Responsible Acceleration: Preliminary perspectives on the challenges and opportunities for improving mine project development time frames

CRIRSCO Colloquium, Perth

5 Sep 2025

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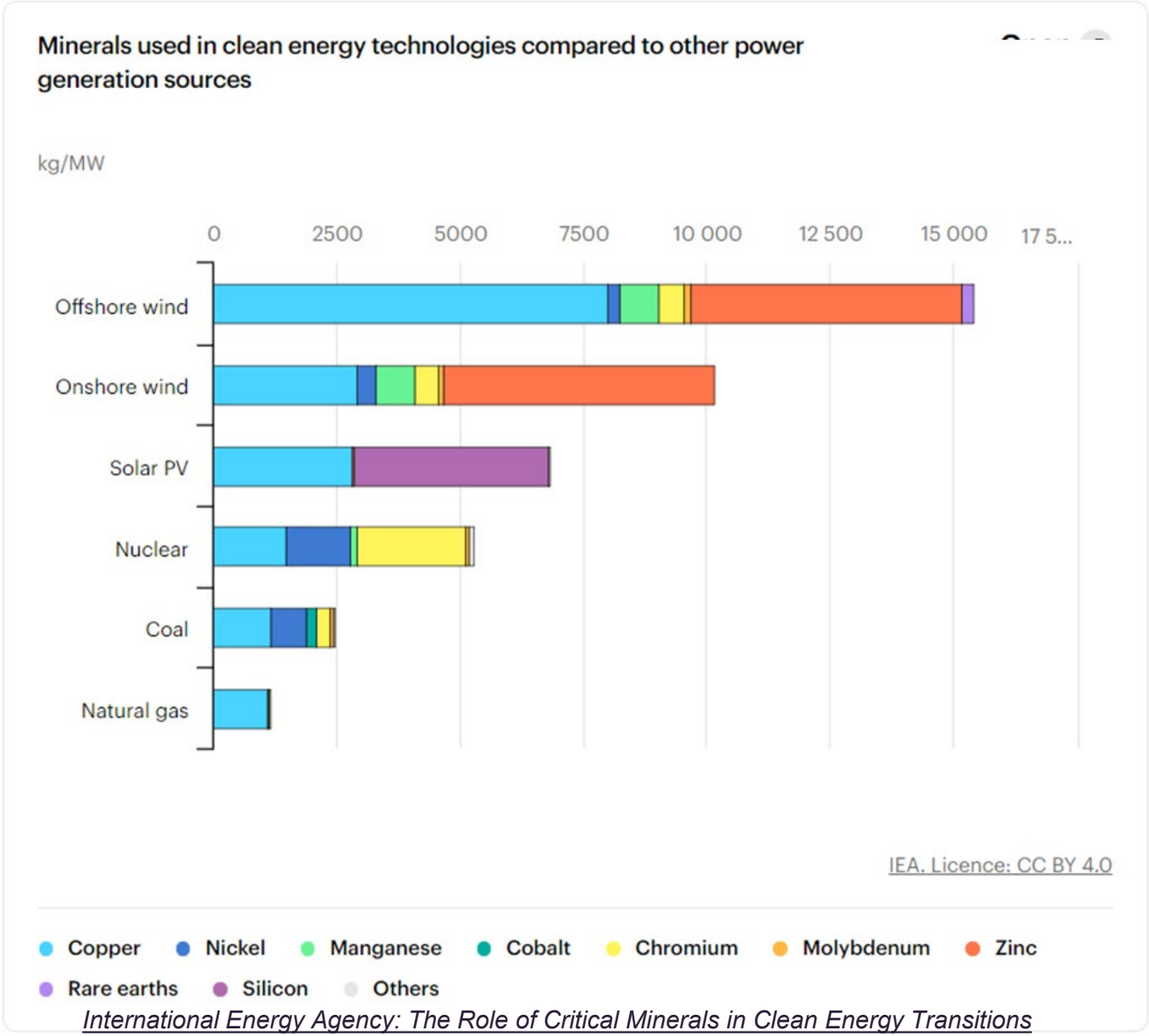
The challenge

Clean Energy requires far great amounts of metals – **~2 to 10 times more** – and a wider variety of metals than '**traditional**' energy supply



International Energy Agency: The Role of Critical Minerals in Clean Energy Transitions

Meeting demand for the energy transition

- The review of the solution targets for increasing the global renewable energy capacity by 2030 concluded that largely, as a society, we should **already be developing the necessary mineral resources** or at least know that they will come into production.

COP28 summit in 2023 in Dubai

- **An acceleration** in the deployment of renewable energy, energy storage and renewable fuels, coupled with tangible progress in energy efficiency and electrification of end-use sectors, are required to meet global climate goals.

International Renewable Energy Agency (IRENA) in 2023

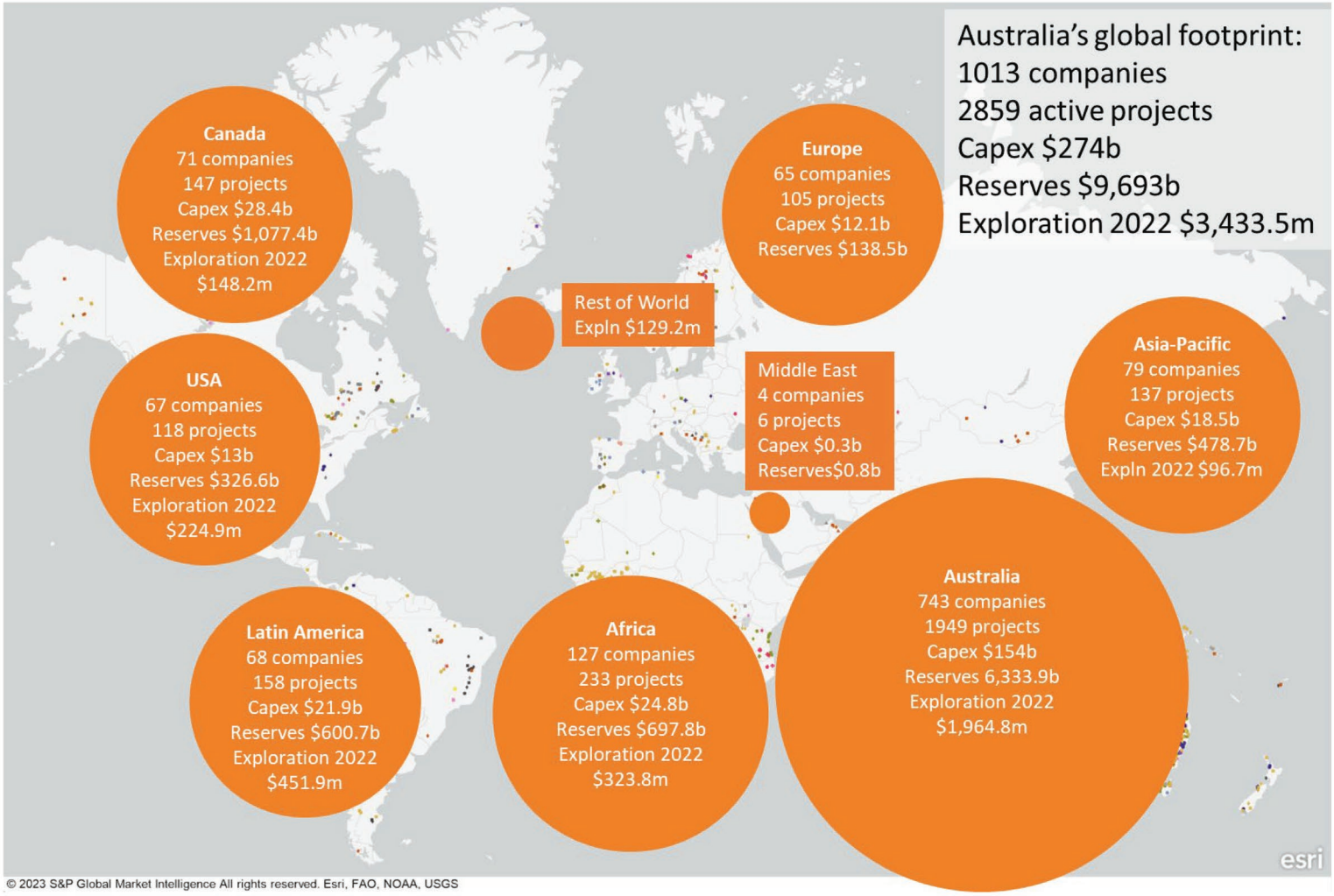
- In practical terms, a lack of global supply of Energy Transition Minerals & Metals (ETMs) could **constrain climate mitigation efforts**.

