



tivan
Critical. Vertical. Sustainable.

Critical Minerals Strategy – Submission

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Critical Minerals Strategy – Submission

Concurrence

Tivan Limited (ASX: TVN) (“Tivan”) commends the Australian government for its initiative in developing a new critical minerals strategy (“the Strategy”) and welcomes this opportunity to contribute on the public record.

Tivan acknowledges the aims and priorities of the Strategy, as follows:

- > help Australia add value to our resources, grow our domestic downstream processing and manufacturing industries and support decarbonisation;
- > focus on creating economic opportunities, including for regional Australia, developing new sovereign capabilities and industries, and building reliable, competitive and diverse supply chains;
- > reflect the Government’s broader priorities, such as tackling climate change, the Australia Made Battery Plan, growing industries in Northern Australia, implementing the Uluru Statement from the Heart, boosting women’s economic equality, and strengthening international trade partnerships.

Tivan is well placed to advise on:

- > how the Government could help the Australian critical minerals sector move up the value chain to develop sovereign capabilities and industries.

Tivan concurs with:

- > the imperative to bring Australian projects online quickly to support diversified critical mineral supply chains and markets.

Tivan further concurs with the challenges cited, specifically:

- > technical risks associated with complex mineralogy and the need for bespoke processing technology solutions
- > project risks given deposits are located in remote areas processing plants require
- > substantial capital and many proponents are junior companies
- > market risks given highly concentrated supply chains due to opaque markets with limited pricing data

Tivan is fully supportive of the Federal government’s heightened engagement with industry to develop the Strategy. Only through the consolidated efforts of government, industry and research will Australia’s critical mineral sector succeed in developing new sovereign capabilities and downstream processes, thereby reducing the inherent vulnerability of concentrated supply chains and supporting the climate transition.

This submission was prepared with the assistance of D4G and Exante Data, Inc. All content, and errors and omissions, are the responsibility of Tivan Limited.



Background

Tivan was formerly known as TNG Limited (“TNG”). The renaming of the company was supported by over 99% of shareholders at a General Meeting on 20 January 2023.

The company holds major project status (both Federal and Northern Territory) for its vanadium-titanium-iron resource at Mount Peake, 250km north of Alice Springs. This project has been under development since 2008 and relies upon the deployment of the TIVAN® hydrometallurgical process.

TIVAN® is a prototypical example of a new sovereign capability. It was co-developed by TNG and METS Engineering Group (“METS”) commencing in 2010. The process was subsequently upgraded and optimised in work carried out by TNG, METS and CSIRO. The technology is now solely owned by Tivan and is patent protected on a global basis.

Despite the early-mover advantage, the commercialisation of TIVAN® has laboured over the past decade. Various iterations of management at TNG failed to adequately invest in the development of the technology and advance a credible strategy for project delivery at Mount Peake.

In the second half of 2022 a high-profile campaign was successful in changing management at TNG. The new management team is committed to ensuring the company’s strategic direction is fully embedded within initiatives of both the Federal and Northern Territory governments. It has re-oriented the company’s mission around three core thematic: Critical, Vertical, Sustainable.

Tivan is based in Perth, with a representative office in Sydney and a regional office in Alice Springs. An office presence in Darwin is scheduled to commence in the June quarter 2023.

Submission

This submission is structured around ten core thematic where Tivan has experience and capability. The twenty-two Discussion Questions formulated are addressed.

Purpose and context

This Submission has been prepared in response to the Australian Government’s Critical Minerals Strategy Discussion Paper dated December 2022 and intended for the exclusive use by the Australian Government (Recipient) in considering the Critical Minerals Strategy. This Submission may not be used in whole or in part, for any purpose other than that for which it is intended.

Reliance

In all cases, this Submission is provided on the basis that the Recipient will conduct their own investigation and analysis of the information set forth in this Submission independently and without reliance on Tivan Limited or any of its respective affiliates, agents and advisors. While reasonable care has been taken in preparing this Submission, and while all information provided in this Submission has been provided in good faith and has been obtained or derived from sources believed to be reliable, Tivan Limited has not in any way verified or audited the information in this Submission. The information in this Submission has not been independently verified and information from outside sources referred to in this Submission has not been verified by Tivan Limited or their representatives. Accordingly, Tivan Limited or its respective related bodies corporate, affiliates directors, officers, employees and associates make no representation, guarantee or warranty, whether express or implied, that the information contained in this Submission has been audited or independently verified, or is complete, accurate or reliable, accepts no responsibility arising in anyway (including by reason of negligence) for errors or omissions, and assume no liability in respect of the authenticity, origin, validity, completeness, reasonableness or accuracy of, or for any errors in or omissions from, the information, statements, opinions and comments contained herein



Thematic 1: Australia’s comparative advantages

“A critical mineral is a metallic or non-metallic element that ... is essential for the functioning of our modern technologies, economies or national security and ... there is a risk that its supply chains could be disrupted”

Geoscience Australia

Australia’s key comparative advantage in the critical minerals sector is its abundance of economically viable resources. The endowment is significant in scale, quality and diversity, including when measured on a global basis. Geoscience Australia’s **critical minerals portal** provides an authoritative resource, and lists 26 resources commodities that qualify as critical minerals. Australia’s project pipeline is extensive and highly diversified. It is well summarised by the **Australian Critical Minerals Prospectus**, published by Austrade.

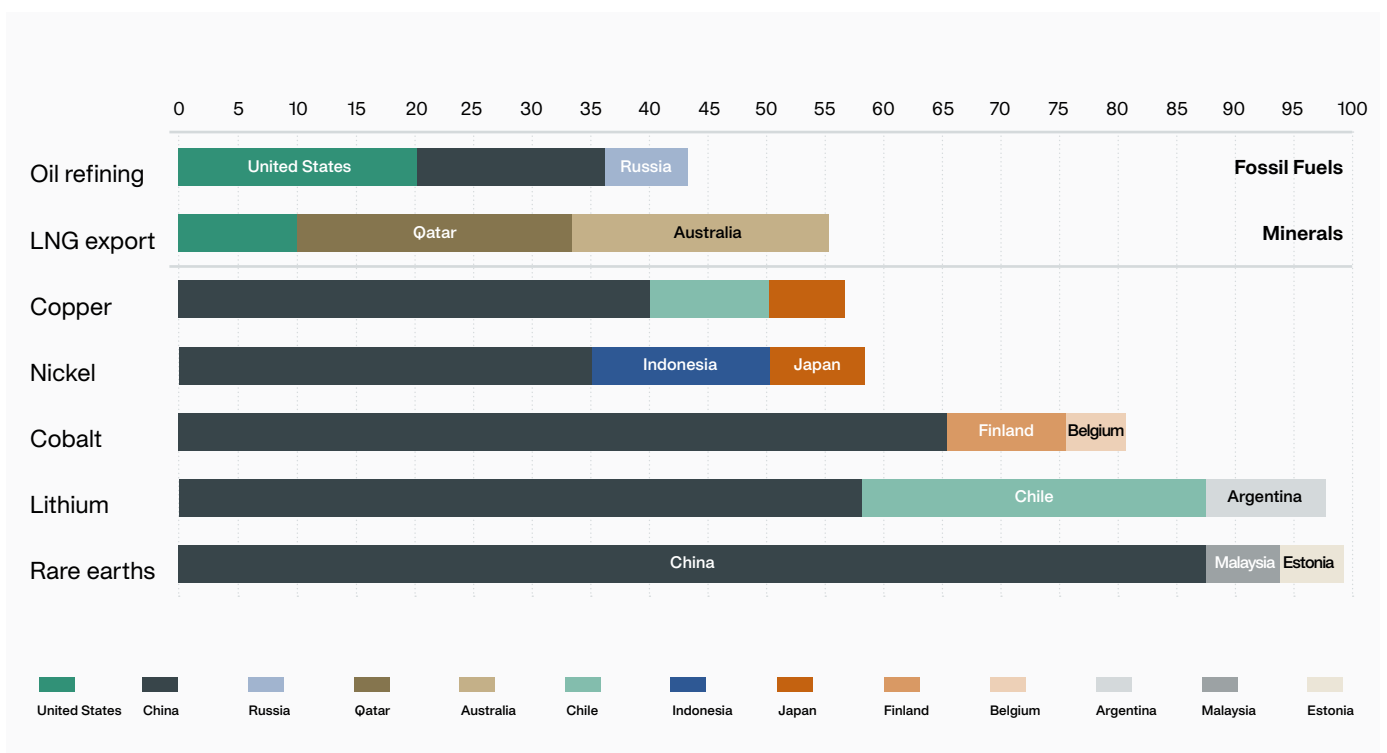
A further important comparative advantage is Australia’s natural endowment of renewable energy sources, particularly solar, wind and hydro. Over the past decade,

generation of electricity in Australia from renewable energy sources has expanded significantly, more than doubling from a low base. Large-scale solar and wind are the most natural bedfellows of the critical minerals sector, as is the case for the resources sector more broadly defined.

