

CRITICAL MINERALS AND HIGH-TECH METALS STRATEGY



Deputy Premier's Foreword

Critical minerals and high-tech metals represent a new frontier for the NSW mining sector. Investments in these types of minerals are vital in enabling our vibrant growth industries, like advanced manufacturing, batteries, defence and aerospace, technology-enabled primary industries and renewables. The future global economy and the pathway to lower emissions will be founded on minerals that NSW is rich in, such as cobalt, rare earth elements and copper.

The minerals sector is an engine industry for the regional economy, generating thousands of jobs and billions of dollars in investment. The NSW Government is committed to further activating our potential in critical minerals and high-tech metals. We already have a strong advantage in our resource base, record levels of investment into regional economies, access to critical road and rail infrastructure, a highly skilled workforce and a strong mining, equipment, technology and services sector.

This Critical Minerals and High-Tech Metals Strategy outlines the NSW Government's vision to build on our existing potential and position NSW as a major global supplier and processor of critical minerals and high-tech metals well into the future. We need to move away from a 'dig and ship' model largely reliant on exporting raw materials, and look to process these materials onshore and use them to manufacture higher value products.

This means taking a coordinated approach across the critical minerals supply chain, supporting the industry from early-stage exploration, through to end uses in manufacturing and recycling. As part of this, we are establishing a Critical Minerals Hub in the Central West of NSW, to activate benefits of collaboration across the critical minerals supply chain, leveraging our existing investments in the Central-West Orana Renewable Energy Zone and Parkes Special Activation Precinct. This is an Australian-first initiative, and will set NSW apart as a premier destination for minerals investment.

I'm excited by the opportunities that critical minerals investment has to offer for our regional economies and communities. The sector will provide a source of economic growth, help diversify the NSW royalty base and provide the materials needed to lower carbon emissions. This Critical Minerals and High Tech Metals Strategy delivers a clear vision to promote exploration, activate supply chains and attract investment, for a valuable, viable and sustainable future for the NSW mining sector.

A handwritten signature in black ink, reading "Paul Toole". The signature is fluid and cursive, with the first name "Paul" and the last name "Toole" clearly distinguishable.

The Hon Paul Toole MP
Minister for Regional New South Wales
Minister responsible for Resources

The opportunity

Establishing NSW as a world leader for investment in sustainable mining is a key priority for the NSW Government. The 20 Year Economic Vision for Regional NSW and the forthcoming Regional Investment Attraction Strategy identify critical minerals as an emerging sector and represents a new future for the NSW mining sector.

The global race is on to locate, develop and establish secure supply chains of responsibly sourced critical minerals and high-tech metals. Critical minerals are a key enabler for a range of global and domestic industries, including advanced manufacturing, renewable energy, defence, aerospace, battery storage, automation, and electric vehicles. Further fuelled by a growing world consumer class and new technologies, increased demand for many minerals is already outstripping supply expansions.

Critical minerals will play a crucial role in reducing emissions, given the direct role of critical minerals in the manufacture of components for renewable energy technologies like batteries, solar panels and wind turbines. Securing those supply chains is vital to secure a low-emissions future.

Critical minerals are 'critical' because they have a range of strategic or industrial applications where there are no other viable substitutes and face potential disruption in supply due to geological scarcity, geopolitical issues, or market dynamics. As such, global security of critical minerals supply is vital – and NSW is well placed to help meet this demand.

NSW has a diverse range of untapped critical minerals, including some very rare deposits, and a thriving metalliferous mining industry. Combined with highly skilled workers and world-leading safety and environmental standards, NSW is well positioned to be a major exporter of responsibly sourced value-added critical and 'high technology' minerals.

Now is the time to invest in the development of the NSW critical minerals sector. The NSW Government is committed to supporting the growth of the sector across the critical minerals supply chain, through investments in exploration, mining, processing, downstream industries and recycling. There is a window of opportunity to secure global investment in long term supply chains and secure new, additional long-term opportunities for the NSW mining sector.

We have a strong emerging industry already in NSW, tapping into globally significant deposits in copper, titanium, zirconium, antimony, rare earth elements (REEs) and cobalt. There is a pipeline of investment-ready projects, with three operating mines capable of producing critical minerals, five projects at an advanced stage of development and more than 15 exploration projects targeting critical minerals.

Investment in downstream processing is vital to ensure the success of critical minerals mining and exploration. Meeting market demand for secure supplies of critical minerals requires a different approach to the traditional 'dig and shift' approach typically undertaken where minimising cost is the prime objective.



*Cadia East surface conveyor at night.
Image courtesy Newcrest Mining Limited.*

NSW can realise the full economic potential of critical minerals investment through dedicated approaches to growing downstream processing capacity, with the majority of value adding and job creation in the technology intensive processing stage. An end-to-end view on investment attraction across the critical minerals supply chain will encourage new processing capacity in NSW or integrate critical minerals from NSW into our strategic partners' existing supply chains. This approach will increase job creation and promote economic recovery for more resilient regional economies.



To deliver on this vision, the NSW Government will:

1. Establish Australia's first Critical Minerals Hub in the Central West
2. Promote exploration for critical minerals resources
3. Activate the industry through proactive development of supply chains
4. Attract investment for critical minerals resources, downstream processing and recycling.



Neodymium Praseodymium bar. Image courtesy Australian Strategic Materials Limited.

Megatrends in critical and tech metals demand

The *Future of Minerals in NSW Report* outlines global trends that will impact global demand over the coming decades.

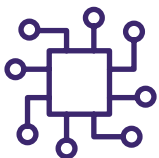
Over the next 40 years, global demand for metals and other key raw materials is expected to surge. The global megatrends driving this increase in demand, include:

- a growing consumer class through global development, urbanisation, and electrification across the world
- technological development requiring greater tonnages and variety of minerals
- climate policy and net zero trends in decarbonisation
- disruption of global supply chains through geopolitical trends and COVID-19.



A growing consumer class

The United Nations forecasts that the world's population will reach 8.5 billion by 2030, 9.7 billion by 2050, and 11.2 billion by 2100. Living standards are also expected to increase, driving demand for minerals through increased consumer spending and urban development. This will increase demand for technology enabled consumer products like mobile phones, electric vehicles and sensors, that rely on critical minerals in their supply chains.