Owen et al., 2022. Fast track to failure? Energy transition minerals and the future of consultation and consent.

- Mining companies and governments are **working on ways to speed up** the progress for development of new energy transition minerals and metals projects.

Australia's global role

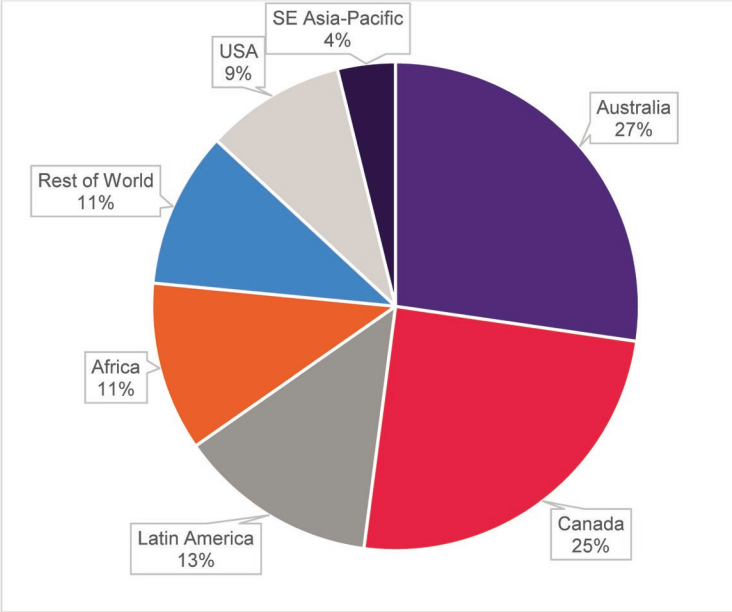
Project leads: Satchwell



Sources: S&P Global 2023, 2023b

Australia's global critical metals leadership (mining, explor. & processing)

Satchwell (2023)



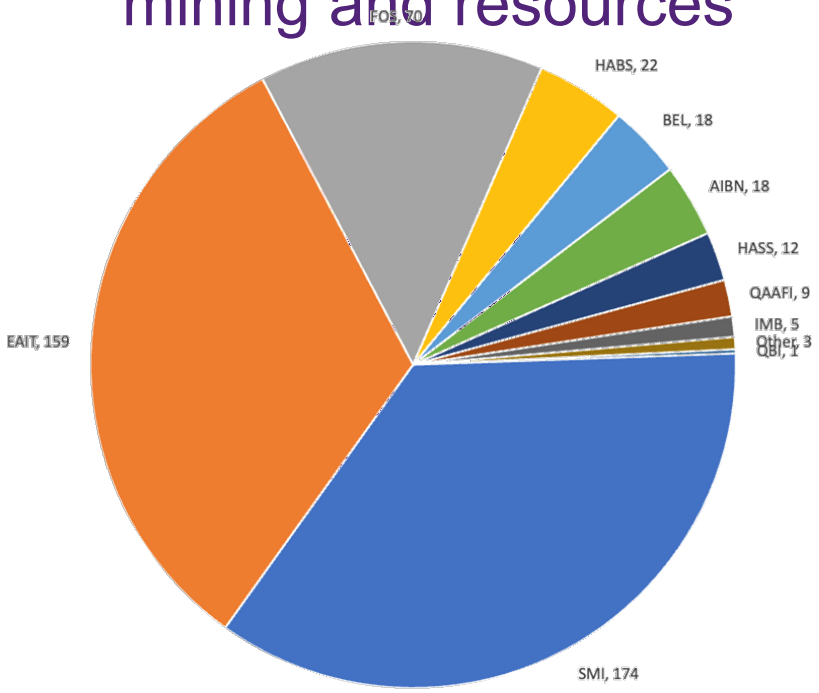
Response - The Capability in UQ Resources

(surveyed in 2024)

21 Schools, 6 Institutes, 16 Centres

World top 4: mining and resources

$250m external revenue 2018-2023



4
Locations

250+
postgraduate students

Response - Resourcing Decarbonisation (UQ Strategic Program)

Challenge of Achieving the Energy Transition

The demand for unprecedented quantities of metals and minerals is driving resource extraction into new geographic areas, vulnerable ecosystems and new communities.

The **Resourcing Decarbonisation Strategic Program** is tackling the sources and supply risks around mineral supply, mitigating the carbon impacts of the resources sector, examining market incentives and policy protections, and understanding the complex risk interactions associated with our decarbonising society.

The goal is to grow interdisciplinary and cross-jurisdictional research on minerals, energy transitions and sustainable development, to unlock responsible energy transition mineral supply and deliver against the rising expectations of performance in environmental, social and government (ESG) issues.

Theme	Project
Complexities of supply and risk	Ecologically responsible mining to fuel a green energy transition
	A National Digital Twin for Critical Metals and ESG
	Identifying, analysing and understanding social risks related to lithium extraction
	Mapping environmental, social & governance (ESG) risks to Australia's mining sector
	Climate resilient resources
	Critical metals from mine waste: Geological Survey WA Stream 1
	Critical Metals potential of Goongewa Zn-Pb Deposit, Canning Basin
	Core to Float – Making sense of a massive dataset related to floatability
	High Voltage Pulse Enhanced Leaching of Mineral Ores
Reducing carbon intensity	Workshop: Path to Net-Zero: Carbon Emissions within the Mining Industry
	Improving Coarse Particle Flotation in Conventional Flotation Cells
Market incentives and business readiness	Critical Metals Data Infrastructure
	Accenture - Professional Dev
	Improving circularity in Queensland's new economy minerals
	Global activities of Australian companies in critical minerals: outline of proposed research report
	Circular economics of climate induced innovation in mining regions
Policy protections and social safeguards	Towards improved ESG performance and sustainability in the Chilean lithium extraction
	T20 Policy Brief: Charting a people-centred critical minerals strategy
	Social safeguards and policy protections for Australia's critical minerals
	Critical Community Relations Trends and Capability at Exploration
	Identifying, analysing and understanding social risks related to lithium extraction in the Lithium Triangle
Integrated risk analysis	What can we learn from an AI-enabled comparative analysis of sci. literature on RD risks?
	Managing Accelerated Mine Development Responsibly
	Advancing social equity in decarbonisation: equity networks

The University Of Queensland
AUSTRALIA

The challenges with resourcing for decarbonisation (supplying resources for the energy transition)

Reducing the time for discovery to mine development

Reduce the project timeline from say 15-20 years to 7-10 years and less

- Industry and government are working on new approaches required to substantially reduce the project development time to bring a new mine into production
- How do we do this efficiently, responsibly and timely across the range of new projects and mines needed?