In seeking to leverage these endowments, particularly in respect of vertically integrated supply chains, the comparatively high cost of labour in Australia is a key structural disadvantage. The critical minerals sector is significantly more labour intensive than the traditional ‘dig and ship’ model. This helps to explain why critical minerals processing has gravitated toward jurisdictions with low unit labour costs. These jurisdictions typically have poor standards of ESG compliance, which facilitate the externalisation of various costs. This accentuates the structural disadvantage that Australia faces in respect of labour costs, which are key contributor to both capital and operating expenditures.

The People’s Republic of China is the clearest example of this dynamic, having successfully claimed the commanding heights in the processing of various critical minerals in recent decades. Its country share is dominant according to data compiled and maintained by the International Energy Agency, as part of its Critical Mineral Policy Tracker.

Figure 1: Share of top producing countries in total processing of selected minerals and fossil fuels, 2019





A further disadvantage is that Australia faces shortfalls and bottlenecks in infrastructure that would support the accelerated development of the critical minerals sector. This extends beyond civil infrastructure (ports, rail, road, airstrips etc.), to the structure of national markets in electricity and gas. The shortfall is particularly acute in Northern Australia, in part due to its vastness and remoteness. The development of large-scale renewable energy infrastructure, including through advances in battery technology, is a key challenge in this portfolio in the years ahead.

The advent of common use infrastructure, coordinated by regional authorities, is an important step forward, and highly relevant to the critical minerals sector. Common use infrastructure reduces the capital expenditure of major projects and provides scaffolding for project facilitation and financing. It also provides scope for commercial synergies to be explored by industry due to co-location, including in respect of process inputs. Common use infrastructure may also assist in streamlining permissioning processes, particularly environmental, whilst promoting community engagement, and ensuring that a social licence to operate is earned and maintained.

At the global level, it is to Australia's pronounced disadvantage that it continues to be viewed as a laggard in climate transition. This poor standing dates to the Kyoto negotiations of 1997, where the 'Australia clause' was used to inflate baseline carbon emissions via the inclusion of land clearing. Domestically, the so-called 'climate wars' of the past 15 years, which saw successive changes in Federal government and policy, have meaningfully impaired the development of coherent strategies and appropriate regulatory regimes in the area of carbon abatement.

In this context, it is encouraging that the Strategy is firmly grounded in principles of sustainability and is directed toward tackling climate change. Beyond the substantive contribution that the critical minerals sector can make, this serves as an important signal of Australia's posture, as it seeks to progressively shift away from a reliance

upon the domestic consumption and international export of fossil fuels. It also positions the Federal government with the capacity to respond to interventionist policies that have been adopted in Europe, and more recently, in the United States with the Inflation Reduction Act.

Australia's strong commitment to the rule of law and its various property rights regimes are also important bulwarks that promote investment in the sector, whether local or foreign-sourced. These are defining features that will serve Australia well in the event that the critical mineral sector becomes increasingly bifurcated in the years ahead, as it pursues a path of complex vertical interdependence.

A further advantage is Australia's proximity to the Indo-Pacific region. This yields natural export markets, characterised by large, urbanising populations, along with various centres of technological innovation and excellence at scale. The maintenance of strong multilateral and bilateral relationships throughout the region is a crucial precondition to reducing the inherent vulnerability of concentrated supply chains, whilst ensuring that Australia preserves its strategic balance on a global basis.

Finally, Australia is relatively well placed in respect of the data resources that serve as a base layer for the critical minerals sector. The public sector, particularly Geoscience Australia, maintains extensive datasets in the commons, and contributes to the global **Critical Minerals Mapping Initiative**. High precision resources are held on a competitive basis in the private domain, including geophysical, geological, topographical and bathymetric mapping. Migrating these resources into the broader field of geographic-information systems is an important challenge ahead.



Thematic 2: Shortcomings in the junior resources sector

“It appears that the incumbent directors have in fact presented a superior case for having acted appropriately to fulfil their duties to all shareholders and that they have appropriately considered and acted in the best interests of the company and shareholders to grow the business in the future”

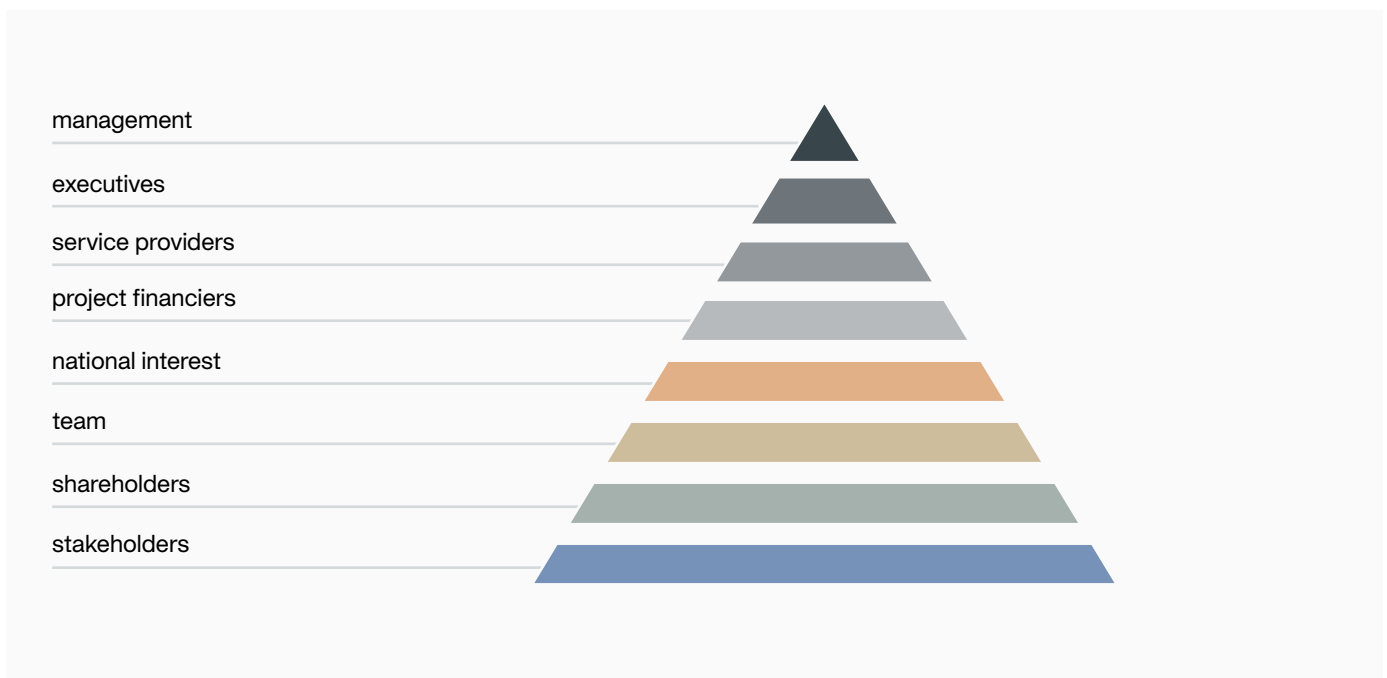
Proxy adviser, ISS, in support of TNG management, September 2022

For the critical minerals sector to achieve its potential on a global basis, progressive change in the culture and conduct of management at home in Australia is required. Throughout the sector there is a structural emphasis on management maintaining control and prioritising its own interests, over a broader array of societal considerations and the legitimate interests of stakeholders and shareholders. It is important that this home-grown topic is recognised in the design and implementation of the Strategy.

The shortcomings of corporate governance and fundamental misalignments that exist in the sector are well known and widely recognised, especially by foreign investors. At the extreme, the entrenchment of control risk important critical mineral resources and technologies becoming stranded. The shortcomings are apt to extend beyond specific boardrooms, to the ecosystem of service providers, including lawyers, brokers, consultants, proxy advisers, share registries, media, and so forth. Deficiencies in governance also assist in perpetuating a variety of workforce, training and diversity issues addressed further below.

The status quo can be contrasted to an idealised, optimised corporate model, where stakeholders, shareholders and even the national interest become foundational considerations. Management is located at the apex of the pyramid, providing leadership and stewardship, and discharging fiduciary responsibilities without fear or favour. The structure is sustainable, and constructed with appropriate societal and legal building blocks. It requires the company to earn and maintain a social licence to operate, at all times grounded by the legitimate expectations of stakeholders.

Figure 2: Critical minerals – idealised hierarchy of interests





While it is important not to impugn the many companies in the critical minerals sector that already operate at or near the optimised model, the shortcomings are real and widespread. There is a risk that the deployment of fiscal resources as part of the Strategy further entrenches the status quo, rather than sustaining the efforts that are required to yield progressive change.

A specific area of concern is the widespread use of performance shares and rights across the junior mining sector. The common practice of granting large blocks of in-, at-, near-the-money options as part of long-term incentive packages is one of the most corrosive techniques used by management to capture funds committed by shareholders and to entrench voting control. The practice drives a persistent wedge between the interests of management and executives, and the interests of shareholders and stakeholders. It creates perverse incentives to slow-track project delivery and it frustrates the renewal of managerial and executive ranks. It also serves to alienate later stage project partners and financiers.

A comparable area of concern is the use of company loans, recourse and non-recourse, to finance the shareholdings of management and senior executives. This practise further embeds a misalignment of interests with shareholders by providing participatory rights and exposure to equity returns, without any equivalent risk exposure.