Developing technologies

Many critical minerals are irreplaceable inputs in technological and industrial applications. Rapid technological advancements are increasing the demand for an increasing variety of critical minerals due to their unique properties that enable applications in key defence, medical and aerospace industries.

Advances in materials sciences have led to discoveries of previously unknown characteristics of elements, broadening the range of commercial applications for critical minerals. Growing adoption of these technologies will further increase demand for previously niche metals, growing commercialisation opportunities for critical mineral inputs.

“Over the next 40 years, global demand for metals and other key raw materials is expected to surge.”



Climate policy and trends in decarbonisation

The rapidly expanding renewable energy industry requires a significant supply of critical minerals in the manufacture of key components. The global move to lower carbon economies will accelerate demand for wind turbines, solar panels and batteries for energy storage. As renewable energy technologies are more metals intensive than fossil-fuel-based technologies, the pace of the change will in part depend on the availability of required metals. Furthermore, there is a need to ensure that the required metals can also be mined and processed responsibly along with reduced emissions.

As outlined in a World Energy Outlook Special Report by the IEA , the rise of low-carbon power generation to meet climate goals will mean a tripling of mineral demand from the renewables sector by 2040. Examples from the IEA report of the greater mineral intensity of low-carbon technologies include:

- a typical electric car requires six times the mineral inputs of a conventional car
- onshore wind farm requires nine times more mineral resources than a gas-fired power plant of comparable output.

The concentration of supply for lithium, cobalt and rare earth elements means that the world's top three producers control well over 75 per cent of global output of these materials.

Investment is required to address the supply chain situation, with additional supply of required critical minerals coming from more diverse range of producers. Unless investment increases, it is expected that the supply of critical minerals will not be able to support the accelerated deployment of solar panels, wind turbines and electric vehicles that would be required to meet the Paris Agreement emissions targets.

Long lead times to bring new production online, declining ore grades and sometimes unmitigated environmental impacts globally mean there is a significant challenge in growing the supply of required critical minerals. This requires a concerted effort by governments and industry to grow investment in the responsible development of critical minerals resources and supply chains.



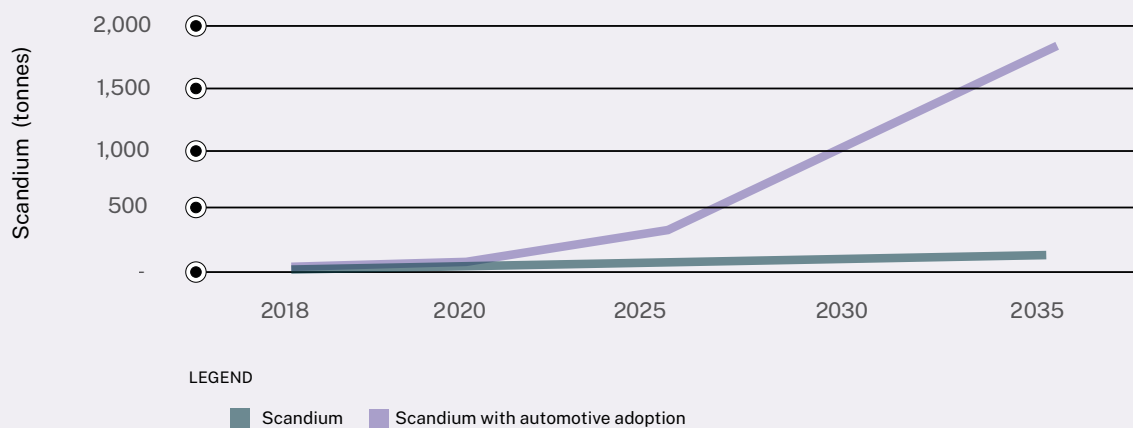
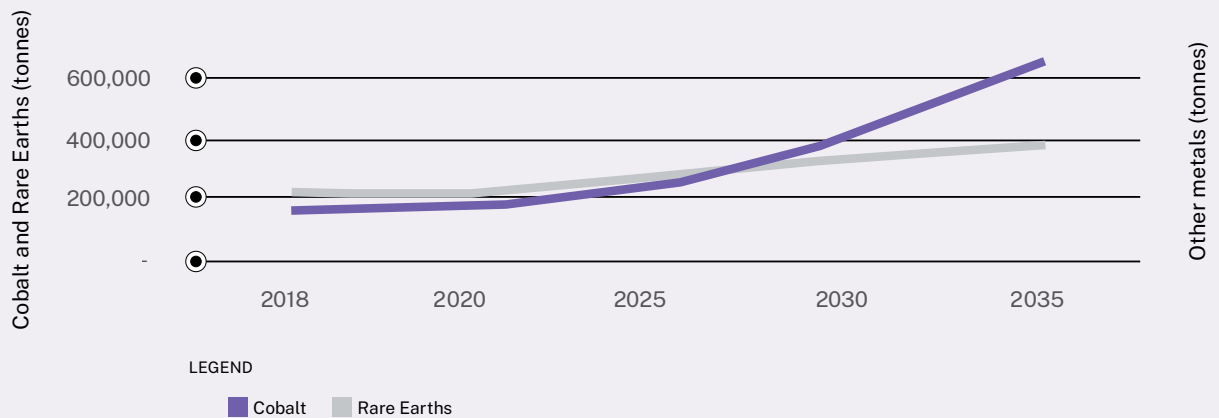
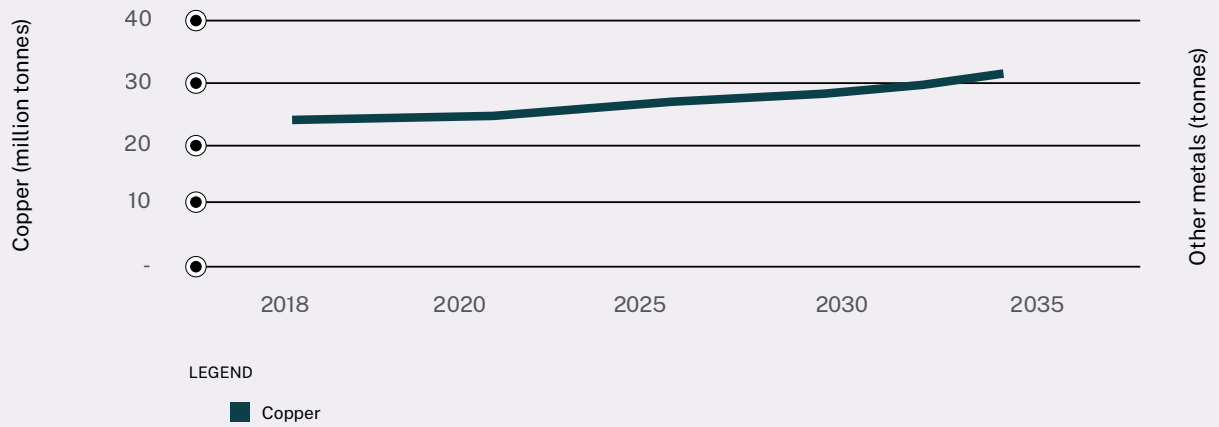
Disruption of global supply chains