How do we successfully develop new supply in the time frame we need?

02

The aim

Managing Accelerated Mine Development Responsibly

The purpose of this research

The problem

Accelerating the development time frame of new mines raises concerns with stakeholders over what this may mean for:

1) the **confidence** in investment and lending decisions, and

2) the **responsible development and operation** of these new projects / mines.

The mining industry is widely considered to still be on a journey to improving its approach to social and environmental dimensions and accelerating this could increase risks.

The primary contributors to project delays are not well understood, and a large range of factors can be pointed to, including operational procedures, company governance frameworks, financing, policy or regulatory environments, community acceptance or technical challenges.

The aim

Preliminary scope of the risks/ challenges and opportunities involved with faster development of mining projects.

It is intended that this study will inform more comprehensive future research with industry, government and non-governmental organisations to properly understand and provide frameworks for the 'accelerated context' into which the extractives industry is entering.

Ultimately, we intend to develop a practical guide available to all stakeholders on the key considerations, stages and pathways to responsibly develop a new mine in an accelerated time frame.

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03 Approach

Stage 1 – Preliminary Scoping

Approach

Stage 1 – Preliminary Scoping

This study relied upon:

- Literature review, and
- discussions with a range of stakeholders from the resources sector to obtain different perspectives on the factors associated with,

  (a) project delays, and

  (b) “fast tracking”.

Discussions with:

- *senior executives in a Tier 1 mining company*
- *lawyer working in permitting*
- *government official working on generation of new geological and mining projects*
- *government official working in the approvals space*
- *private geoscience/ mining consultant with experience working on projects across various stages of the mining value chain*
- *academics researching various aspects of the mineral resources sector, including mineral processing, environment and ecology, permitting, and social responsibility.*

03

Preliminary information

Mining is different to manufacturing

Mining	Manufacturing
Relies on estimates	Relies on products
Only the final product is certain	Only the market is uncertain

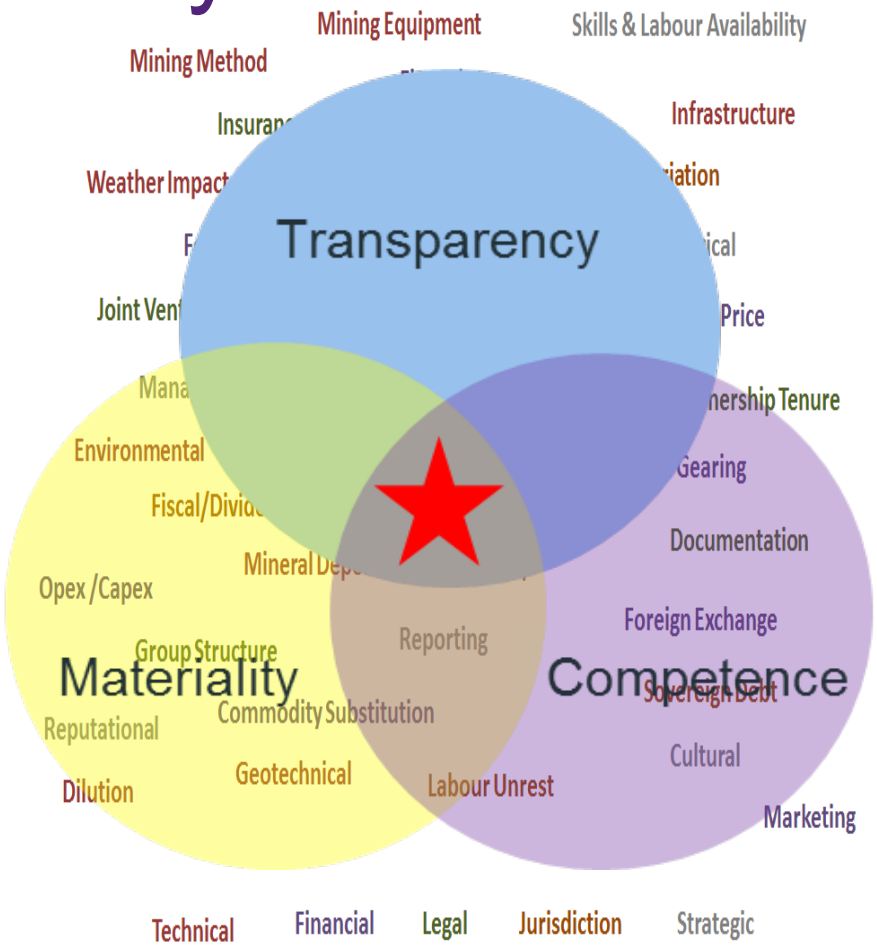
Mining project development is a risky business…..

Mining is an inherently risky business…many prospects and projects never make production

Stakeholders need transparent, consistent and balanced views of a project's development status, including social, environmental and governance factors

Risks and opportunities exist for

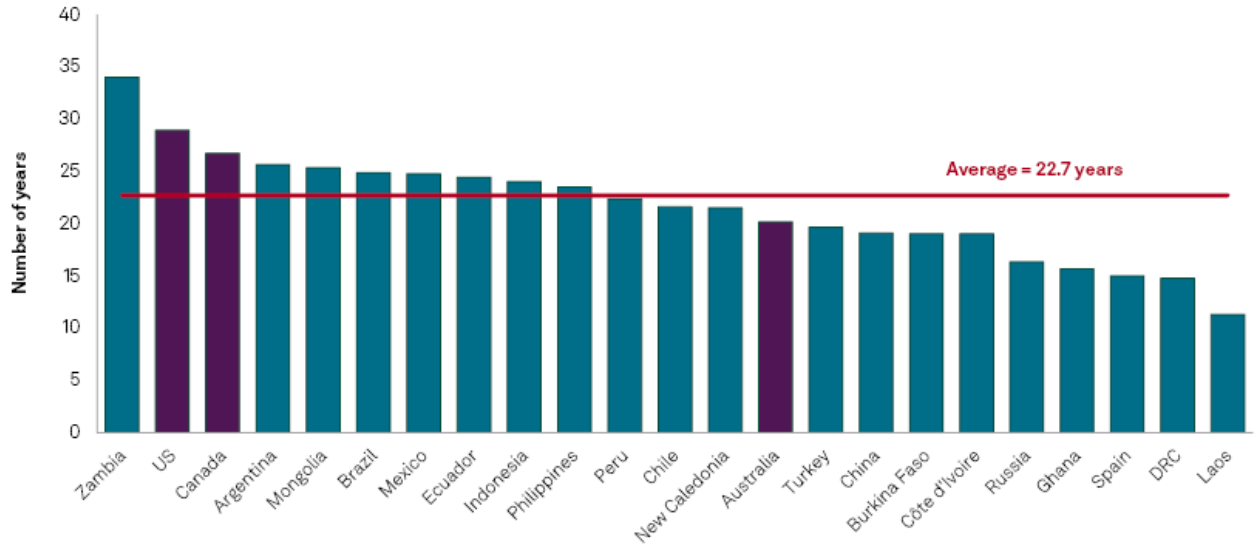
- advancing an exploration prospect to a viable project,
- advancing a project to a mine, and
- operating a mine