A broader challenge is to enhance the efficacy of regulation in conjunction with any fiscal impulse. While Australia's rule-based regime is robust, the junior mining sector is widely viewed as wanting in terms of broader regulatory compliance. The sector poses difficult challenges to regulators as most companies operate on a pre-revenue basis and operate on a cycle of representations being made to shareholders to sustain ongoing funding requirements. Regulatory enforcement is sporadic, fragmented and resource constrained.

State and Territory based tenement and land access regimes are also vulnerable to dubious practices. These pose risks to security of tenure, and can impair resource definition and progress at the pre-feasibility stage. Once again, the risk of key critical resources becoming stranded is all too real.

Similarly, disputes in the area of corporate control transactions are not uncommon and are often protracted unnecessarily. It is of fundamental importance to the critical minerals sector that such disputes are resolved in an efficient, effective and speedy manner, consistent with the remit of the Takeovers Panel.

For the Strategy, the broad imperative is to address the complex technical challenges that have been identified within the context of evolving societal expectations. Whilst the Discussion Paper is reassuring in this respect, much will depend on the willingness of government at all levels to reform the critical minerals sector as it supports its development. Carrots and sticks each have a role to play.



Thematic 3: A call to action in R&D

“A strong America cannot be dependent on imports from foreign adversaries for the critical minerals that are increasingly necessary to maintain our economic and military strength in the 21st century”

President DJ Trump, Executive Order on Addressing the Threat to the Domestic Supply Chain from Reliance on Critical Minerals from Foreign Adversaries: September 2020

A prerequisite for the durable advancement of the critical minerals sector is enhanced coordination and cooperation in research and development (R&D). As the Discussion Paper highlights:

Australia holds significant critical minerals processing expertise and R&D capability, with significant know-how and technical expertise across our national science agencies, industry and academia.

There are, however, meaningful impediments to these groups working effectively together and there has been broader decay in Australia’s commitment to R&D in recent decades. These issues are particularly germane in critical minerals processing, as the field is both research and capital intensive.

For the Strategy, a useful benchmark was published by the US Department of Energy (DoE) in 2021. **The Strategy to Support Domestic Critical Mineral and Material Supply Chains** is an exemplar of strategic coordination across government, industry and researchers. It sets out six calls to action and provides programmatic objectives as well as pathways to implementation.

R&D is a central focus throughout, with the US seeking to marshal its best and brightest under the broad rubric of national interest, as follows:

- > the assured supply of critical minerals and materials and the resiliency of their supply chains are essential to the economic prosperity and national defense of the United States;
- > the report established a coordinated Federal Strategy to address critical mineral and material supply chain challenges through calls to action and

specific recommendations focused on research and development, industrial supply chain development, mapping improvements, permitting, and workforce development;

- > the United States needs a more connected and coordinated research and development strategy to facilitate an evolution to United States critical mineral and material independence.

At the implementation level, the report makes specific recommendations to foster coordination and cooperation between government, industry and researchers, including the development of an R&D roadmap and the identification of R&D opportunities through public-private partnerships. The whole of government approach yields various avenues to foster R&D, and for the deployment of funding, including at the tertiary education and workforce levels.

Set against this backdrop, Australia’s current commitment of \$50 million for the Critical Minerals Development Program over 3 years, and \$50.5 million to develop the Critical Minerals Research and Development Hub, is inadequate both in scope and scale. While more significant funding of \$1 billion has been earmarked for the Value Adding in Resources Fund it may be several years until this facility becomes operational at scale.

On scope, it is worth emphasising that Australia’s limitations in developing its critical mineral sector extend beyond the challenges cited in the Discussion Paper, and include mapping. The DoE report is once again instructive here, noting the state of play in the US:

the lack of geophysical, geological, topographical and pathymetrical mapping at the scale required for mineral resource assessments and private sector exploration is a critical information gap.

Australia’s broader commitment to R&D can be viewed through the prism of the CSIRO, the national scientific research agency. CSIRO’s budget currently stands at \$1.5 billion, less than 0.1% of GDP. The budget has trended lower as a percentage of GDP over the past 40 years. CSIRO has also turned increasingly to external earnings to fund R&D, even though the target of 30% that was established in 1985 was subsequently removed.



Figure 3: CSIRO: Treasury and External Funding; 1926-2015

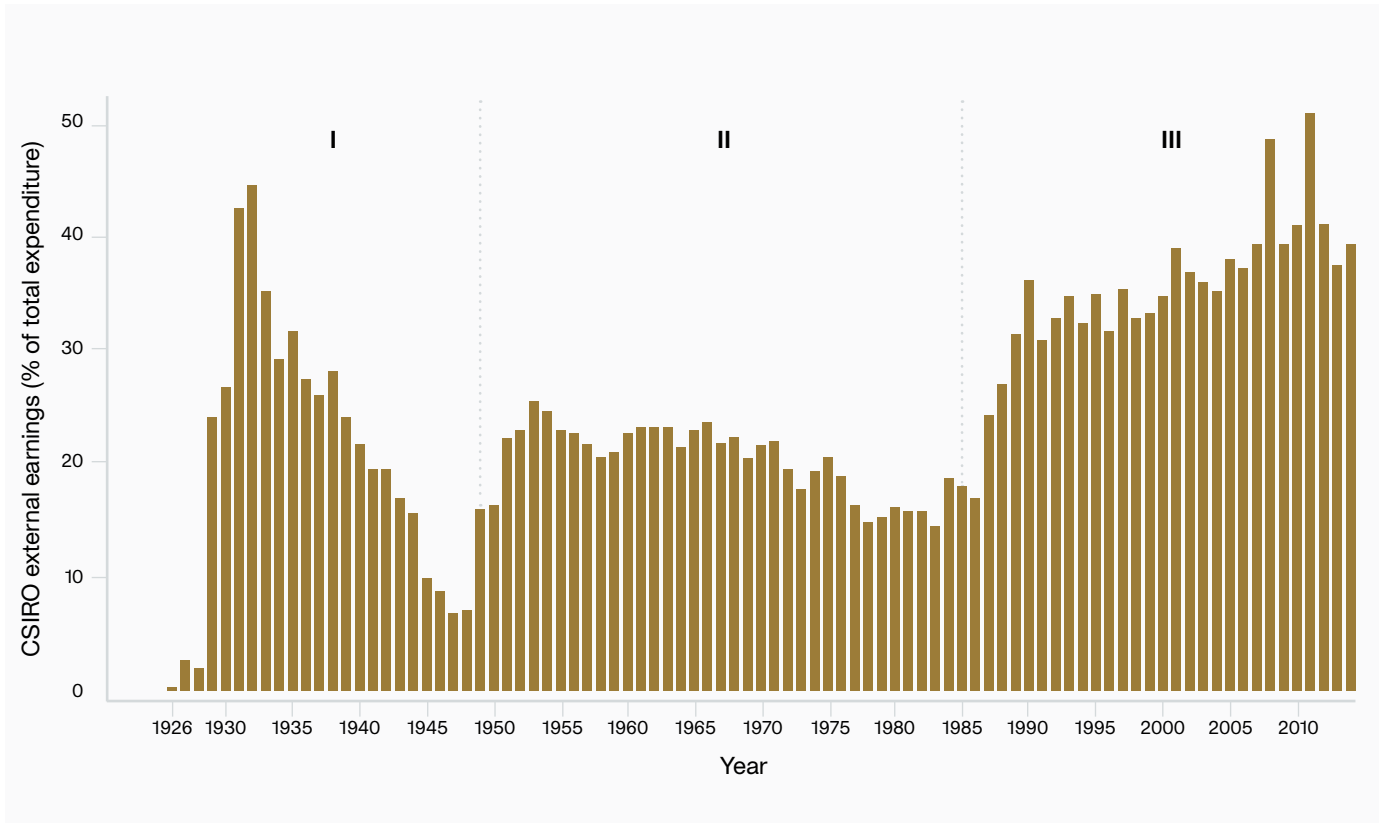


Figure 1: CSIRO external earnings as a proportion of total expenditure 1926 – 2014/15. Note: external earnings includes all non-Treasury including government, non-government sources and sources that are combinations of both (eg. the Wool Research Trust Fund from 1945, the Wool Industry Fund from 1972, and the Rural Research and Development Corporations and the Cooperative Research Centres program from 1990. Total expenditure is external earnings plus appropriation income from Treasury. Source: CSIRO Annual Reports.

While CSIRO has an important role to play in the Critical Minerals Research and Development Hub, its international standing, along with its nationwide footprint, leaves it ideally placed to contribute further, including in fostering cooperation between countries in R&D. Expanding CSIRO’s capacity in critical minerals will also assist with industry engagement, including through increasingly collaborative approaches in the development of intellectual property and future revenue sharing.

For the Strategy, a call to action is needed to enhance coordination and cooperation in the crucial area of R&D. Without this, Australia’s considerable skill base and know-how in critical minerals will remain siloed and fragmented, beholden to disparate incentive structures and vulnerable to brain drain dynamics.

Relatedly, government funding that is fit for purpose, in scope, scale and timing, is required to kickstart a new era of R&D in the critical minerals sector. This initiative must be accompanied by heightened due diligence standards, to ensure that fiscal accountability is maintained and that public resources are appropriately deployed.