Critical minerals have highly complex global supply chains with a significant proportion of mineral production subject to a high degree of monopoly. Geopolitical factors, including trade restrictions, impact on the demand, supply and price of certain minerals. Countries that are dominant in these supply chains have incentives to restrict exports if they choose to provide a competitive advantage.

Governments and industry need security in their supply chains through a diversified supply base. Investments in new supply of critical and high-tech metals in secure jurisdictions like NSW will become exceedingly important, given changes in the geopolitical environment and increasing requirements for environmental, social and governance (ESG)-credentialled minerals.

Further, COVID-19 has significantly disrupted global supply chains. International border closures and national lockdowns have slowed the flow of raw materials and finished goods, disrupting manufacturing. COVID-19 has highlighted the fragility of certain supply chains, and investments in the localisation of these supply chains will work to mitigate future disruption. Supporting further onshore value-adding and manufacturing, both within NSW and across Australia will be critical to securing supply chains within Australia and for our regional partners.

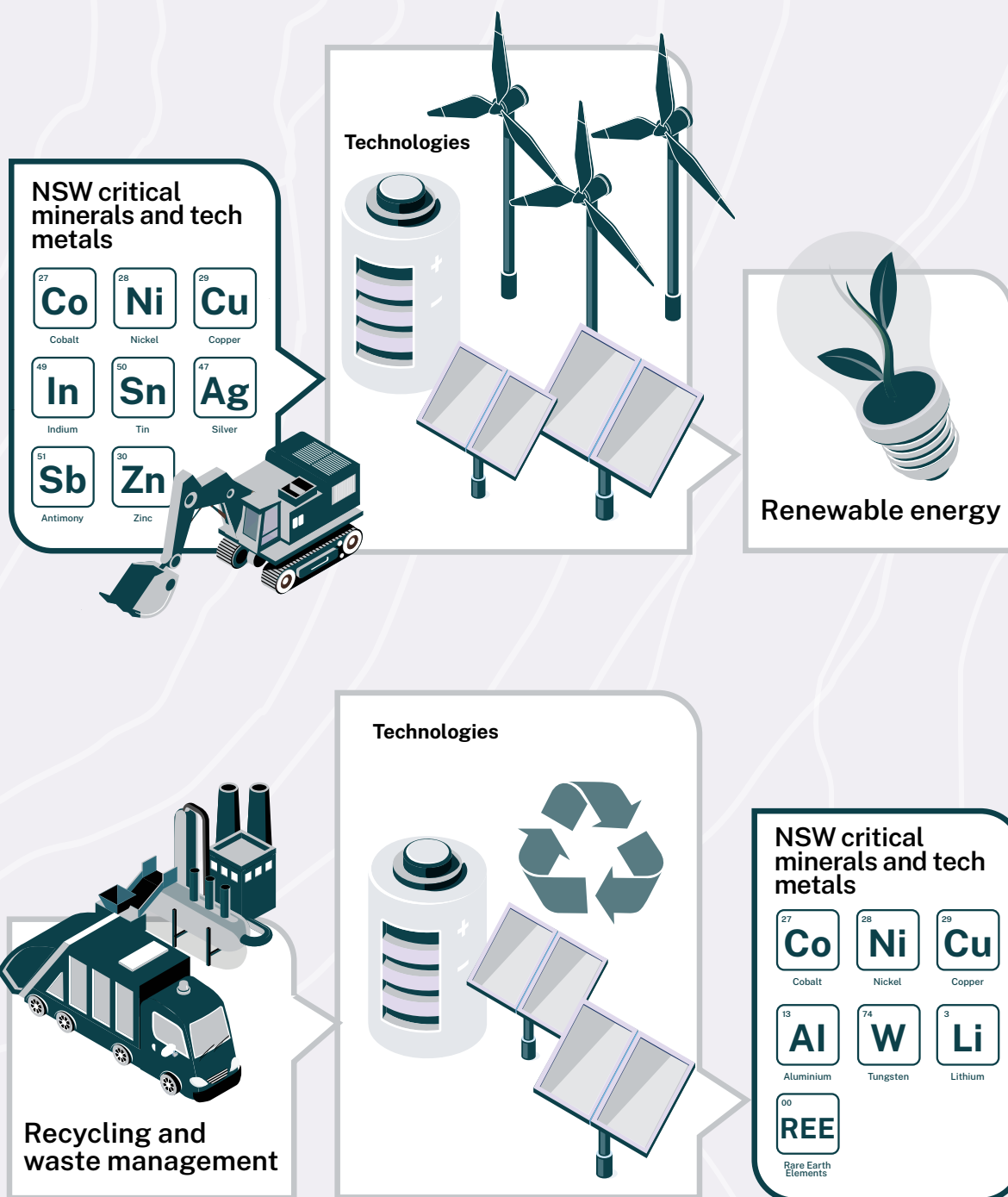
Charts show the outlook of demand for a selection of critical and tech metals that can be mined and processed in NSW