Noppe, 2014

Discovery to production time frames - mines

- Average for USA, Canada and Australia, 20-27 years
- WA, Pilbara region - new iron ore mine establishment is some 16 years, industry seeking to half this time frame



Data compiled Feb. 21, 2024.
DRC = Democratic Republic of Congo.
Includes countries with at least two mines. Includes mines not yet in operation.
Source: S&P Global Market Intelligence.

The average time for a mineral deposit discovery to enter production for an estimated startup date of 2030 in countries with active mining industry.
The US, Canada and Australia are highlighted in purple for their broad similarity of the mining industry.

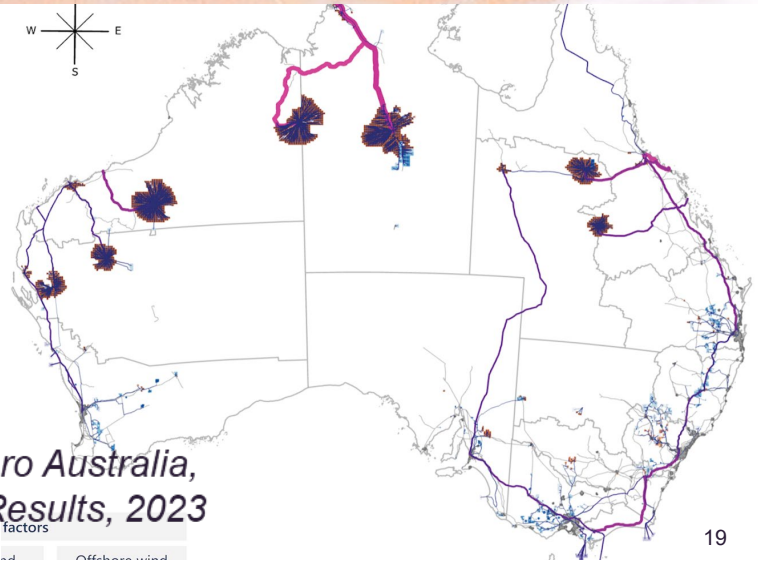
S&P Global, data Feb 2024, From Bonakdarpour et al., 2024

Decision to production time frames – lessons from energy projects

- While renewable energy projects (wind turbines and solar panels) tend to come into production marginally faster than a mineral or metal mining project in Australia, the initial approval process still takes **3.5 to 5 years**.
- This is a reduction in lead times from 2006, when on average a wind farm project from idea to full operation was recorded to take **10 years** and a solar farm approximately **7 years**.
- *Interpreted that these improvements in lead times were **driven by faster pre-construction planning and quicker approval stages from government agencies**.*

Longden, 2024

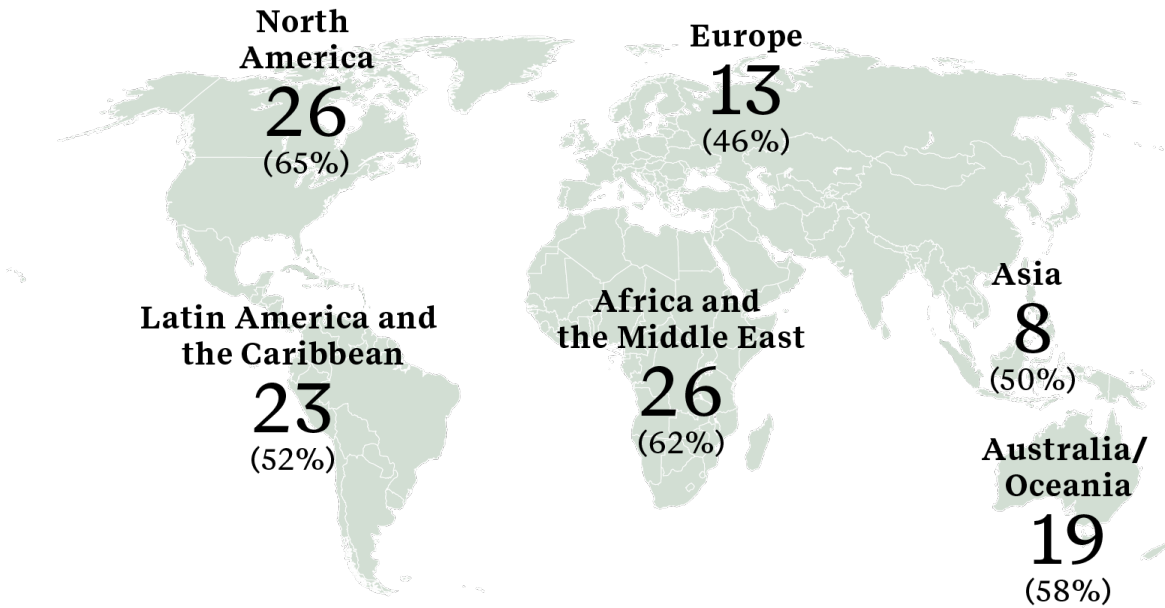
CSF CONTINUA MISTI - Arequipa, Peru
Solar PV power project
1,382,400 panels