Thematic 4: Intellectual property and pilot plants

“In addition to its current R&D portfolio, DOE can shape future critical minerals and materials investments through public-private partnerships that focus on pilot scale facilities for mining, extraction, and processing”

US Department of Energy, 2021

As part of a renewed emphasis on R&D in the critical minerals sector, priority needs to be given to the development of laboratory testbeds, demonstration facilities and pilot plants. From the perspective of industry, large-scale pilot plants are a crucial bridging step between the laboratory and project delivery. They constitute the single most important risk mitigation strategy for all aspects of a complex project and should be viewed as mandatory for novel technologies.

The purposes served by large-scale pilot plants include:

- > Demonstration and optimisation of technologies and process flowsheets at a scale that can be used in design with high degree of confidence
- > Ongoing testwork of complex technologies, allowing for identification of issues in plant design such as material selection and the impact of recycled streams
- > Generation of information and data required to satisfy regulators, especially environmental
- > Production quantities of output for evaluation by potential customers
- > Utilisation for training of operators and supervisors
- > Provide basis for third party process guarantees
- > Provide basis for due diligence and decision making by project financiers

A broader benefit for Australia is the retention of technological expertise, countering the brain drain that has occurred in the resource sector over recent decades. The opportunity to display Australian-based ingenuity to a broad audience, including stakeholders and community, can make a strong contribution to earning and maintaining a social licence to operate. Moreover, there is the potential to develop regional hubs of expertise, for example with the recently announced initiative in Townsville. Darwin is well suited as a location in this respect.

The principal challenge with large-scale pilot plants is the high capital cost. There is no guarantee of revenue, and the validation and process optimisation will take longer for complex processes. There are unavoidable technical limitations as well, as scale up factors are not fully reliable, especially in the area of early-stage selection of battery limits. Large ore samples may also be required to simulate throughput on a continuous basis.

It is also likely that large-scale pilot plants will involve challenges in terms of intellectual property. Many important metallurgical technologies are patent protected by overseas companies, limiting the field of endeavour for Australian researchers. The corollary is that where novel advances have been made in Australia, efforts should be redoubled to take advantage of the opportunities that exist to commercialize the relevant technologies.

On balance, and within the broader call to action in R&D, there is compelling case for enhanced cooperation and coordination between government, industry and research in respect of laboratory testbeds, demonstration facilities and pilot plants. Arguably, the difficulties faced by industry in commissioning pilot plants at scale represents a form of market failure, leading to a net loss of economic value to Australia. Federal grants that contribute to the cost of pilot plants, and expedite their timing, are a highly efficient use of fiscal resource.



Thematic 5: Regionalism, and the pivotal role of Northern Australia

“A strong north means a strong nation”

Our North, Our Future: Whitepaper on Developing Northern Australia, 2015

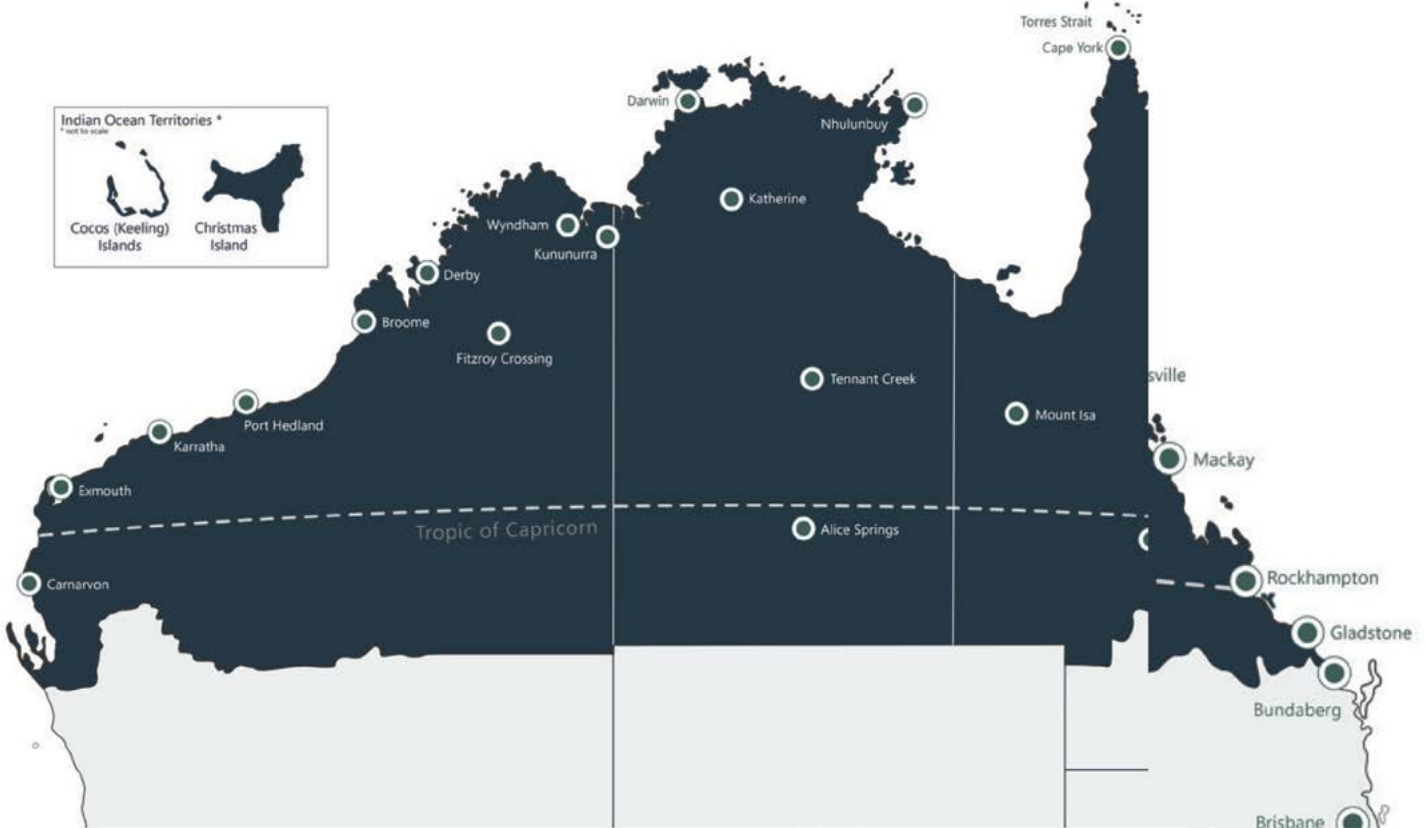
Northern Australia has been a framework for discussion for all tiers of government since the 1980’s, across multiple governance platforms. Today, Northern Australia is defined as all the Northern Territory and those parts of Queensland and Western Australia that intersect with the Tropic of Capricorn, including the Indian Ocean Territories of Christmas, Cocos and Keeling Islands. This represents nearly half of the entire Australian continent.

The economic contribution of Northern Australia to the broader Australian economy is undisputed, driven by traditional and emerging industries including agriculture, aquaculture, extraction and processing of resources and defence. Critical minerals, along with clean energy, manufacturing, and food and beverage manufacture are amongst the emerging industries.

Commensurately, the significance of Northern Australia to the national security agenda and Australia’s geo-political posture cannot be overstated. The Northern Territory hosts key military installations, including the Joint Defence Facility Pine Gap near Alice Springs, and RAAF Base Tindall, near Katherine.

Today, a number of broad challenges have been identified by think tanks, industry and government which limit unlocking the growth potential of Northern Australia.

Figure 4: Northern Australia, as defined by the Australian Government





These include:

- > **Remoteness** – an enduring challenge to industry, as capital and operating expenditures are necessarily higher in remote jurisdictions. Lack of proximity to large-scale power resources can also act as a binding constraint. The advent of fly in, fly out workforces has opened new frontiers, yet poses additional challenges in terms of social impact, and a significantly higher source of variable cost than urbanised labour. The cyclonic zones of Northern Australia may pose additional challenges and cost burdens for industry in meeting relevant safety standards.
- > **Water** – security of supply, a particularly important requirement for critical minerals processing. This requirement imparts an equally important set of environmental, cultural, social and economic obligations on large-scale industrial proponents so as to underwrite the responsible use and reuse of often scarce water resources. The presence of groundwater dependent ecosystems in Northern Australia may heighten the complexity and sensitivity of the required balancing of interests.
- > **Infrastructure** – a critical dependency of industry, as prosperity driven by capacity to trade and presentation to market is dependent on the supply chain, especially transport logistics. Infrastructure offers significant collaborative opportunities between industry and regional communities, where consultation and engagement on early-stage design through to execution are crucial. Government has an outsized role to play in facilitating and contributing to infrastructure investment in Northern Australia, including by promoting the use of renewable energy sources. Ensuring appropriate governance regimes are in place is a further deliverable, so as to support benefits flowing to local communities.
- > **Land** – tenure of 78% of Northern Australia coalesces with the rights, interests and cultural heritage of First Nations peoples. Engagement with Land Councils, Traditional Owners, and local communities to develop respectful partnerships that present opportunities to collaborate and co-design to ensure mutual benefit is of enduring importance. This important topic is address further below.
- > **Innovation and research** – a precondition for the sustainable development of Northern Australia is ongoing research and development, including appropriate incentive structures. Universities with campus locations in Northern Australia have an important contribution to make, especially in terms of education and training, community-based leadership, and in fostering collaborative opportunities with industry. The Cooperative Research Centre for Developing Northern Australia (**CRNCA**) is an exemplar in the field.
- > **Data resources** – access to reliable and large data sets to inform decision making is a critical and expanding need for government, industry and research. Data resources are inevitably less rich for Northern Australia, given its vast scale and under-investment. It is an important priority that the commons is maintained. Regional Development Australia plays a useful role in assisting regions to collaborate, source data, undertake modelling and provide regular analysis to inform decision making.
- > **Governance** – the importance and impact of the resources sector dictates the need for strong governance frameworks with appropriate enforcement mechanisms. Northern Australia can face additional challenges in this area due to capacity limitations, along with cultural overlays and remoteness. Failures in corporate governance warrant responses that are meaningful and transparent, thereby ensuring social accountability whilst fostering progressive change.