Source: NSW Minerals Outlook, CRU Consulting, March 2019

Critical mineral and high-tech metals to enable the future

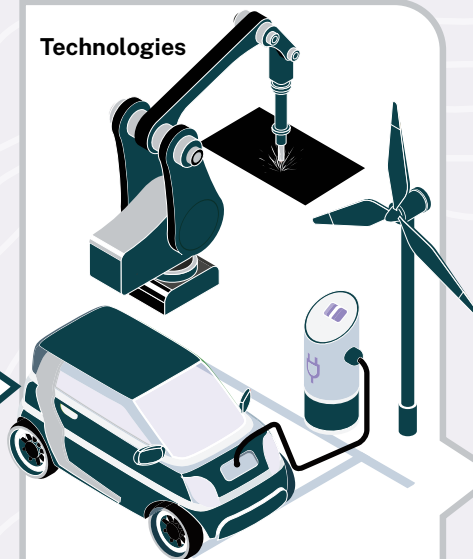
NSW hosts a range of strategically important critical minerals that are vital for a range of future industries. Investments in the development of these minerals, as well as in downstream processing and technologies will be crucial to driving the establishment and growth of these sectors.



NSW critical minerals and tech metals

00 REE Rare Earth Elements	50 Sn Tin	29 Cu Copper
22 W Tungsten	22 Ti Titanium	
21 Sc Scandium		

Technologies

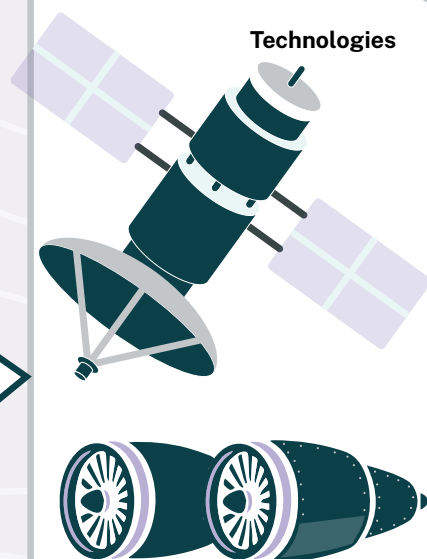


Advanced manufacturing and technology enabled primary industries

NSW critical minerals and tech metals

00 REE Rare Earth Elements	13 Al Aluminium	21 Sc Scandium
74 W Tungsten	22 Ti Titanium	

Technologies



Defence and aerospace

Why NSW

NSW has a range of unique factors to support the activation of a valuable, viable and investment-ready critical minerals sector across the supply chain.

NSW has significant resource potential and world-class geoscientific data

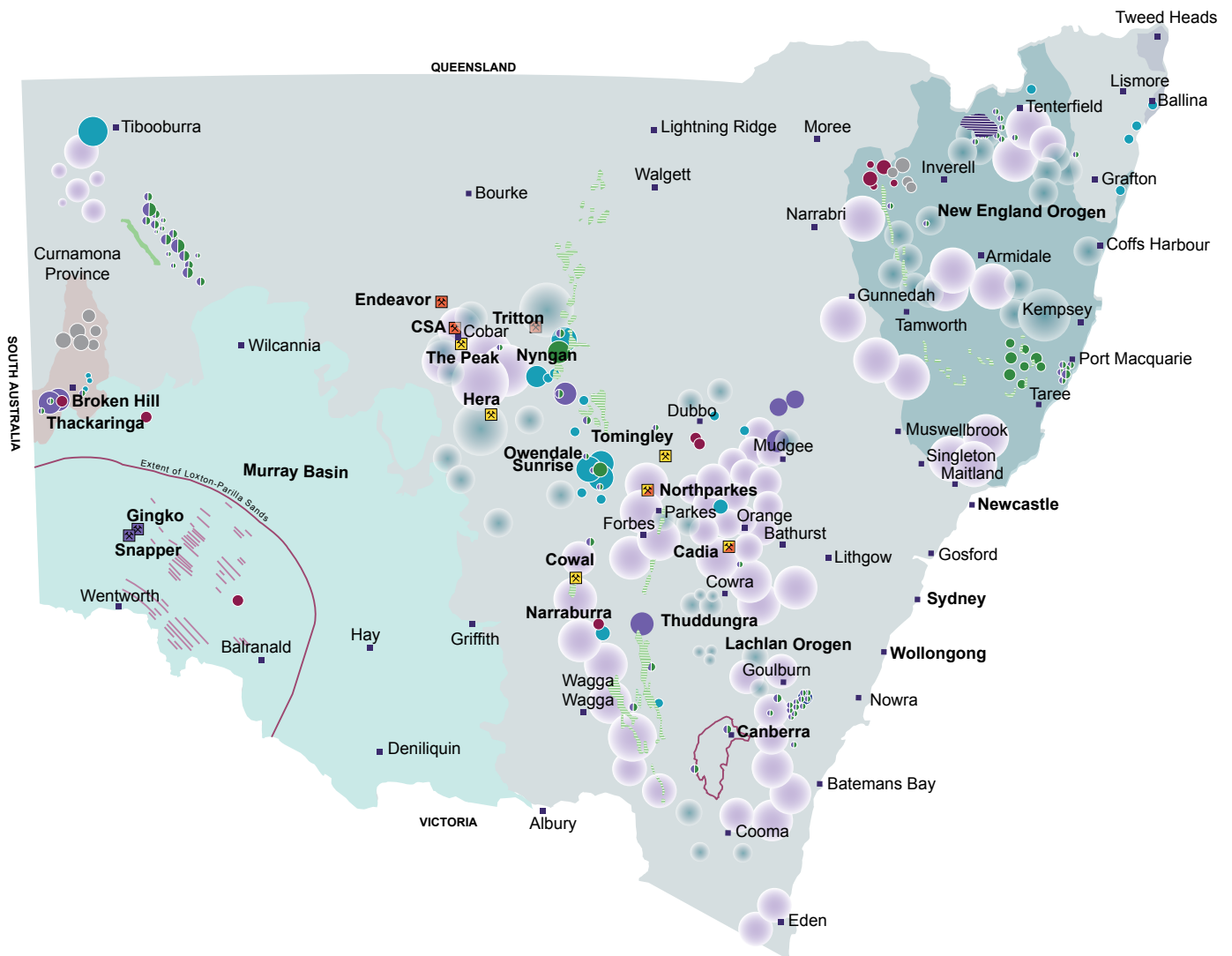
NSW is highly prospective for minerals such as copper, zirconium, titanium, REEs, cobalt, antimony, and scandium plus other associated critical minerals with further unexplored potential.