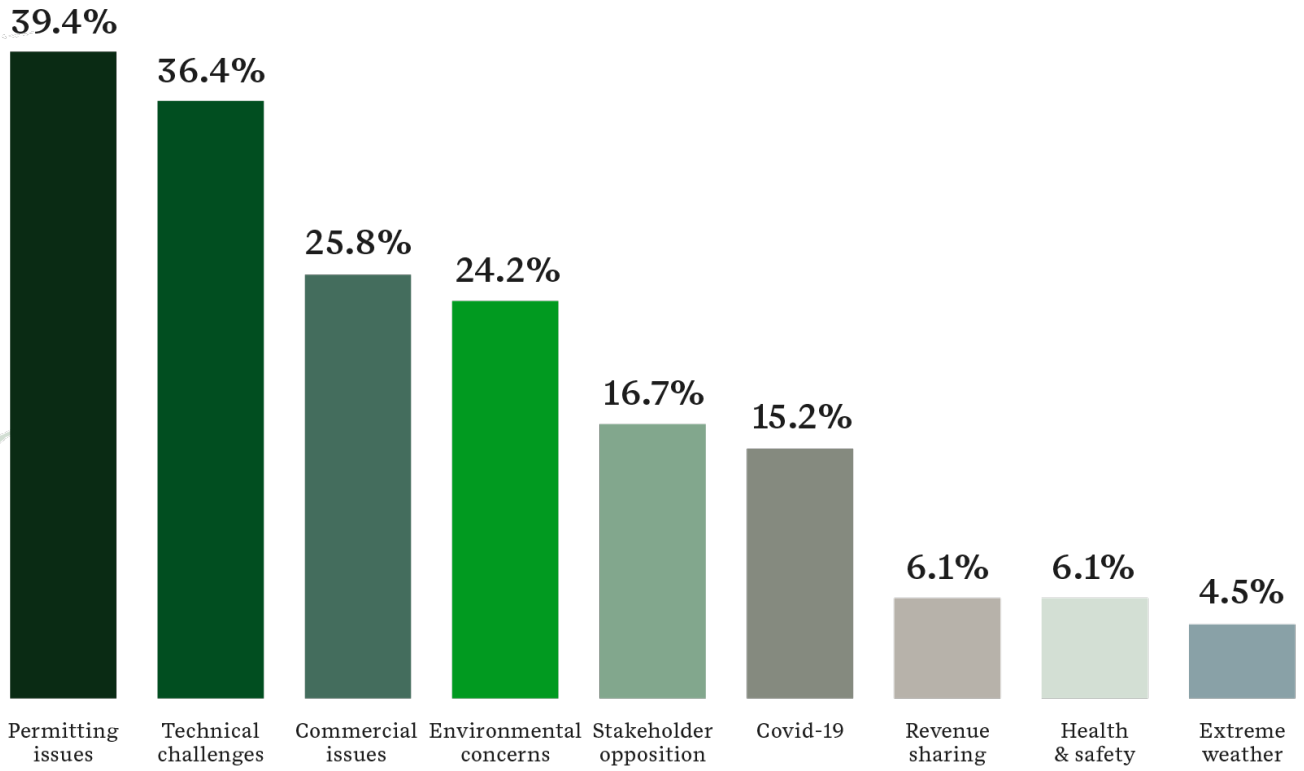
Net Zero Australia, Final Results, 2023

ERM research (2023, update due 18 Sep 2025)

Number of projects assessed per region
(% of those delayed)



Causes of delay to critical minerals projects
(% of delayed projects)



Source: ERM analysis (2017-2023 data)

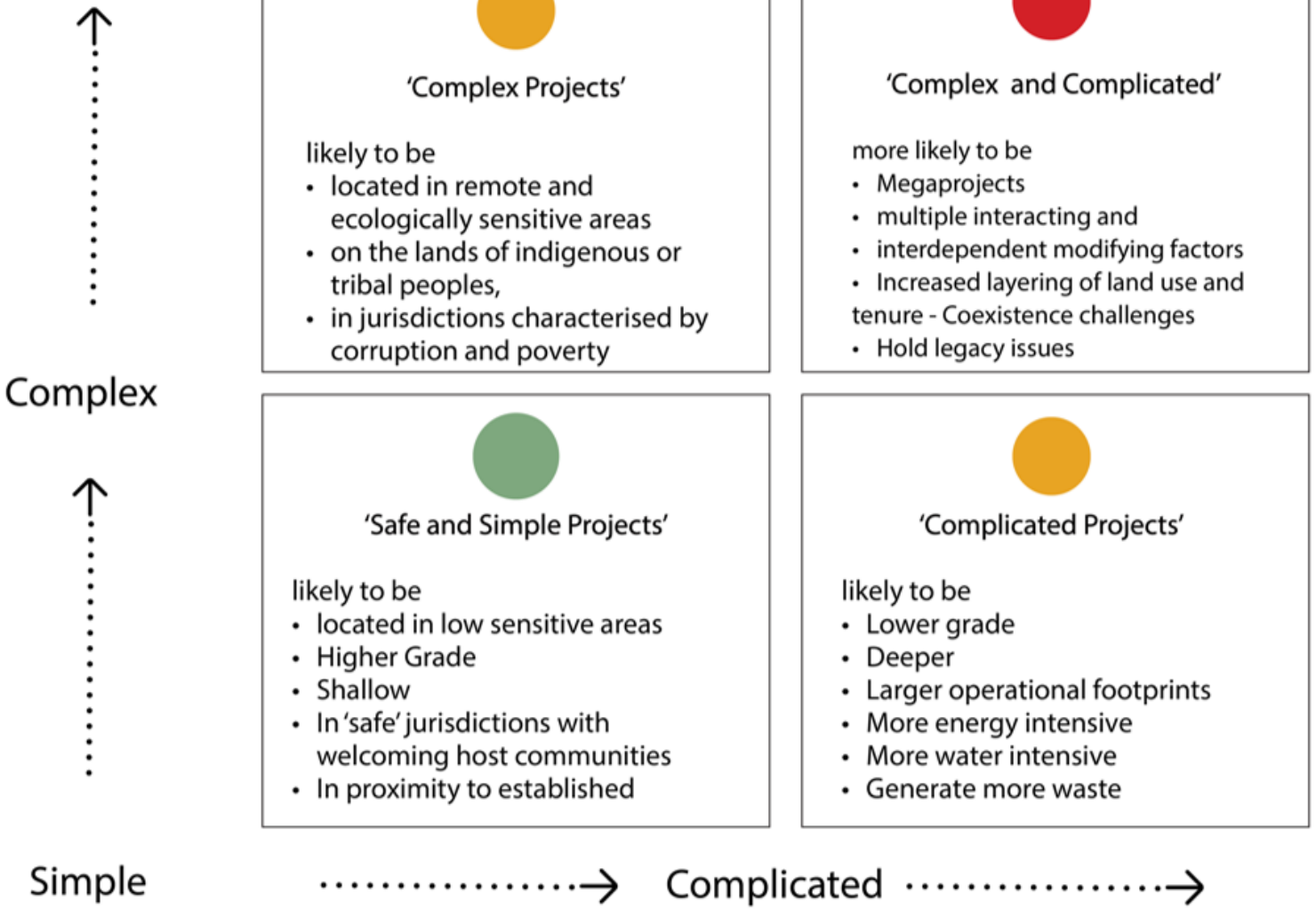
Complex projects

Source:

Frankenstein's and Fairy Tales
Accelerating Discovery to Delivery

Geoff Deans
Director, Modifying Factors

AusIMM CRITICAL MINERALS CONFERENCE 2025



Adapted from R.K. Valenta et al. Re-thinking complex orebodies: Consequences for the future world supply of copper Journal of Cleaner Production 220 (2019) 816-826

Development processes within various entities control

The project developer

- Data collection and interpretation effort/ duration
- Study / assessment detail and stage-gate decisions to advance with the project
- Underlying processes, their time & sequencing
- Internal investment decisions; risk-based options

Lenders/ financing

- Variable Due Diligence scopes
- Will decide if 'bankable'
- Will control / decide on investment or not