At the policy level, the Federal Government continues to build on the direction announced in the 'Our North, Our Future: White Paper on Developing Northern Australia' which presented a twenty-year commitment and framework for development. This policy framework was informed by the Green Paper on Developing Northern Australia. Many of the challenges that were identified are enduring, as is the imperative of sustainable development.

The Northern Australia Infrastructure Facility (NAIF), established in 2016, has a central role to play in generating transformational growth through discharging its mandate as an innovative financing partner. Importantly, NAIF's mission extends to the furthering the public benefit, and to facilitating sustainable participation, procurement and employment outcomes for First Nations peoples.

The emergence of the critical minerals sector is important as it affords a greenfield opportunity to pursue development in Northern Australia at scale, and to integrate disparate regions into the national complex. The consolidated efforts of government, industry and research are required for the opportunity to be realised responsibly, for the benefit of all stakeholders.



Thematic 6: First Nations

“Aboriginal people are not about shutting down mining. Aboriginal people are calling for a greater say on their country,”

**National Native Title Council,
CEO Jamie Lowe, May 2022**

Over the past two decades the relationship between the resources sector and First Nations peoples has gradually evolved from the transactional foundations that were established following the overturning of the legal fiction of ‘terra nullius’ in the Mabo Decision of 1992. Most attention had been paid to land access regimes, fulfilling agreement requirements, and setting the terms of reference for entry and mine operations. There is now more focus on frameworks based on Free Prior Informed Consent (FPIC), and beyond that, holistic inclusion. Most recently, there have also been vocal calls for financial independence and wealth creation by First Nations peoples, broadly defined as a claim on economic sovereignty.

The long history of promise making and breaking has left many scars. Even in parts of Australia where there are rich mineral deposits and significant agreements in place, long-term benefits have rarely flowed sustainably to local communities. There are complex cultural and societal breakdowns involved. These include gross levels of under-investment in basic services, health and housing, which are typically seen as the remit of government and related agencies. There has been clear lack of long-term collaborative design and delivery, and little co-ordination between industry and government. These factors, amongst many others, make it very difficult for local communities, especially Traditional Owners, to manage the numerous bodies, companies and governments they are expected to engage with. Further, many of these service gaps provide the basis for pre-employment capacity, critical to ensuring that employment opportunities embedded into agreements are fully realised.

This also holds in relation to contracting opportunities in the supply chain. In many regional and remote communities, the barriers to entry for both employment and business ownership include a range of social, cultural, economic and prevocational factors. In order to

address these issues, it is necessary that government and industry work together with local communities to develop complementary programmes, services and infrastructure, whilst ensuring there are adequate delivery times and support horizons in place.

At the company level, First Nations peoples face multiple barriers to entry and acute cultural challenges. In remote communities, access to employment and supply chain opportunities are strongly negatively impacted by shortcomings in civil society rights and basic services such as health, education, finance and housing. Entrenched racism and inadequate corporate engagement strategies are compounded by minority representation within workforces and a broader lack of cultural capacity at the managerial level.

Notably, First Nations employment opportunities and programs are often run by Community Relations functions in companies. Yet to achieve outcomes in employment, retention and strong career paths, Human Resource functions are better placed to take the lead. These teams have the capability and remit to address policy reform and negotiations which could lead to more flexible job requirements, job sharing, investing in prevocational training, mentoring and openness to First Nations run labour hire.

While there has been a lot of focus on building management and delivery capability in First Nations small businesses, it is equally important to build the capacity of resource companies to employ and contract successfully with First Nations peoples. There has been a range of work done to understand and address what is required for successful First Nations employment and business development. Further, sustained efforts are required.

Helpfully, there is guidance available for how to inform, engage and collaborate with First Nations communities. Key principles have been produced by the International Council on Mining and Metals, the Uluru Statement From the Heart, Minerals Council of Australia, Closing the Gap, Transitions in Mining Economies Cooperative Research Centre, along with various Working with First Nations Communities Guides at the federal and state levels.

University of Queensland’s Centre for Social Responsibility in Mining has worked with the Aboriginal Enterprise in Mining Energy and Exploration (AEMEE) to develop a good practise guide for building the capacity of the industry in effective procurement with First Nations



companies. Achieving a step change in outcomes requires the development of organisational strategies and capacity. This covers the managerial and executive levels, policies, culture, management systems and training and skills.

Practice has shown that unless such capacity is in place, aspirational commitments, a hallmark of agreement making across the industry, are unlikely to succeed. One common example is where a company commits to First Nations employment and contracting opportunities, but the policies and procedures in procurement and Human Resources frustrate the commitment being achieved.

Moreover, First Nations companies are unlikely to be successful in winning contracts on a commercial basis (needed if they are to have long term viability), without aligning to the procurement requirements of the company and building capability to exploit these opportunities. Access to finance for startup and growing First Nations businesses has also been identified as a significant impediment to supply chain involvement. This is an area that could benefit from a particular focus from government and its entities, such as Indigenous Business Australia.

Within the Northern Territory, the newly formed NT Aboriginal Investment Corporation aims to create jobs, businesses and wealth for Aboriginal Territorians, whilst strengthening culture. This is an important and overdue step forward in supporting self-determination.

Free Prior Informed Consent

In order to ensure that Indigenous cultural heritage is protected, companies and governments must act with greater transparency and accountability and fully respect and uphold Indigenous people's rights to free, prior and informed consent (FPIC). Enshrined within the UN Declaration on the Rights of Indigenous Peoples, FPIC means that:

- > negotiations and agreements with Indigenous peoples must be free from coercion or improper influence,
- > Indigenous peoples' consideration and consultation must be given prior to any developments, and
- > all members of the Indigenous group need to be well informed about mining and other large projects with the opportunity to give or withhold consent. (Oxfam)

Central to the concept of FPIC is recognition that First Nations people have a long history of connexion to land, and a long forward horizon for its care and use. FPIC recognises that the quality of decisions about rehabilitation and future land use are significantly impacted by who is involved in the decision-making process.

From consent to inclusion

The application of FPIC concepts are largely focussed on processes related to land access, mandated activities, compliance with regulation, agreements and approvals. These processes can be an experience of passive receipt of information in a situation of unbalanced power dynamics and unbalanced financial resources.

Inclusion is a broader concept which acknowledges the importance of involving First Nations peoples across the life of mine, from exploration to development to operations and closure. Inclusion is attendant to social impact, and to delivering more sustainable outcomes for companies and communities. Inclusion implies 'making room' and has a wider reach than concepts like engagement and consultation with First Nations people.

First Nations inclusion centres around:

- > how we improve settings to make equal room for the 'other' through sense of place, partnerships, impacts, ideas, innovation and influence;
- > building and fostering trusting relationships between First Nations people and non-Indigenous peoples;
- > creating a respectful environment to explore, learn, and communicate with a community that has been underrepresented for a long time in history; and
- > educating future generations about truth and reconciliation.

As the critical minerals sector takes shape it is crucial that it heeds the past failures of the resource sector and strives for the holistic inclusion of First Nations peoples and communities at all stages of development.



Thematic 7: Workforce, training and gender equity

“With intense demand for Australia’s sustainably sourced and high quality minerals, will come intense demand for the workers responsible for producing them,”

**Minister Madeleine King –
Press Release 11 August 2022**

As the range of skills required by the resources sector in Australia has changed, so has the way people are engaged. Most companies have workforces comprising employees, contractors and consultants, and alliance and collaborative contracting arrangements blur the lines between employee and non-employee roles. This makes consistency in workplace culture and optimal design difficult to achieve, particularly with the advent of fly in, fly out contracting. Respectful engagement and inclusion are crucial foundational elements for human resource practices in addressing these challenges.

It is important for the Strategy to recognise that roles and capabilities within the resources sector have expanded well beyond engineers, geologists and accountants to include trades, administration and social sciences. All these roles are critical. Meanwhile, there continues to be a concerning decline in training pathways within the tertiary sector and with low participation in high school STEM courses.

