle with an EV.**

The US and their allies are sensitive to the fact that critical mineral production is concentrated in China. For example, China produces over 80% of rare earth elements ('REE') used to make powerful magnets in electric motors and wind turbines. Mining and processing minerals in Australia is an important addition to Chinese supply chains.

Booming global demand creates a huge economic opportunity for mining corporations in Australia - where we have many critical minerals in abundance. This puts increasing pressure on the environment and communities.

Geoscience Australia has a $225m exploration fund to deliver new data on critical minerals which has stimulated 419 new exploration tenements by 49 companies. Australia already mines many critical minerals but has mostly exported raw minerals for processing and refining in China. This is starting to change with more investment in domestic processing and refining. Since 2019, the Commonwealth and state governments have contributed $6.6 billion in loans and grants for critical mineral extraction and processing.

In Australia there are 31 official Critical Minerals.

High Purity Alumina (HPA)
Antimony (Sb)
Arsenic (As)
Berylium (Be)
Chromium (Cr)
Cobalt (Co)
Fluorine (F)
Graphite (C)
Lithium (Li)
Magnesium (Mg)
Manganese (Mn)
Molybdenum (Mo)
Niobium (Nb)
Nickel (Ni)
Platinum group-elements (PGE)*
Rare-earth elements (REE)**
Rhenium (Re)
Scandium (Sc)
Selenium (Se)
Silicon (Si)
Tantalum (Ta)
Titanium (Ti)
Tungsten (W)
Vanadium (V)

In 2023 Australia published a **Strategic Minerals List** which includes minerals that are important for the renewable energy transition but their supply chains are not sufficiently vulnerable to make the critical minerals list:

Aluminium (Bauxite) (Al)
Copper (Cu)
Phosphorous (P)
Tin (Sn)
Zinc (Zn)

Most states in Australia and the NT have developed their own critical mineral strategy & list. Australia has signed at least 7 international partnerships for critical minerals.

ALTERNATIVES TO NEW MINES

Many critical minerals can be found in the tailings of metals mines - like copper (Cu) or gold (Au). **Geoscience Australia has recently produced a map** of Australian mine tailings which host many critical mineral elements.

Recycling of critical minerals will become increasingly important as more batteries and renewable projects reach their end of life.

ENVIRONMENTAL RISKS

Each 'critical mineral' has its own set of risks associated with extraction and processing.

In addition to many common risks associated with mining, like heavy metal contamination, biodiversity loss, damage to cultural heritage, dust, and water use, there are unique radiation risks at some critical minerals projects.

It is important to understand the positive and negative impacts of mining so that sober decisions can be made and efforts to decarbonise do not displace or diminish communities and the environment, already facing increasing threats from climate change.

There are concerns that the hype over critical mineral is driving an industry push for de-regulation of policy where in fact we drastically need stronger environmental laws and protections for communities from the impacts of mining.

Critical Mineral Fact Sheet Series

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The Fact Sheet series we will include the following:

1. Mineral Sands
2. Rare Earths Elements
3. Lithium
4. Processing - types
5. NORMS & TENORMS

* PGE Includes 6 separate elements
**REE describe a collection of 17 elements including the lanthanides along with cerium, scandium and yttrium. They have become indispensable components in many essential technologies.