Future of Minerals in NSW

REPORT SUMMARY

NSW GOVERNMENT
The New South Wales (NSW) resources sector is vibrant, with world-class deposits, a highly skilled workforce and a well-earned reputation for safe, responsible and innovative mining practices.

The NSW Government strongly supports the state’s minerals industry and the responsible development of its mineral resources. Our goal is to make NSW the number one state for new exploration and resources investment in Australia.

The Future of Minerals in NSW Report is intended to inform investors, project developers, miners and explorers of global consumer trends and technology development that will shape the supply and demand for minerals, especially high-tech and critical minerals. The report outlines how NSW is positioning itself to be a supplier of raw materials for a high-tech future underpinned by our highly prospective natural resource endowment, supported by world-class geoscientific datasets and a robust regulatory framework.

Consistent with the Australian Government’s Critical Minerals Strategy and associated investment incentives, the NSW Government has identified key areas for investment in emerging and traditional metals.

**Macro trends**

Over the next 40 years, global demand for metals and other key raw materials is expected to surge for the following reasons:

- **a growing middle class** – the world’s population is forecast to reach 8.5 billion by 2030, 9.7 billion by 2050 and 11.2 billion by 2100. Over the same period, average living standards are expected to rise, creating a growing global middle class. This will drive additional demand for minerals through increased consumer spending on manufactured products and housing.

- **technological development** – much of the advancement in material science involves combining multiple elements with unique properties into superior compound substances. This is leading to increased demand for a greater variety of minerals to produce a growing range of compounds.

- **the energy transition** – the shift to lower carbon economies will accelerate the deployment of wind, solar and battery technologies. The manufacture of renewable technologies requires a significant amount of mined minerals. It is expected aluminium, copper, silver, bauxite, iron, lead, rare earth elements and other minerals will see significant growth in demand as this transition occurs.

![Figure 1: Historical and forecast of the world's middle class (OECD 2019)](https://www.brookings.edu/wp-content/uploads/2017/02/global_20170228_global-middle-class.pdf)
Figure 2: Metals used in components of a jet engine

Combustion chamber and high pressure turbine
Nickel based superalloys with a thermal barrier coating such as yttrium stabilised zirconia

Low pressure turbine
Nickel based superalloys

High pressure compressor
Titanium or nickel alloys

Low pressure compressor
Titanium or aluminium alloy

Fan
Titanium alloy

Figure 3: Typical raw materials required for a 3MW direct drive wind turbine

3 MW direct drive turbine
1,100 t concrete
(77 t of coal + 635 t limestone)
304 t steel
(234 t coking coal + 456 t iron ore)
4.3 t copper
2.7 t aluminium
1.8 t rare earths
Zinc and molybdenum

NSW mineral potential

NSW has a long history of mining stretching back for almost two centuries. The state hosts the giant Broken Hill silver-lead-zinc and Cadia Valley copper-gold deposits, in addition to several other significant base and precious metal mines with ongoing exploration. As well as its traditional metals of gold, copper, lead, silver and zinc, the state has proven prospectivity for other traditional metals such as tin, antimony, aluminium, nickel, molybdenum and platinum group metals. The potential for emerging metals in NSW has already been recognised, with several projects in development to produce rare earth elements, cobalt, scandium and titanium.

Detailed information about the geology and mineral potential of NSW is available free of charge via the MinView online data portal and explained in more detail in the Future of Minerals in NSW Report.

Potential to meet global demand

There is growing global demand for both traditional metals like gold and copper, as well as emerging high-tech metals such as rare earth elements, scandium, cobalt and platinum group elements. NSW is prospective for these metals and is well-placed to become a key supplier in the global minerals industry.

Figure 4: Major geological provinces and operating mines in NSW

**Traditional metals**
- Copper
- Gold
- Silver
- Lead
- Zinc
- Aluminum

**Emerging metals**
- Nickel
- Platinum Group Elements
- Antimony
- Molybdenum
- Tin
- Cobalt
- Scandium
- REE
- Titanium
Exploration opportunities in NSW

Diverse geology and a broad variety of minerals makes NSW an ‘all-rounder’ for mineral resources in Australia and globally. Despite its significant prospectivity, most of the state remains under-explored or unexplored.