In addition, the technological trends toward automation, including big data, machine learning and artificial intelligence, remote operations control, robotics, and so forth, call for a much broader range of professions and skills. The digital transformation of the resources sector is inevitable, yet policy in Australia has often focused on a narrow suite of professions related to mining. This accentuates the risk of workplace displacement, whilst also imposing an opportunity cost on the sector relative to global peers. Professions and roles associated with data sciences, information systems, knowledge management (including GIS), sustainability, environmental management, community development, and support services all provide broader pathways into economic participation.

At the capability level, work undertaken for the Minerals Council of Australia (MCA) shows that “there is consensus that skills requiring greater degrees of task creative intelligence, social intelligence, and perception and manipulation will be more resilient to the impacts of technology and automation”. By way of example, the following capabilities are viewed as highly relevant to the resources sector at large:

- > Change Management
- > Collaboration
- > Complex Stakeholder Engagement
- > Creativity
- > Data Analysis
- > Data and Digital Literacy
- > Design Thinking
- > Stakeholder Analysis
- > Strategic Planning

Diversity and barriers

This background strongly supports the secular case for the resources sector to embrace a more diverse workforce. The sector faces many challenges in attracting and retaining the needed talent and capabilities to meet demand now and into the future. Overlaying this is the reputation of the sector as cyclical, male dominated and tolerating of socially unacceptable behaviour. The sector continues to struggle with providing safe workplaces and rewarding career paths for anyone who does not represent the dominant culture.

Barriers to entry and retention remain a significant issue for women, First Nations peoples, those from minority backgrounds and older workers. A diversity framework is a useful way to lower these barriers, and to address culture, behaviours and inadvertent policies which tolerate or support sexism, racism and intolerance.

Crucially, diversity needs to extend to leadership positions, including boardrooms, to break through glass ceilings and reinforce cultural change. There has been meaningful progress in this aspect in recent years, including in the critical minerals sector, with Lynas Rare Earths Limited an instructive example.

Gender equity

There have been several studies and reviews undertaken to address the low participation rate of women in the resources sector. Recommendations from Women



and Mining agenda of the MCA in 2007 identified that improvements were needed in both culture, and policies and practice. The report 'Unearthing New Resources', by University of Queensland's Centre for Social Responsibility in Mining, highlighted that the following issues:

- > Attraction and recruitment strategies
- > Systems and information
- > Attraction and retention of Indigenous women
- > Structural changes to improve work practices flexibility
- > Improvements in the work environment
- > Workplace culture and life work balance
- > Career management and development

In 2013 the MCA reported mixed results. Women in the Australian resources sector comprised around 15% of the workforce (both sites and corporate) compared to a national participation rate of 45%. There has been marginal growth to 18% over the past decade. Significantly women represent a much smaller proportion of employees at mine sites, minerals processing operations and in exploration.

The 2019 MCA whitepaper to the Northern Australia enquiry, and the 2022 Rio Tinto review, show that there has been only tepid progress across the industry. The issues identified range from sexual assault to discrimination and exclusion. Recommendations included:

- > Develop strategies to effectively engage and maximise opportunities for women
- > Recognise the differing needs of women, including Indigenous women, historically disadvantaged women, or older women
- > Develop policies and practices to eliminate discriminatory behaviours
- > Recognise the costs of losing highly skilled and experienced staff, and capitalise on the benefits of workplace diversity
- > Recognise employees have caring responsibilities
- > Provide visible leadership to achieve cultural change.

Critical minerals at the vanguard

Against this industry background, there is opportunity for the critical minerals sector to differentiate itself, and provide an impetus for broader systemic change. There are strong corporate incentives to establish best practices as the sector emerges, particularly in terms of attracting and retaining talent, enhancing corporate imagery and branding, and enhancing workplace productivity. Diversity is good business. Companies in the sector that recognise this will enjoy a long-run competitive advantage.



Thematic 8: Climate transition

“The greatest risk to achieving net zero by 2050 is the shortage of metals and minerals”

R Dhawan, 23 August 2022

Australia’s long journey to recognising the climate transition has finally reached its terminus. The commitment to net zero by 2050 is now a bipartisan position and was enshrined into law by the Climate Change Bill 2022. The transition calls for reducing net greenhouse gas emissions to 43% below 2005 levels by 2030, implemented as a point target, and implemented as an emissions budget covering the period 2021-30.

While there were various policy failures at the Federal level over the past decade, there was also progress, most notably with the formation of the Clean Energy Finance Corporation in 2012 and the Emissions Reduction Fund in 2014. The legislative reform known

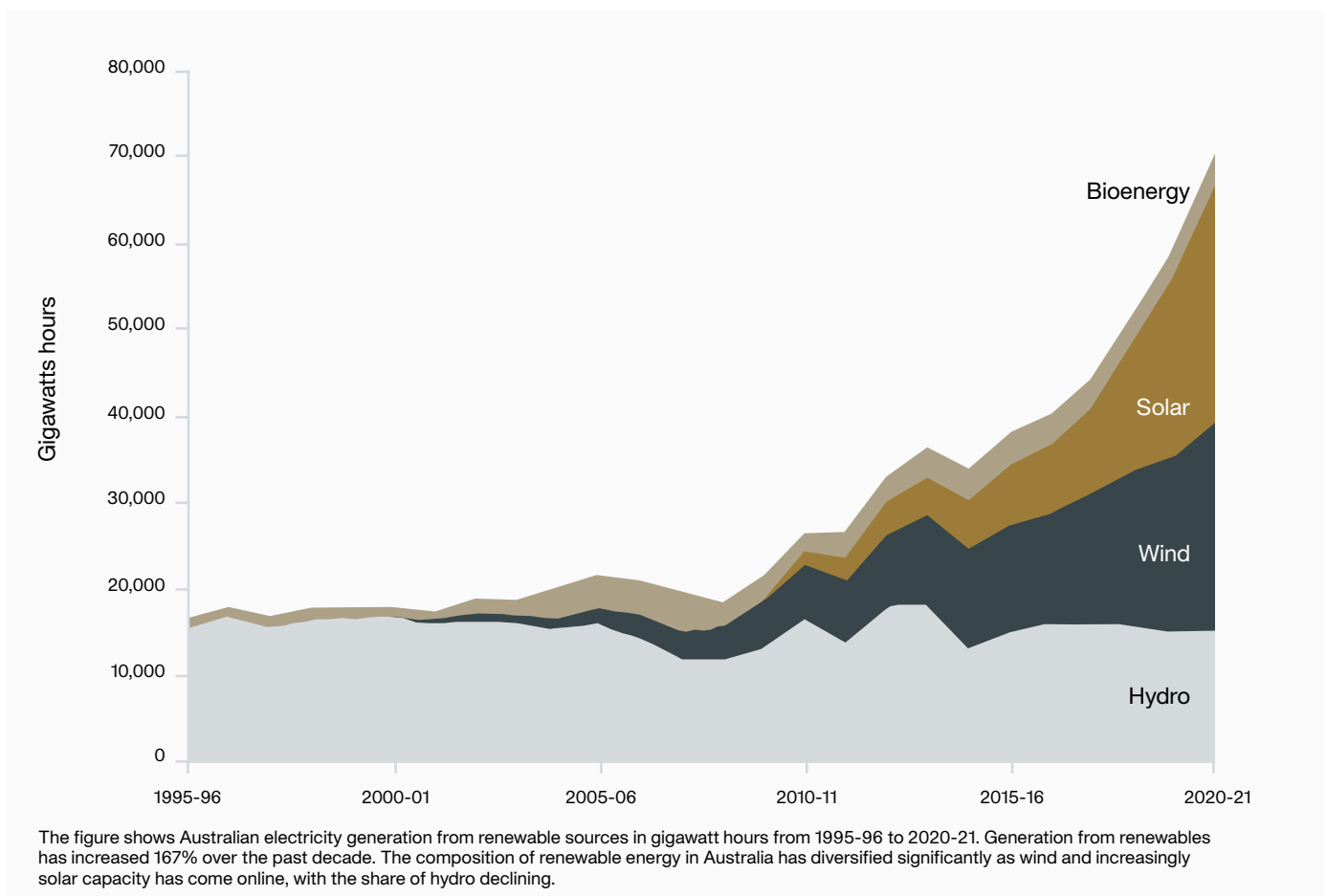
as the “safeguard mechanism”, which came into effect in 2016, has also, and perhaps inadvertently, provided the scaffolding for the ratcheting tighter of large-scale industrial emissions, even if much more needs to be done in terms of reforming baselines.

Significant progress has also been made by State and Territory governments, and by the private sector, both industry and especially the financial sector. The pivot by the Business Council of Australia in October 2021 to embrace net zero was a signal moment. Research and academia have also front run the transition, including think tanks such as the Grattan Institute.

For the critical minerals sector there are three main dynamics at play.

First, there is broad-based recognition that critical minerals have fundamental role in contributing to technologies that facilitate the climate transition. The most commonly cited examples are rare earths and lithium, as inputs to permanent magnets and light weight batteries, especially relevant in the electric vehicle

Figure 5: Australia’s renewable adoption





revolution, and to wind turbines as well. There are many less high profile examples, including in battery space, where nickel, cobalt, manganese and graphite, are known to contribute to performance. Copper and aluminium are central to electrical technologies, are in demand at scale as a consequence.