While the Geological Survey of NSW has a well-developed understanding of existing critical and high-tech minerals potential for the state, there are opportunities to grow this knowledge base, adding to the wealth of pre-competitive data that supports a pipeline of discoveries. These activities in data acquisition and synthesis are delivered through best practice tools and processes for an unprecedented level of detail for explorers to understand mineral deposits, resource potential, existing tenements, and exploration licence applications.

Commonwealth and state governments, research bodies and industry have partnered to develop new concepts and technologies to promote exploration, through the \$220 million MinEx Cooperative Research Centre (CRC). The program is a 10-year collaboration with the objective of generating new precompetitive geoscientific data for underexplored, undercover regions across Australia. The NSW Government has committed \$16 million to support the program, which will develop more productive, safer, and environmentally friendly drilling methods, develop new technologies for collecting data while drilling, and undertake drilling to collect new data in underexplored areas, through the National Drilling Initiative (NDI). The NDI is a world-first collaboration of Geological Surveys across Australia, researchers, and industry.

There also remains significant untapped potential, with exploration to date having been largely limited to the areas where prospective rocks are found at the surface. Only as little as 5 per cent of all drilling for minerals in NSW has been at depths greater than 150 metres, which means 80 per cent of the state is essentially unexplored.

“NSW is highly prospective for minerals such as copper, zirconium, titanium, REEs, cobalt, antimony and scandium...”



Map of critical mineral and high-tech metal deposits in NSW

Deposit or occurrence

- Cobalt
- Scandium
- Cobalt and scandium
- Heavy mineral sands
- Rare earth elements

- Platinum group elements
- Lithium
- Gold
- Copper

Area shaded is based on quantity of current resources and/or historical production

Operating mine

- Heavy mineral sands
- Gold
- Copper

Prospective area

- Cobalt and scandium
- Rare earth elements and lithium
- Heavy mineral sand strand line deposit

NSW mineral and metal endowments



Refined Copper

NSW has an abundant copper resource, estimated at 15 million tonnes contained in polymetallic deposits that are associated with gold and other precious metals. The existing annual production of copper in NSW totals 200,000 tonnes, supporting a significant proportion of mining activity and employment in regional NSW. NSW copper production is exported as a concentrate and compares to Australia's total export volume in 2020-21 of 902,000 tonnes, where Australia is the sixth largest producer of copper accounting for just under 5 per cent of world production.

Given the strong outlook for copper demand and declining ore reserves, copper supply will have increasing importance over the coming decade.

Copper demand will not only increase due to global electrification driven by decarbonisation, but also through increasing demand growth from electric vehicles and the renewable energy sector. Given the abundance of copper in NSW, and large, established nature of its market, there is a significant value proposition for NSW from investment in copper.

Increasing demand for ESG-credentialled copper could shift production from conventional smelting to the production of 'green copper' powered by hydrogen. The production of refined copper using low-carbon innovative technology represents a significant opportunity to leverage a key NSW advantage and capture lost value add.



Rare Earth Elements

The NSW deposits of REEs are particularly rich in heavy REEs, a key difference from other REE deposits globally. The specific mineralisation style of the Dubbo region and the Lachlan Orogen present target areas for further REE discoveries in NSW. A prime example of such deposits is the polymetallic Toongi deposit. This deposit underpins the Dubbo Project, which is at an advanced stage of development and is globally significant, as one of the few projects that will offer long-term access to a range of critical minerals, including REEs, independent of existing supply chains.

The manufacture of magnets containing neodymium and praseodymium underpin the development of REEs. These magnets are used in wind turbines and electric motors, with demand expected to grow at 9 per cent annually until 2038. The wider applications for REEs span many sectors including communications, sensors and advanced alloys.



Cobalt

Two projects currently being developed in NSW contain cobalt intended for the battery precursor supply chain. There is further prospectivity for cobalt-rich deposits in the Central West and Broken Hill regions. Additional opportunities for cobalt in NSW could include the reprocessing of mine tailings.

Cobalt demand has grown by 5 per cent between 2017 and 2020 and is expected to grow by 11 per cent in 2020-2025 due to its continued use in lithium batteries. The sustained importance of cobalt will support growth in electric vehicles and large-scale energy storage as renewables are incorporated into energy grids.



Scandium

NSW has some of the highest-grade scandium deposits in the world. NSW hosts scandium-only projects and projects where scandium is a by-product alongside cobalt and nickel.

The adoption of scandium has been constrained by lack of supply, restricting its use to niche aerospace applications and in solid oxide fuel cells for a total global scandium market.

The development of scandium resources from NSW could also dramatically increase scandium oxide supply, sparking greater demand for aluminium-scandium alloys across the broader aerospace industry, in the automotive industry for lighter vehicles that offer extended range to electric vehicles, and into consumer products.



Titanium and Zirconium

There are undeveloped heavy mineral sand deposits in the Murray Basin, containing titanium minerals, zircon, and monazite. NSW has historical and ongoing mineral sand mining with a pipeline of exploration and mining projects.

The major market for mineral sands is the well-established titanium dioxide pigment market that is approximately US\$3.7 billion in size and driven by global urbanisation. NSW minerals sand are rich in rutile, with a greater opportunity for 'green' titanium metal production as less processing is required when starting from rutile. Lower emissions titanium will continue to have strategic value for aerospace, defence, and medical uses.

Demand will likely increase for zirconium for refractory ceramics, which are used for nuclear energy and other high corrosion industrial processes. Also used in catalytic converters, this application is growing in importance given an increasing focus on emissions reduction.