Ore deposits and mineral prospectivity across NSW extend both at depth and under younger cover rock sequences. However, almost all historical exploration in the state has been confined to areas where prospective geology is exposed at the surface. The majority of known metallic mineral occurrences in NSW have been discovered in areas of exposed prospective geology or shallow cover (<150m cover).

This means NSW is under-explored, with deep and under cover mineral potential largely untested.

The Future of Minerals in NSW Report highlights the exploration potential of the following highly prospective regions in NSW:

- Macquarie Arc
- Cobar Basin (and other Siluro-Devonian basins)
- Fifield-Nyngan Belt
- Broken Hill
- Southern Thomson Orogen.

Only eight per cent of the mineral drill holes across the state have been drilled deeper than 150m.
Advantages of investing in NSW minerals exploration and mining

Mining investment not only depends on mineral endowment but on access to infrastructure, reliable utilities and a clear development process. Australia, and specifically NSW, offers major advantages that make it an attractive destination for mining investment.

Australia has sustained an unprecedented period of economic growth since 1991. NSW is the largest economy in Australia and the state’s strong economic performance in recent times has bolstered this position. This recent improvement is, in part, due to strong infrastructure investment, especially in regional NSW.

By participating in MinEx Cooperative Research Centre (MinEx CRC) activities, the NSW Government is expanding its geoscientific knowledge to realise the untapped potential for minerals in NSW.

Domestic and international explorers have already recognised the strong mineral potential of NSW. As a result, there is a pipeline of mineral projects in development ready for investment.

NSW has modern mining legislation, combining responsible development standards with efficient administration services. Processing times are measured and reported against committed service delivery standards.

Community engagement is central to the development approval and resource titles application processes in NSW. This ensures that mining proponents can adjust proposals to mitigate impacts on local communities and enhance community benefits as part of the mine project approval process.

NSW is a leader in innovative mining practices. The state ensures the environmentally responsible discovery and extraction of minerals. To meet high standards for environmental protection and safety, the NSW mining industry is supported by innovative businesses in the mining equipment, technology and services sector.

The commitment of the NSW Government to balance economic, social and environmental interests in developing mineral resources puts the NSW minerals industry in a strong position to comply with socially responsible sourcing initiatives and standards.

The NSW Government offers a range of services to assist mineral explorers and miners

- A recently published online prospectus provides a ‘one-stop-shop’ linking to products and services available to explorers and mine developers to help them understand the investment opportunities in NSW. To view the online prospectus visit resourcesandgeoscience.nsw.gov.au/onlineprospectus
- The Geological Survey of NSW (GSNSW) currently stores 1.5 million metres of drillcore representing the most informative one per cent of all samples taken by industry and makes them available to inspect by appointment.
- Through its DiGS® online archive, GSNSW provides access to over 140,000 non-confidential reports and other important mineral and exploration documentary material such as exploration reports, departmental reports, maps and GSNSW publications dating back to 1875. To view the DiGs online archive visit search.geoscience.nsw.gov.au
- Through the MinView online data portal, GSNSW provides a comprehensive collection of free geological, geophysical, geochemical and mineral occurrence data. Downloads include the NSW Statewide Seamless Geology map – one of the most complex geodata sets ever compiled and released worldwide. Access MinView at minview.geoscience.nsw.gov.au
- Through its Cooperative Drilling grants program, the NSW Government provides direct financial support to mineral exploration in underexplored areas of the state. The most recent round of Cooperative Drilling, which was open for application in late 2019, offered $2 million in grants to reimburse successful applicants 50 per cent of direct drilling costs, up to a maximum of $200,000 per exploration program.
The NSW Government recently completed the largest ever airborne electromagnetic survey by area in the state’s history searching for minerals as part of the MinEx CRC National Drilling Initiative.
Download the full Future of Minerals in NSW Report at resourcesandgeoscience.nsw.gov.au/future-of-minerals or scan the QR code