The State Government

Federal/ Commonwealth

DNRMMRRD, 2024

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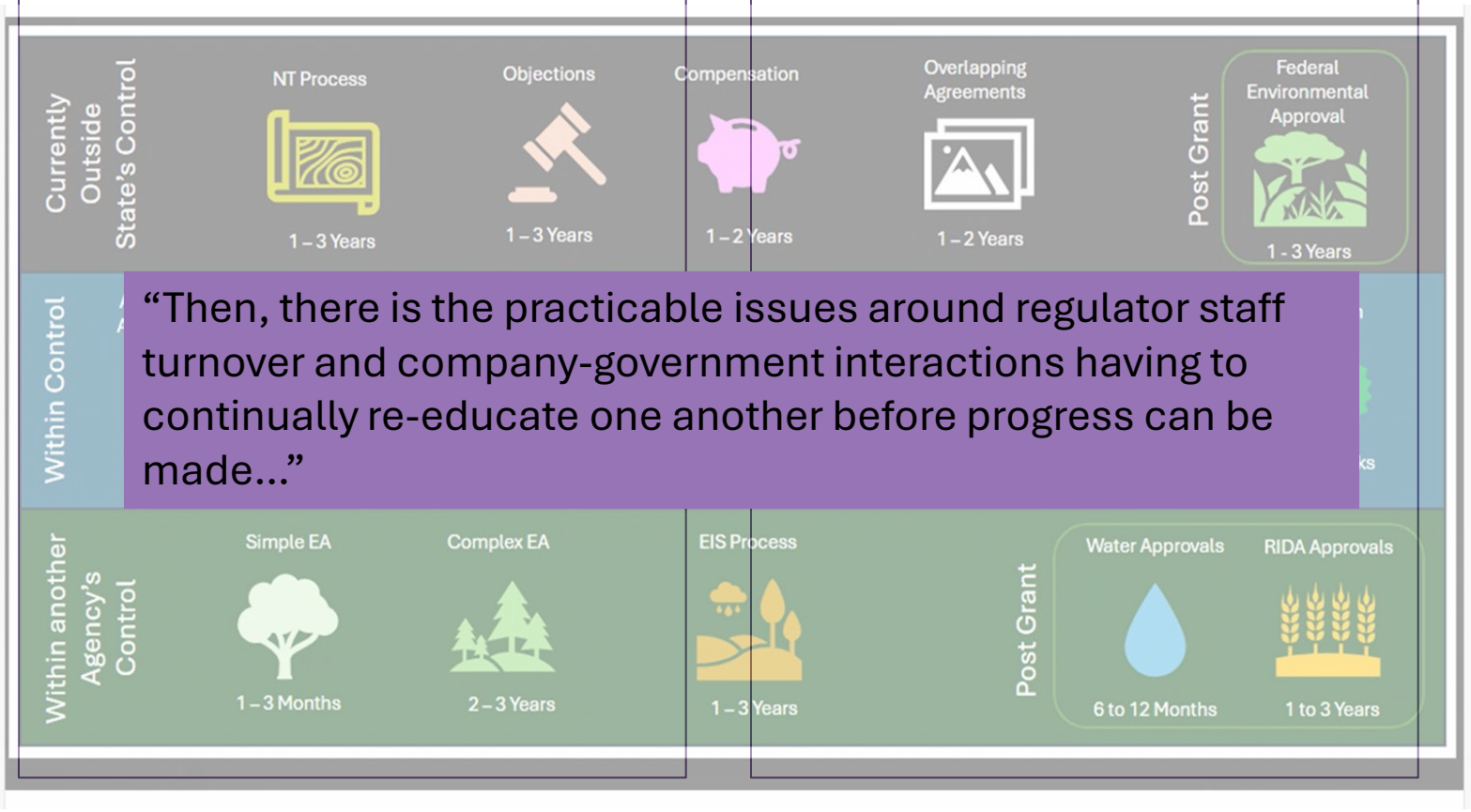


DNRMMRRD, 2024

Critical Minerals Queensland (CMQ)

"The global race to secure critical minerals and supply chains has resulted in fierce investment competition."

"…the Queensland Government is doing more—actively advocating and supporting the development of more critical mineral projects across the state, including accelerating the exploration, extraction, processing, and value-adding of critical minerals. :

"Critical Minerals Queensland (CMQ) is dedicated to accelerating Queensland's critical minerals industry. "

A snapshot of Government funding initiatives

QLD	A$5 billion	Own and deliver the 1100 km CopperString 2032 project.
QLD	A$300 million	Upgrade the rail connection from the North West Minerals Province to the Port of Townsville.
QLD	A$77 million	Build the first Queensland Resources Common User Facility.
QLD	A$75 million	Establish Critical Mineral Zones to accelerate projects through a place-based approach.
QLD	A$55 million	Reduce rents to A$0 for critical mineral explorers.
QLD	A$22.6 million	Funding explorers to unlock the next generation of critical mineral projects.
QLD	A$30 million	Accelerate development of resource projects in the North West Minerals Province in the next five years.
AUS	A$53.8 million	Funding for Queensland resource projects to onshore value chains under the Modern Manufacturing Initiative.
AUS	A$26.7 million	Funding for Queensland resource projects to accelerate early and mid-stage projects under the Critical Minerals Accelerator Initiative.
AUS	A$8.4 million	Funding for Queensland resource projects to advance projects towards financing and production under the Critical Minerals Development Program.

Queensland Critical Minerals Prospectus, 2024

Queensland Resources Council

Streamlining Report 2024, Drivers for Change to deliver:

"Solutions for predictable and timely processes and decision-making

Reduced duplication with a whole-of-Government approach

Transparent communication and engagement through constructive and collaborative dialogue between Industry, Government, and other stakeholders

Certainty and predictability of risk-based regulation

Consistency in regulatory interpretation

Optimised systems, processes and information management by supporting the digital transformation and modernisation of approval systems

Balanced, fair, efficient and effective objections and appeals processes."

DRIVER 1 PREDICTABLE AND FASTER TIMEFRAMES

1

Key actions:

- Expand the use of 'accepted development' for low-risk projects
- Improve pre-lodgement meetings with applicants
- Remove duplication in approval processes
- Introduce parallel decision-making processes.

DRIVER 2 FAIR AND CONSISTENT LAND ACCESS

2

Key actions:

- Establish land access pricing benchmarks to ensure fair compensation for landholders and expedite early exploration.

DRIVER 3 REGULATORY LEADERSHIP

3

Key actions:

- Comprehensively review Resource Industry's governing legislation based on a co-designed scope across both primary and secondary approvals
- Introduce a lead agency approach to efficiently progress applications
- Better mutual understanding of requirements
- Introduce a single streamlined notification process to guide approvals assessments and enhance delivery timeframes.

DRIVER 4 ONLINE APPROVALS HUB AND SKILLS UPLIFT

4

Key actions:

- Fund and develop a unified platform for reporting and sharing information across agencies
- Industry and Government to collaborate to upskill assessment staff through onsite training, site visits, and case studies.