Tungsten

There are undeveloped deposits of tungsten in the Lachlan and New England Orogen. Tungsten is important for the production of hard, high abrasion and temperature resistant carbides and alloys. Tungsten alloys are used for tool production, drill bits and armour plating. There is low substitutability for tungsten in these speciality alloys, meaning these deposits have significant economic importance, especially in the hard rock mining industry.



Antimony

Antimony has historically been produced alongside gold, tungsten, and tin from known polymetallic deposits in the New England Orogen of NSW. The deposits at the Hillgrove Mine in the New England remain globally significant. Additional investment is currently being sought to resume the extraction of antimony at the Hillgrove Mine.

Geopolitical factors in the global supply for antimony opens new opportunities for NSW deposits for uses in fire retardants, lead-acid batteries, new large scale grid storage batteries and defence applications.



Minerals: copper, neodymium

Opportunities for by-products and tailings reprocessing

Many critical minerals in NSW are often found in deposits associated with other critical minerals. Examples include:

- niobium, hafnium, and zirconium that are associated with unique NSW REE deposits
- platinum group elements (PGEs) associated with nickel-cobalt laterites
- indium, bismuth and tin that are associated with tungsten deposits.

These mineral associations extend to critical minerals being found within base and precious metal ore deposits.

Based on drill core samples and historical company records, it is believed that many base and precious metal mines of NSW have processed ores that contain critical minerals. However, because of technology limitations and market conditions, these critical minerals have not been extracted. This presents further opportunities for investment into upgrades at current mines or using historical drill core samples to identify tailings deposits which could be commercially re-processed to extract critical minerals. The massive lead-zinc-silver sulphide ore body of Broken Hill has been mined since the 1880s and this historical activity has potential for the extraction of critical minerals from discarded mine tailings.

A good example of an existing mine developing a new opportunity is at the world-class Cadia gold and copper operations in the Central West of NSW. Newcrest is in the process of commissioning Australia's first molybdenum extraction plant. Associated with mine expansions at Cadia, the molybdenum will be extracted by further processing of the copper concentrate, generating up to \$45 million in additional revenue each year. Molybdenum has a variety of uses such as in specialty steel and alloys that are important for wind and hydropower turbines, fertilisers, lubricants, and other emerging catalyst applications.



Australian tailings dam

NSW has a strong economic position supporting regional NSW, combined with a world class METS sector

The NSW Government has committed unprecedented levels of funding to support investment into regional NSW, where most mining activity is located, with an intent to further grow and support regional industry. The \$4.2 billion Snowy Hydro Legacy Fund will deliver major, transformative infrastructure in areas crucial to enable the critical minerals sector, including water security, activation of regional centres and improved freight linkages.

Further investment attraction funding supports the establishment of businesses in regional NSW and job creation. The highly successful \$100 million Regional Job Creation Fund offered co-funding to activate or accelerate regional projects in key industries, and the \$250 million Jobs Plus Program offers enabling infrastructure rebates, assistance with NSW planning approvals, payroll tax relief and subsidised training package rebates.

NSW has a unique and proactive approach to navigating planning approvals through a strategic, precincts-based approach to maximising investment. Investments in Special Activation Precincts (SAPs) across regional NSW will drive regional investment and job creation.

The Parkes SAP can offer streamlined pathways for certain types of development including advanced manufacturing, with fast-tracked planning approvals for complying development, environmental approvals, and a dedicated investment concierge to support businesses to relocate or set up in Parkes. The NSW Government has committed \$185 million to delivering enabling infrastructure at the Parkes SAP, as part of the \$4.2 billion Snowy Hydro Legacy Fund.

Parkes will also be Australia's largest inland freight and logistics hub, centred around the Inland Rail and National Logistics Hub, making it an ideal location for processing and manufacturing, close to critical minerals developments in the Central West. The Parkes SAP is planned as Australia's first UNIDO-certified eco-industrial park, offering opportunities for investment into critical minerals resource recovery and other circular economy opportunities.

Investments by the NSW Government in further Special Activation Precincts will support the development of downstream industries for critical minerals, including the defence and aerospace hub planned at Williamtown, and opportunities for agricultural technology (food tech) at Moree.

Further, NSW's long history in mining means it has fostered a mature mining, equipment, technology and services (METS) sector. At least 25 per cent of Australian METS is headquartered in NSW, where it can draw on a large, local skilled and experienced labour force with transferable skills.

The NSW Government contributes to a robust program of research and development for mining and associated capability in partnership with Geoscience Australia, as well as world-class mining research underway within the university sector in NSW and the Newcastle Institute for Energy and Resources. The Commonwealth Government's Australian Nuclear Science and Technology Organisation (ANSTO) is located at Lucas Heights in Sydney, and has been instrumental in supporting the testing and commercialisation of critical minerals processing technology in NSW.

NSW is leading the way in clean energy investments and will drive demand for critical minerals and high-tech metals

NSW's approach to driving down emissions sets us apart as a key investment destination for the industries of the future, including investments in low-carbon products. Critical minerals are a vital component in the development and manufacture of low-emissions technologies.

NSW has a distinct opportunity to become a global leader in the battery ecosystem. NSW hosts the minerals required as inputs for a range of battery chemistries, including cobalt and scandium. NSW has the green energy capability and resources to capture value across the entire battery supply chain, from the extraction and processing of raw materials, to the production of battery components and battery cells, exporting finished products, and recycling end-of-life battery materials.

NSW has already implemented policy frameworks for key sectors to accelerate development of the battery ecosystem, through the deployment of electric vehicles and stationary storage systems in Renewable Energy Zones. There is potential to link manufacturing to nearby anode, cathode and other minerals processing.

The NSW Hydrogen Strategy outlines a \$3 billion investment to incentivise green hydrogen production, attracting up to \$80 billion in investment. Hydrogen will be critical to power mining and energy-intensive minerals processing in a decarbonised economy, including in 'green' copper processing. There is further opportunity for NSW minerals to supply inputs for the infrastructure required to produce, store and transport hydrogen. The rapid growth in demand for hydrogen as an energy source is driving increased growth in demand for nickel and titanium for electrolyzers, and for platinum-group elements associated with cobalt-nickel laterites for fuel cells.