Vanadium is a sleeping giant. While its traditional use is to strengthen steel, thereby mitigating carbon emissions, there is burgeoning demand for electrolyte to support large-scale redox flow batteries, especially in China. The design for these low-maintenance storage solutions was first patented by the University of New South Wales in Australia in 1986, a notable example of home-grown R&D.

Second, there is widespread acknowledgement of the importance of greenfield projects in the critical minerals sector adopting sustainability metrics from commencement, and where possible, using large-scale renewables as the strongly preferred energy source. This is particularly important for minerals processing, where energy loads are high. There will be case by case considerations, but it is certainly achievable for the sector to build out ahead of Australia's renewable adoption curve, and to act as a further source of demand. In some cases the energy loads are on a 24/7 basis, an important characteristic in terms of marketability and energy storage.

With Australia's broader industrial base likely to be in transition for the decades ahead it is fundamentally important that the critical minerals sector plays a leadership role in energy usage, as it is not burdened by sunk costs of capital, nor is it highly carbon-intensive.

Finally, there is scope for the critical minerals sector to evaluate the use of hydrogen as a reducing agent in process flowsheets. This would represent an important breakthrough technology if deployed at scale. There are many advantages of this approach, the most important of which is the substitution away from typical reduction agents, namely coke and coal. Notably, as well, the use of hydrogen has the potential to reduce other unwelcome gas emissions, such as nitrogen oxides and sulphur dioxide.

There are complex metallurgical considerations in this area, that are beyond the scope of this Submission. These are introduced in the tables overleaf. It is worth highlighting that the established technology for iron production is smelting via blast furnace, which requires metallurgical coke to operate effectively. Decreasing availability of suitable metallurgical coke, along with policy-induced cost impositions on carbon intensive industries, are foundational requirements for the transition to hydrogen-based technologies across the global steel-making industry.

In contrast, select refractory group metal oxides are relatively volatile and smelting tends to result in a loss of metal. Direct reduction processes are thus more amenable, particularly for powder-based metallurgy. Within this area, where many critical minerals reside, hydrogen is a preferred reducing agent, depending on availability, cost, safety, and a variety of other considerations.

While a relatively new technology, hydrogen-based reduction is certainly within scope for the emerging critical minerals sector, and highly legitimate aspirational goal, from a social, environment and commercial perspective. Once again, R&D has an important role to play, in helping to locate Australia at the forefront of technologies that can durably assist in the climate transition.

**Table 1:** Direct smelting processes, Tivan Limited

Metal Produced	Process Name	Process Equipment	Feed Type	Reducing Agent	Product	Reference
Lead	Kaldo	TBRC	S	Coke	Lead bullion	(Sinclair 2009)
	Kivcet	SF and EF	P	Coke		
	Isasmelt	TSL	P&S	Coal		
	Ausmelt	TSL	P&S	Coal		
Nickel	–	EF	P	Coal	Molten ferronickel	(Crundwell et al. 2011)
Iron	COREX	SF and smelter	P	Coal	Molten iron	
	Hismelt	FBR and smelter	P	Coal		
	FINEX	FBR and smelter	P	Coal		
Copper	Ausmelt	TSL		–	Molten black copper	(J, Sole & Davenport 2011)
	Kaldo	TBRC		–		
	Direct Blister	Flash Furnace		–		
	Flash Smelting					
Ferromanganese		EF	P	Coke or Coal	Molten ferromanganese	(Downing 2013)
Ferrochromium		EF	P	Coke or Coal	Molten ferrochromium	(Bacon 2013)
Tin		Reverberatory	P	Coal	Molten Tin	(Barry 2013)

Table 2: Direct reduction processes, Tivan Limited

Metal Produced	Process Name	Process Equipment	Feed Type	Reducing Agent	Product	Reference
Iron	HYL	Moving Bed SF	P	Syngas	Sponge Iron	(Morris 2001)
	Fastmet	Rotary hearth furnace	S	Coal or Coke		
	Midrex	SF	P	Syngas		(Morris 2001)
	Inmetco	SF and hearth furnace	–			(Morris 2001)
	Fior/Finmet	FBR	P	Syngas		(Morris 2001)
	SL/RN	Rotary kiln	P	Coal		(Schenk 2011)
	Circored	FBR	P	Hydrogen		
Tungsten	–	Multi-tube pusher Rotary kiln	P	Hydrogen	Tungsten powder	(Neikov et al. 2009)
Molybdenum		Electric heated muffle furnace Multi-tube pusher	S	Hydrogen	Molybdenum powder	(Gupta 1992) (Neikov et al. 2009)
Rhenium	–	Pusher type furnace	S	Hydrogen	Rhenium powder	
Nickel	–	Fluidised bed reactor	–	Hydrogen	Nickel powder	(Neikov et al. 2009)
Cobalt	–	Muffle electric furnace	–	Hydrogen	Cobalt powder	(Neikov et al. 2009)
Copper		Continuous belt furnace	P or S	Hydrogen	Sintered porous cake	(Neikov et al. 2009)

EF: electric furnace. TBRC: top blown rotary converter. P: primary. SF: shaft furnace. FBR: fluidised bed reactor. S: secondary.
*not commercially available



Thematic 9: Global opportunities and risks

“We are going to take the most aggressive action ever, ever, ever to confront the climate crisis and increase our energy security”

President J Biden, remarks on Inflation Reduction Act, September 2022

Leveraging Australia’s natural comparative advantage in the critical minerals’ supply chain will be best achieved by establishing an industrial base characterized by the complex vertical interdependence of contributing companies, rather than emphasizing the modular efficiency of singularly focussed corporate entities.

Complex vertically interdependent supply chains are designed to be responsive to legitimate government, stakeholder and shareholder demands, while seeking to maximize competitiveness by drawing on national as well as international factors of production. As noted above, Australia is particularly well positioned to develop robust complex vertically interdependent supply chains around its abundant natural endowment of critical minerals. Opportunities for the establishment of several resilient and sustainable downstream value chains are manifold, especially in an international policy environment increasingly focussed on climate transition.

Both intermediate and finished products all along the climate change arresting value chain – value chains that crucially rest on the availability of critical minerals – are likely to experience consistent and secular exponential growth in the decades ahead. Australian vertically interdependent supply chains are well positioned to take advantage of this demand dynamic, with naturally comparative advantages in both ESG governance as well as critical mineral abundance.

Risks abound however, with large trading and political economy blocks seeking to establish domestically oriented value chains by a combination of (i) placing limits on market access, (ii) subsidizing domestic processing, and (iii) restricting international trade in products containing certain technologies. While Australia’s comparative advantages should be able to overcome these challenges, coherent and deliberate governmental policies could aid in the development of competitive vertically interdependent value chains.

From modular design to vertical interdependence

Coming out of WWII the global industrial base was dominated by a number of vertically integrated industrial behemoths, that benefited from the emergence of US hegemonic leadership. These companies, and their copies in Europe, the UK, Japan, and the fast-growing economies of East Asia, were focused on scaling production with limited account for stakeholders and limited interest in maximizing shareholders’ value.

With increased international market access, inspired by globalization, cross-border trade and investment introduced more factors of production to existing markets and gave rise to a surge of purchasing power in the West as well as in the East. The resulting economic and legal landscape for the multinational corporation was centered on virtues that were said to take best advantage of these shocks:

- > Multinational Efficiency
- > Deep Integration
- > Standard Setting

The result was for industry to turn *modular* in order to specialize and maximize efficiency in production, relying on relative international peace, regulatory coherence and a universally accepted framework governing international trade.

However, most recently, some weaknesses in the pattern of globalization have been exposed and, going forward, important concerns for industry – as well as for the national interests which they serve or under which jurisdiction they thrive – have come to include:

- > Resilience and Reliability
- > Sustainability
- > Domestic Value Addition and National Security
- > Supply Chain Control and Sovereignty

Increasingly therefore, modular approaches to industry and supply chain design are being supplanted by an emphasis on *complex vertical interdependence*. Rather than relying on singular optimization by stand-alone units, complex vertical interdependence allows corporations to be sensitive to and drivers of the values and concerns put forward by governments, stakeholders and shareholders.



Global fracturing: risks and opportunities

The infusion of complex vertical supply chains with concern for resilience, reliability, sustainability and national security (including through prioritizing highest domestic value addition) presents geopolitical risks and opportunities – especially in critical minerals sector, both extraction and processing.

The *vulnerabilities* or risks are, holistically, based in the further fracturing of the markets and their political economies on an East/West basis. In terms of concentrated supply chains or cross-border complex vertical interdependence, these risks are expressed in not merely the fracturing of the international regulatory framework (regional standard setting) but predominantly in the barriers set to the exchange of technology and know-how.

Significant exposure to one (political and trading) block could, over time, lead to effective exclusion from other blocks through (a) commercial demands for further (technological) integration, or (b) restrictions set on the export of or access to certain products or technologies. For the critical minerals sector, including its vertical processing industries, this risk is especially pronounced and the exposure to the policy vagaries and demands of a single end-consumer heightened.

The *opportunities* are however manifold if a strategy of complex vertical interdependence manages to embrace the efficiency gains that come from being mindful of varied international production factor allocation while nurturing supply chain resilience by anchoring both the start and end-stage of the value chain domestically. The cross-border component of the supply chain would seek to source intermediate inputs that are relatively interchangeable, while protecting those elements that provide comparative advantage to the holistic supply chain.