DRIVER 5 ENHANCED GOVERNANCE AND TRANSPARENCY

5

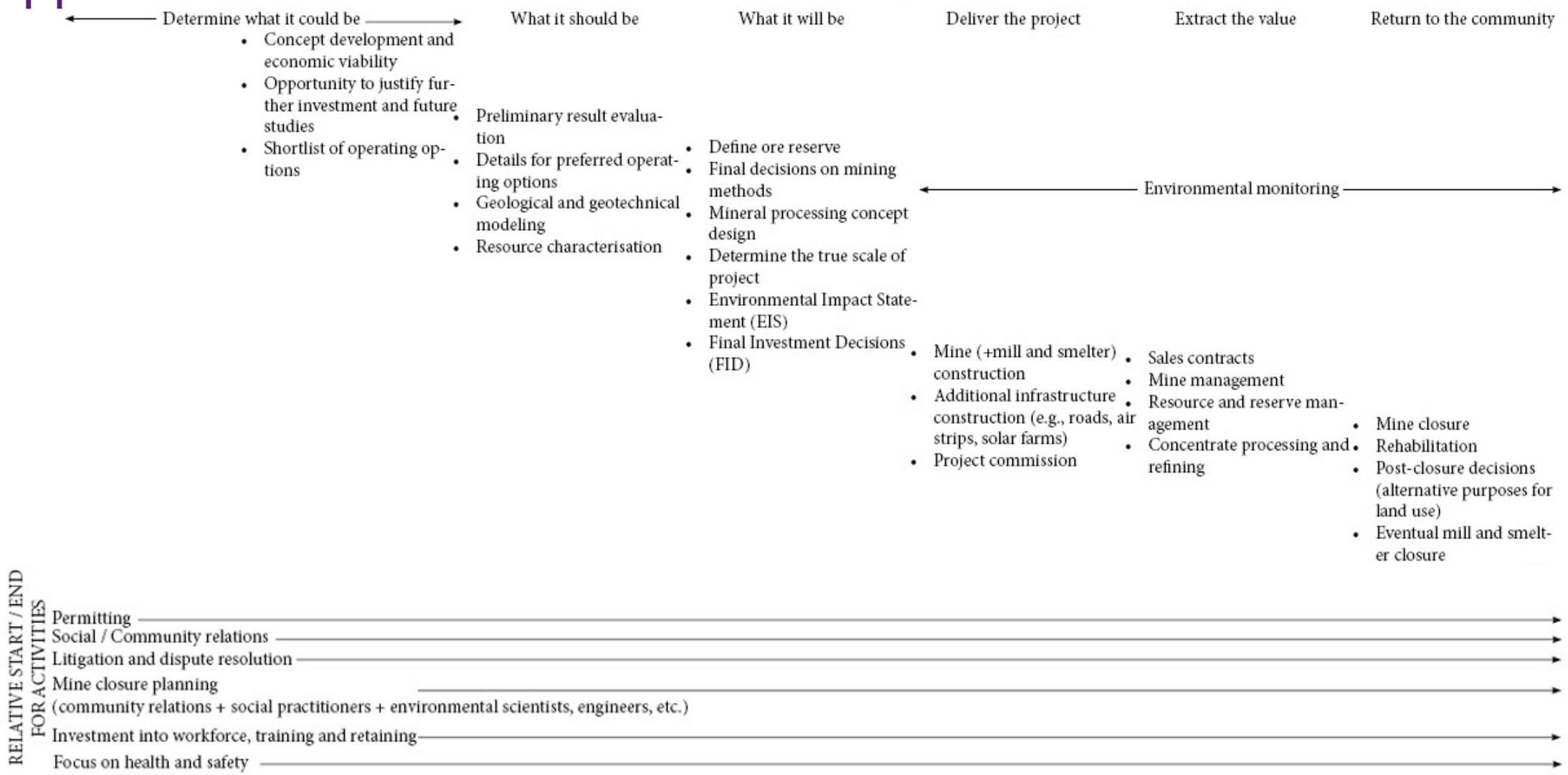
Key actions:

- Resources Cabinet Sub-Committee to deliver robust governance
- Risk-based transparent decision making through releasing statement of reasons and applicant feedback
- Reduce delays in project approvals.

04

Stage 1 Preliminary Perspectives

Capturing typical approval & decision processes – risks & opportunities



Main contributing factors to (un)successful project development time frames:

Key Factors

- Environmental concerns
- Permitting
- Local stakeholders
- Politicisation of contracts
- Industrial strategy
- Labour relations
- Taxes and regulation
- Infrastructure constraints

Bonakdarpour et al., 2024

Other Factors (from this research)

- Policy and agency coordination
- Permitting process (in)efficiencies
- Social & community impact and track record
- Water supply considerations
- Access to funding (at various development stages)
- Early and effective engagement with stakeholders / timelines for consultation
- Accurate & complete technical assessments

Key takeaways

Importance of early engagement with all stakeholders

- **Early engagement** with key stakeholders for a project is required to build a robust understanding of potential impacts and risks surrounding the project and develop a program to support full and proper assessment.

AusIMM Bulletin, 2024

- Project development and stakeholder **engagement is a complex** process since community consultation and consent are multi-layered and inherently scattered.

Owen et al., 2022. Fast track to failure? Energy transition minerals and the future of consultation and consent.

- Even with an apparently rigorous process in place, there can be flaws or **gaps in understanding the risks and consequences**, delaying or stalling the development a project.

Next steps - Responsible Acceleration' research

Scope of a more comprehensive study, including the following questions:

- Consider whether the further study is best as an industry-government-NGO consortium with the aim of developing tangible solutions, business frameworks, standards etc.
- Consider opportunities for shortening mining project lead times that may lie in the project evaluation stages within the developers control?
- Whether project development decisions require more data and study rigour or require different approaches to the way data is used and reported or different sequencing of assessments/ studies (for example by way of risk-based assessment at earlier study stages, with derisking and additional data at later stages).
- Whether we can identify current 'bottle necks' to project development, and are these internal to companies and their processes, or due to delays associated with statutory regulation processes, approvals or societal issues and concerns?
- Whether there should be different approaches to developing a greenfield mining asset and a brownfield mine expansion?
- Whether a project like Resolution Copper in Arizona (discovered nearly 26 years ago with an estimated supply of up to 25% of the US' copper demand) would be in production by now if in another jurisdiction – and why?
- What do investors and lenders need to know to provide funding.
- Whether it is possible to recognise which projects cannot be accelerated and why?
- And more….

05

Conclusions

The challenges with the time line of resourcing for decarbonisation

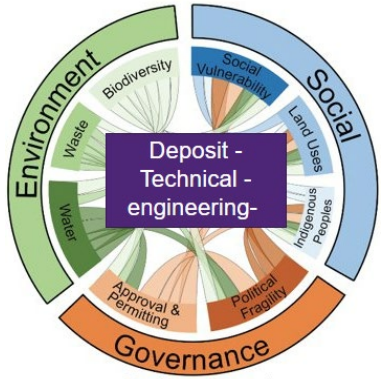
Our #1 priority – The timely sourcing of the supply of critical minerals and metals

1. Understanding – research, consultation
2. Discovery – exploration (permitting)
3. Assessment – studies, consultation
4. Development – approval (permitting) & construction
5. Processing – extraction
6. Downstream – refining
7. Skills – future workforce

Our 'second #1' priority - Achieving the above #1's responsibly (ESG)

How do we:
1. Discover
2. Finance and
3. Develop (responsibly)
4. Permit (approval)
5. Skill