NSW has strong environmental, social and governance credentials for a socially conscious sector

NSW leads the world in providing ESG opportunities for critical minerals projects and triple bottom line assessments. NSW has committed to halve emissions by 2030 as we progress to zero emissions by 2050, increasing renewable energy generation through Renewable Energy Zones, and supporting the establishment of the green hydrogen sector.

The Government has also invested \$750 million via the Net Zero Industry and Innovation Program to drive demand in technologies requiring critical minerals, enabling development across the sector and supply chain opportunities to global markets.

Investments in the Central West Renewable Energy Zone (REZ) will combine renewable energy generation such as wind and solar, battery storage and high voltage poles and wires to deliver reliable energy. The REZ in the Central West will be NSW's first, located around Dubbo and Wellington. The REZ is expected to be shovel ready by the end of 2022, unlocking up to 3000 megawatts of new network capacity by the mid-2020s. This provides a major opportunity for suppliers of critical minerals to capitalise on increased demand for inputs into the renewable energy sector, as well as supporting decarbonised inputs for downstream processing and manufacturing located in the Central West, where a vast majority of the NSW endowment lies.

The NSW mining sector is underpinned by a world-class regulatory, environmental protection and safety framework. Compliance within the NSW system provides transparency, with NSW progressing an agenda of continual improvement in safety and regulatory standards driving world class ESG credentials for NSW miners.

While maintaining these high standards, we are accelerating planning approvals through recent planning reforms, in response to the COVID-19 pandemic. Actions to reduce assessment timeframes and reduce red tape are provided in the Planning Reform Action Plan. The action plan introduces measures to reduce assessment timeframes for planning proposals, regionally significant development and major projects, reduce concurrence and referral cases between agencies and accelerate precinct coordination.

Strong governance is vital to ensure a security of supply. The NSW planning and regulatory system is mature, rigorous, and meets the needs of conscious investors across the global supply chain. The NSW Mining Concierge service also supports investors and mining companies to navigate regulatory requirements for mining projects in NSW.

NSW mining governance and compliance promotes positive long-term relationships with communities to improve the overall social licence of the mining sector, leading to project longevity and security of supply.



*Critical minerals and high-tech metals
will be key to NSW's clean energy future*

The NSW critical minerals action plan

We know there are a range of complex barriers to critical minerals industry development in NSW, particularly challenges in sourcing investment, raising capital, securing equity partners, and developing supply chains for export to downstream markets. The NSW Government is firmly committed to addressing industry barriers and securing investment. We will develop a strong pathway for explorers, producers, and investors to take advantage of the environment for NSW critical minerals.

To deliver on this vision, the NSW Government will:

1. Establish Australia's first Critical Minerals Hub in the Central West of NSW
2. Promote exploration for critical minerals resources
3. Activate the industry through proactive development of supply chains
4. Attract investment for critical minerals resources downstream processing and recycling.



NSW is establishing Australia's first Critical Minerals Hub in the Central West

A Critical Minerals Hub in the Central West will be a central focal point for mining and value added processing, delivering benefits of collaboration and agglomeration close to existing, approved, and potential mining developments in the Central and Far West. The proposed hub will fulfil objectives set out and agreed to in the Commonwealth Government's National Critical Minerals Roadmap.

Anchored by the Parkes SAP and regional infrastructure investments, the Central West Critical Minerals Hub will play a central role in activating an integrated supply chain, connecting critical minerals produced across Australia. The strategic location of the Parkes SAP on the proposed Inland Rail north-south and existing east-west heavy rail routes provides important freight linkages allowing the movement of inputs and outputs in addition to high quality port facilities along the east coast for the import and export of components.

Given this position within potential critical mineral supply chains, the Central West Critical Minerals Hub supports the development of downstream industries such as circular economy and reprocessing, renewable energy, and downstream critical minerals and high-tech metals processing. The Hub will leverage existing investments at Parkes, as well as the \$3 billion investment in the Central West Orana Renewable Energy Zone.

Further activities facilitated by the Central West Critical Minerals Hub to assist critical mineral mining and processing include:

- creating pathways for end-of-life e-waste in order to recover and reprocess critical minerals
- securing e-waste input from domestic and neighbouring regions for recycling and reprocessing
- establishing green chemical production and storage suitable for minerals processing or agricultural production and shortening the supply chain
- planning for future innovation, including setting aside infrastructure and space for trialling processes of tailings to make downstream processing of 'problem' wastes more economically viable.

To support activation of the Central West Critical Minerals Hub, the NSW Government will:

- progress strategic studies to identify land use constraints and support optimisation of exploration and mining projects
- provide dedicated investment attraction support by the Office of Regional Economic Development, Investment NSW, and specialist advice from Mining, Exploration and Geoscience
- facilitate engagement between investors, mining projects and downstream processors to identify commercially viable partnerships and capital raising opportunities
- progress strategic studies to identify infrastructure and services required for integrated and mutually beneficial supply chains ensuring integration with the national circular economy
- facilitate programs to increase opportunities for local education, training, and skill development and to ensure local economic benefits and ensure future skills needs are met in partnership with the METS sector.





Promoting exploration for critical minerals resources

NSW has become a mineral exploration destination of choice. NSW has doubled its share of national exploration spending since 2010, and quadrupled its share of greenfield exploration during the same period. There are a record number of applications for exploration being lodged and new ground being actively explored, doubling since 2016.

Additional exploration within known mineral systems is required to identify new deposits for particular critical minerals, including REEs, tungsten, antimony, and cobalt found in tailings. Further investigation and support for greenfield and brownfield exploration will support an ongoing pipeline for critical minerals investment.

We will leverage our existing strengths in world-class precompetitive data and partnerships with the research sector and industry to explore opportunities to identify new sources of critical minerals, including from legacy mines.