The fight against climate change is likely to contribute meaningfully to, and perhaps even dominate, the demand for intermediate and final products over the coming decades. The demand for electrical vehicles, battery technologies and renewable electricity infrastructure will continue to grow from both consumers and governance, providing an unparalleled opportunity to redraw existing production chains and actively contribute to the architecture of international supply chains in the twenty-first century. Considering the fight against climate change and the associated demand for new products is not unique to one geopolitical block,

Australia's vertically integrated value chains are well positioned geographically as well as commercially to service a variety of markets, thereby contributing to complex interdependence on a global basis.

Contending with unilateralism

As a complex vertically integrated supply chain in critical minerals is built out, there are increasingly acute policy risks that could derail the initial establishment of value-added downstream processing capabilities. These policy risks are generated by each geopolitical block and, while the expression is unique to each, both Western and Eastern partners are pursuing unilateral policy choices that have the potential to limit market access or exert commercial pressure on competitive Australian industries:

- > **US' Inflation Reduction Act (2022):** provides a hefty subsidy to downstream products such as electrical vehicles, batteries, and renewable power infrastructure, conditional on the use of domestically won US critical minerals. This "strengthening of the US' supply chain for critical minerals" is explicitly designed to limit the importation of raw critical minerals and develop a robust and vertically integrated processing capacity domestically. As such, US efforts at bolstering its downstream supply chains from critical raw mineral mining could pose a competitive threat to establishing complex vertically interdependent supply chains in Australia. Retaining competitive market access to the US remains critically important as Australia builds out its own production capacities in a way that compliment and compete with US firms.
- > **EU's Circular Economy:** is an early attempt by the European Union to coordinate its Member States' industrial policies to enhance its use domestic of critical minerals. The EU, partly in response to US efforts, has decided to lever its regulatory influence and roll out a combination of border carbon adjustments, countervailing tariffs, and easing of investment rules and regulations; all to remain competitive with the US in attracting and developing downstream industries from critical minerals. Australia, with its emphasis on ESG and comparatively high labor standards, is well placed to engage the European market and compete for the establishment of complex value chains as it has a crucial comparative advantage in the early production stages.



- > ***China's Uncertain Market Access:*** is likely to continue to pose challenges to companies aiming to sell into its large market or take advantage of some of its production factors. China's efforts at leapfrogging its industrial base technologically works in crucial ways to exacerbate existing ESG and market access challenges, especially in an increasingly contested international trade and investment rules framework where national interests are powerfully expressed. In the critical minerals sector, China's global footprint poses an ongoing competitive and commercial challenge to Australia's complex vertically integrated value chains.



Thematic 10: Transparency and sustainability accounting

Climate risk is investment risk:

Larry Fink, Chairman and CEO, Blackrock, 2020

Transparency and good governance are bedfellows. This truism has yet to be fully recognised by the resources sector, even if inroads have been made in multi-lateral fora over recent decades. Amongst the most significant proponents is the **Extractive Industries Transparency Initiative (EITI)**, whose mission is to “promote understanding of natural resource management, strengthen public and corporate governance and accountability, and provide the data to inform policymaking and multi-stakeholder dialogue in the extractive sector”.

The Millennial Development Goals are also increasingly cited by major mining companies, and are geared toward enhanced transparency. In addition, there has been a significant growth in independent external verification specialists, adding depth and capacity, but also creating a landscape which is muddled at times.

The broader sustainability agenda has followed a potted road over recent decades, including through disparate attempts to formulate standards. In the financial arena the Task Force of Climate-related Financial Disclosure (TCFD), established by the Financial Stability Board in 2015, proved to be the key breakthrough. It has heavily influenced systemically important financial institutions (SIFI) since, including the Investor Group on Climate Change (IGCC), a collaboration of institutional investors across Australia and New Zealand.

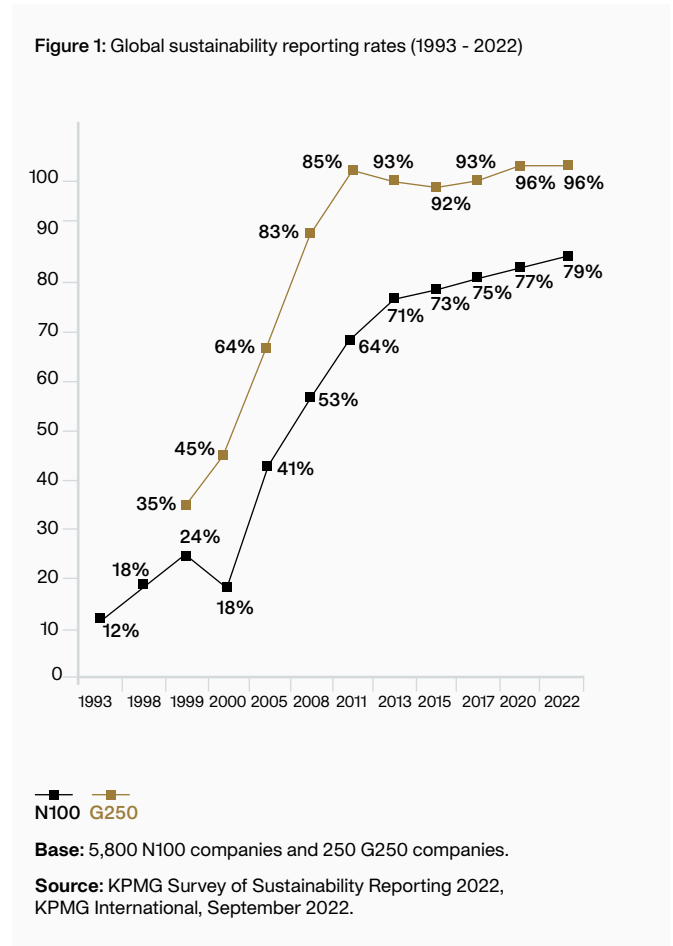
The most far-reaching initiative has been sustainability accounting, sometimes referred to sustainability reporting. This can be broadly defined as a requirement for enterprises to report based on their positive and negative contributions to sustainable development, including climate. In its most ambitious form it reshapes the narrow and prevailing interpretation of shareholder-based capitalism, to explicitly include stakeholders within the reporting schematic.

An important step in this direction was taken in September 2020 when the IFRS Foundation, the peak body for financial reporting standards, issued a

Consultation Paper on Sustainability Reporting. This subsumed the five leading global standard setters, namely CDP, Climate Disclosure Standards Board, Global Reporting Initiative, International Integrated Reporting Council and Sustainability Accounting Standards Board. Then in November 2021 the IFRS founded the International Sustainability Standards Board, which is now responsible for developing sustainability standards for global adoption (IFRS Standards are used for all or most domestic-listed companies and financial institutions in approximately 165 countries).

While a work in progress, the trend toward sustainability accounting is firmly entrenched, and will act as important counterweight against greenwashing in the time ahead. The resources sector will need to come to terms with this tightening of regulatory standards, as it will require significantly more disclosure and standardisation than voluntary sustainable reporting, which has become the default practice over the past decade.

Figure 6: Voluntary adoption of sustainability reporting





For the critical minerals sector, the challenge is to recognise the shifting landscape in accountability, and to take advantage of its relative agility, along with the contribution it can make on the path to net zero. At a minimum the sector needs to maintain sustainability reporting at pace with industry standards, and leverage and influence the work of peak bodies including the **International Council on Mining and Metals (ICMM)** and **Centre for Social Responsibility in Mining (CSRMI)**.

At the project and proponent level, it is also incumbent upon the sector to maintain heightened engagement with regulatory agencies, and with stakeholders broadly defined. While recognising that critical minerals play an integral role in supporting the global green energy transition, all Australians expect the environmental and social impacts of development to be managed responsibly. Established regulatory frameworks require Environmental Impact Statements (EIS) and Social Impact Assessments (SIA) to determine how the proposed development may impact emissions targets, loss of biodiversity, impacts on community and culture, impacts on waterways, ecosystems and flora and fauna, and so forth. Forthright transparency through these processes is not always provided, yet remains the optimal path toward earning and maintaining a social licence to operate.

As the critical minerals sector matures there will be increased demand for and recognition of socially responsible and ecologically sensitive mining practices. Beyond the demonstration of achievement through sustainability assessments, there is the opportunity to lead and to create new pathways, brands, networks and value propositions. This is how climate risk can be transformed into investment opportunity.



Summary

Tivan welcomes the refresh of the Critical Minerals Strategy, and urges government to push forward, keeping pace with global developments, whilst prioritising the national interest. Australia has a unique opportunity to participate in the reshaping of complex vertically integrated supply chains, leveraging sovereign endowments and capabilities, reducing inherent susceptibilities, whilst promoting global interdependence in the fight against climate change.

The reset, review, renewal of Tivan, following a high-profile change of control in late 2022, is occurring in lockstep with the refresh in Canberra, and with the strong support of the Northern Territory Government. Through such consolidated efforts as these, sovereign capabilities and technologies will be animated, and projects of sovereign permanence will come into view.



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