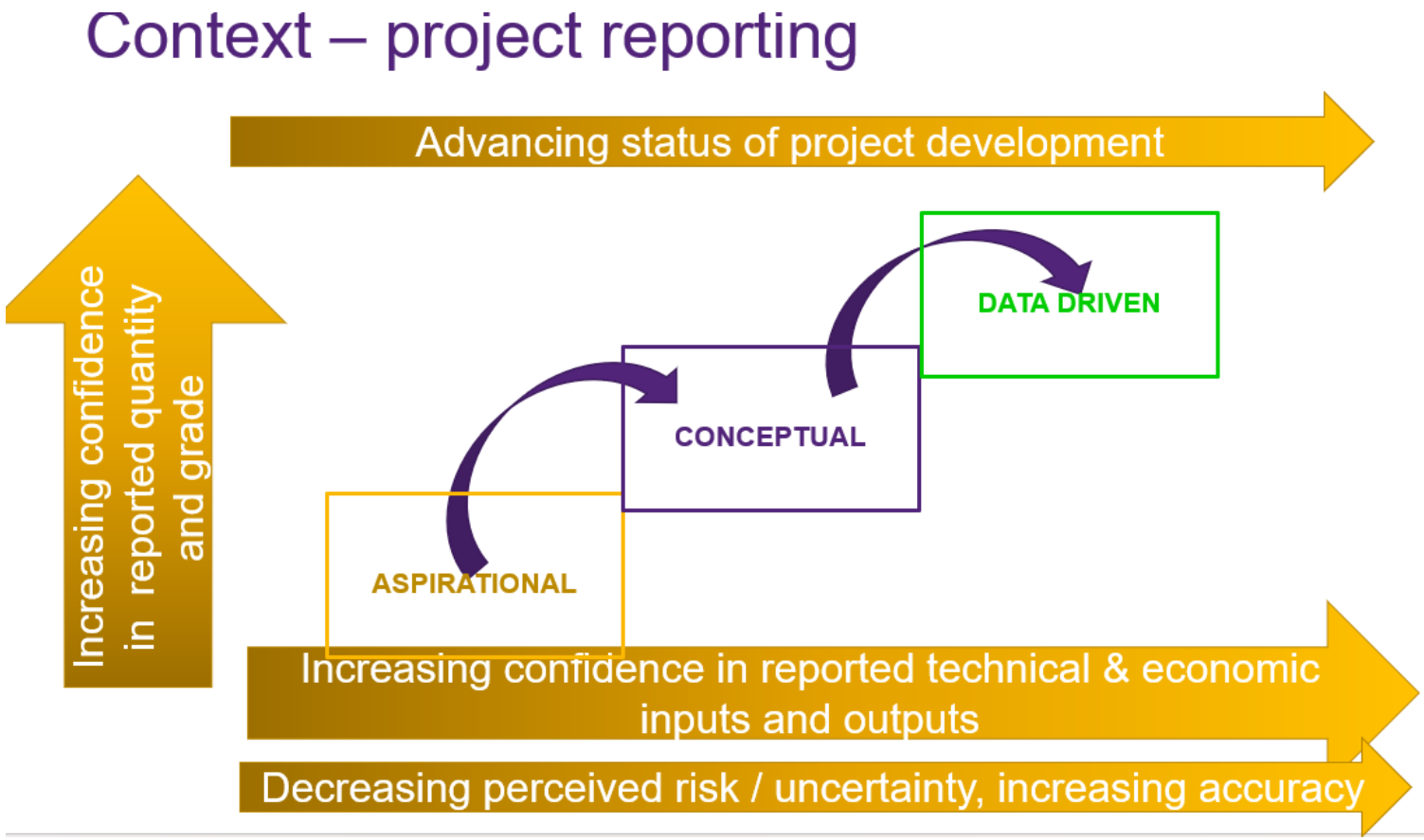
For the quantum of critical metals projects in the time frame needed?



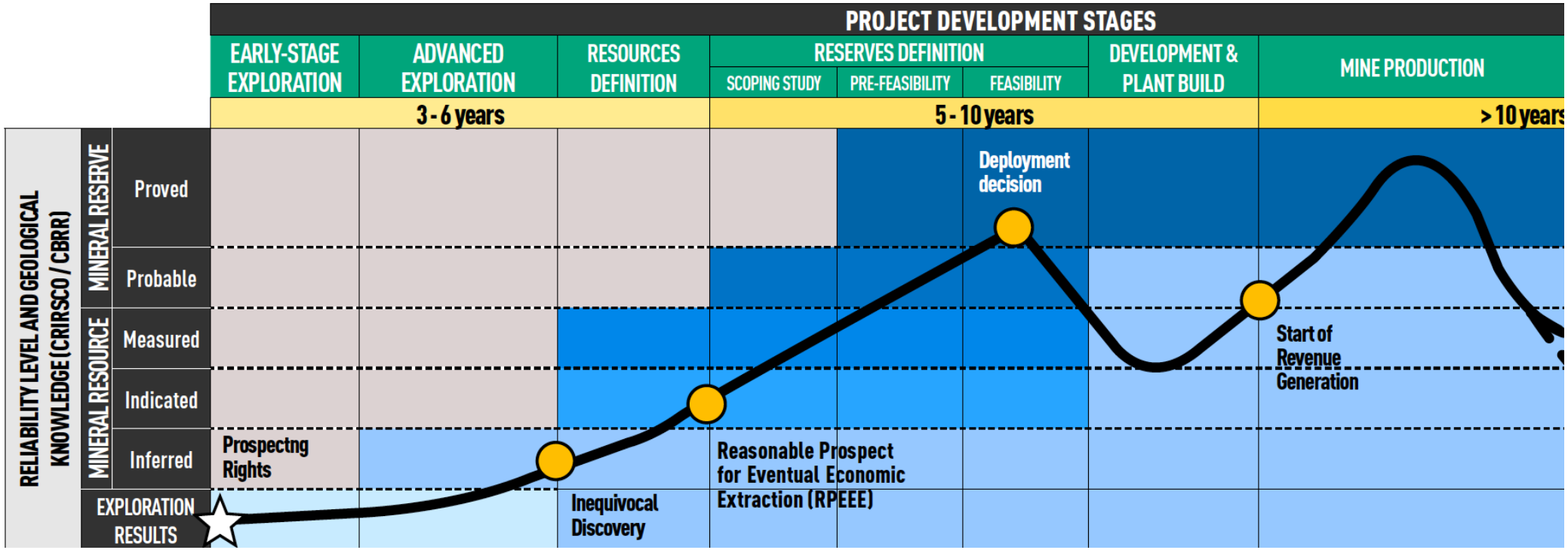
+ Government

Question for CRIRSCO

What does accelerated project development mean for stakeholders?



And…Assurance across the mine value chain



Methodology for monitoring how information is reported and confidence in forecasts:

- project development level
- interrelationship of increased level of confidence in technical and economic studies
- adding value

Allows:

- Identification of the veracity of statements
- Benchmarking between similar projects.

Resource Project Framework de Noppé (2016)

CUCHIERATO, PISANI, PENHA, ROBINE, PENNA, PEREIRA (2022)

Responsible project acceleration to resource the energy transition

Requires that ‘the solutions' are tackled **collaboratively, disclosed transparently**

Requires we all work together
(government=permitting, communities=participation, access, industry, research & academia=skills, funding, etc)

URGENTLY

Learn lessons, share and improve

Thank you

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