The NSW Government is supporting critical minerals exploration by:

- redirecting the focus of the Geological Survey of NSW to further investigate the NSW critical minerals endowment to improve geological, geophysical, and geospatial data on the state's geology and mineral resources
- releasing a high-tech metals map showing the location of a range of minerals, REEs, and heavy mineral sands across NSW
- contributing \$16 million to the development of future deep exploration technologies and unlock new greenfield exploration through participation in the MinEx CRC
- releasing a significant amount of historic exploration data from November 2021 which further supports explorers in targeting their exploration activities,
- streamlining and modernising titles assessment and administration to support faster decision making
- enabling more effective access to NSW geological samples in the Londonderry Core Library, to capitalise on technological advancements to enable re-evaluation of known mineral concentrations.

To further support exploration activity in the critical minerals sector, the NSW Government will:

- incentivise greenfield exploration through dedicated funding support for early-stage explorers in critical minerals, including additional rounds of the New Frontiers Co-operative Drilling Program
- drive discovery of new critical minerals resources by investigating the potential for processing of tailings from legacy mines, fly ash dams, mine dumps and tailings facilities, including sample testing and characterisation in partnership with Geoscience Australia

- undertake further geological surveys in the New England Orogen, including mapping of Permo-Triassic mineralised granites in the New England Orogen known to be associated with enhanced concentrations of critical minerals in other parts of NSW
- further improve our pre-competitive data availability, including the development of web enabled visual layers displaying critical minerals location and availability
- revise and reduce Mineral Allocation Areas to further promote exploration
- deliver targeted education and media campaigns to improve social licence and overall public understanding of the strategic importance of exploration and mining of critical minerals, and the role critical minerals will play in the decarbonised economy.



Activating the industry through proactive development of supply chains

The NSW Government can play a key role in bridging gaps across the supply chain, especially given the urgency and importance of critical minerals for a range of Government priorities, including renewable energy and advanced manufacturing. Critical minerals are crucial in enabling the establishment and growth of these sectors.

Emerging geopolitical trends outline the need to build secure supply chains. Activating the sector across the critical minerals supply chain within NSW will ensure secure supply for downstream markets, de-risking the sector and establishing long term jobs and investment.

The NSW Government is supporting the development of supply chains through:

- the \$4.2 billion Snowy Hydro Legacy Fund which is delivering major, transformative infrastructure in areas crucial to enable the critical minerals sector, including water security, activation of regional centres and improved freight linkages
- the \$3 billion investment through the NSW Hydrogen Strategy to deliver a low-emissions energy source for energy-intensive minerals processing
- the \$750 million Net Zero Industry and Innovation Program, which will support development of downstream opportunities through increased demand for low-emissions technologies
- investments in Special Activation Precincts, including the Parkes SAP which offers streamlined processes for certain types of development
- improving assessment timeframes for mining projects and reducing red tape through execution of the Planning Reform Action Plan
- creating a dedicated Mining Concierge Service to assist mining projects to navigate a pathway through the planning and approval process, and refer and manage issues that impede mining project development
- establishing Renewable Energy Zones which will unlock a significant pipeline of large-scale renewable energy and storage projects.



“Activating the sector across the critical minerals supply chain within NSW will ensure secure supply for downstream markets, de-risking the sector and establishing long term jobs and investment.”



Lithium ion battery research facility.

To further support this, the NSW Government will:

- commission scoping studies and engage with industry to define the commercial viability, infrastructure requirements and ESG credentials for copper processing, high-tech metallisation, battery manufacturing and recycling in regional NSW
- support the development of downstream critical minerals and high-tech metals processing in NSW to capitalise on the unique NSW minerals endowment through investigation of additional value-added opportunities
- support training and development through partnerships with industry to identify future skills gaps and promote establishment of new training and development pathways fit for the new economy
- reduce red and green tape by providing direct project facilitation support for critical minerals projects to navigate planning and regulatory approvals
- establish a regular Industry Roundtable to support collaboration across the critical minerals supply chain and enable industry partnerships and cooperation
- support the development of circular economy precincts specialising in the recovery of critical minerals and metals
- investigate opportunities for local procurement to drive domestic demand and provide offtake opportunities for manufacturing, including in cell batteries
- assist NSW projects to access state and federal financial assistance, where available.

“NSW hosts the minerals required as inputs for a range of battery chemistries, including cobalt and scandium.”



Attracting investment for critical minerals resources, downstream processing and recycling

Attracting new sources of capital is crucial to the development of NSW's critical minerals sector. Downstream industries are currently investing in resources and processing capacity globally to secure long-term supply from sources that meet their ESG requirements. Accordingly, there is significant opportunity to secure international investment in NSW critical minerals projects.

Our global network is ready to tap into new sources of foreign direct investment, opening new avenues to finance. The NSW Government will double the footprint of its international trade and investment network, with new locations across our key export markets, including Japan, India, South Korea, the European Union, the United States, and the United Kingdom. The Global NSW Strategy, positions NSW as an attractive investment destination, promoting critical minerals supply chain development to the global market.

The NSW Government is supporting investment in the critical minerals sector by:

- supporting a dedicated Industry Development function within the Mining, Exploration and Geoscience division of NSW Government, specialising in investment attraction for the mining sector, in partnership with the Office of Regional Economic Development
- collecting and publishing information on investment ready critical minerals projects in NSW
- increasing investment and trade representation in global markets to facilitate foreign direct investment into critical mineral projects and the development of offtake agreements
- analysing market opportunities through value chain analysis to identify gaps for industry development and new opportunities for investment.

To support access to new investment markets, the NSW Government will:

- facilitate access to finance, local offtake agreements and access to secure supply chains through leveraging offshore markets through Investment NSW, the Office of Regional Economic Development, and other NSW Government agencies
- facilitate access to foreign direct investment through its extended offshore network in key investment markets and leverage Commonwealth partnerships with Austrade and the Department of Foreign Affairs and Trade
- facilitate trade opportunities, including offtake agreements and access to export markets
- provide proactive investment attraction of key market opportunities, targeting investment to gaps in the critical mineral supply chain, and targeted investment promotion to the financial sector and key trade partners
- seek new and update current cooperation agreements with our global trading partners to include critical minerals and high-tech metals
- ensure critical minerals are a key consideration in any investment, energy or related strategy developed by the NSW Government.

To find out more, visit: nsw.gov.au/criticalminerals

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