AUSTRALIA MINERALS

REALISE THE OPPORTUNITY

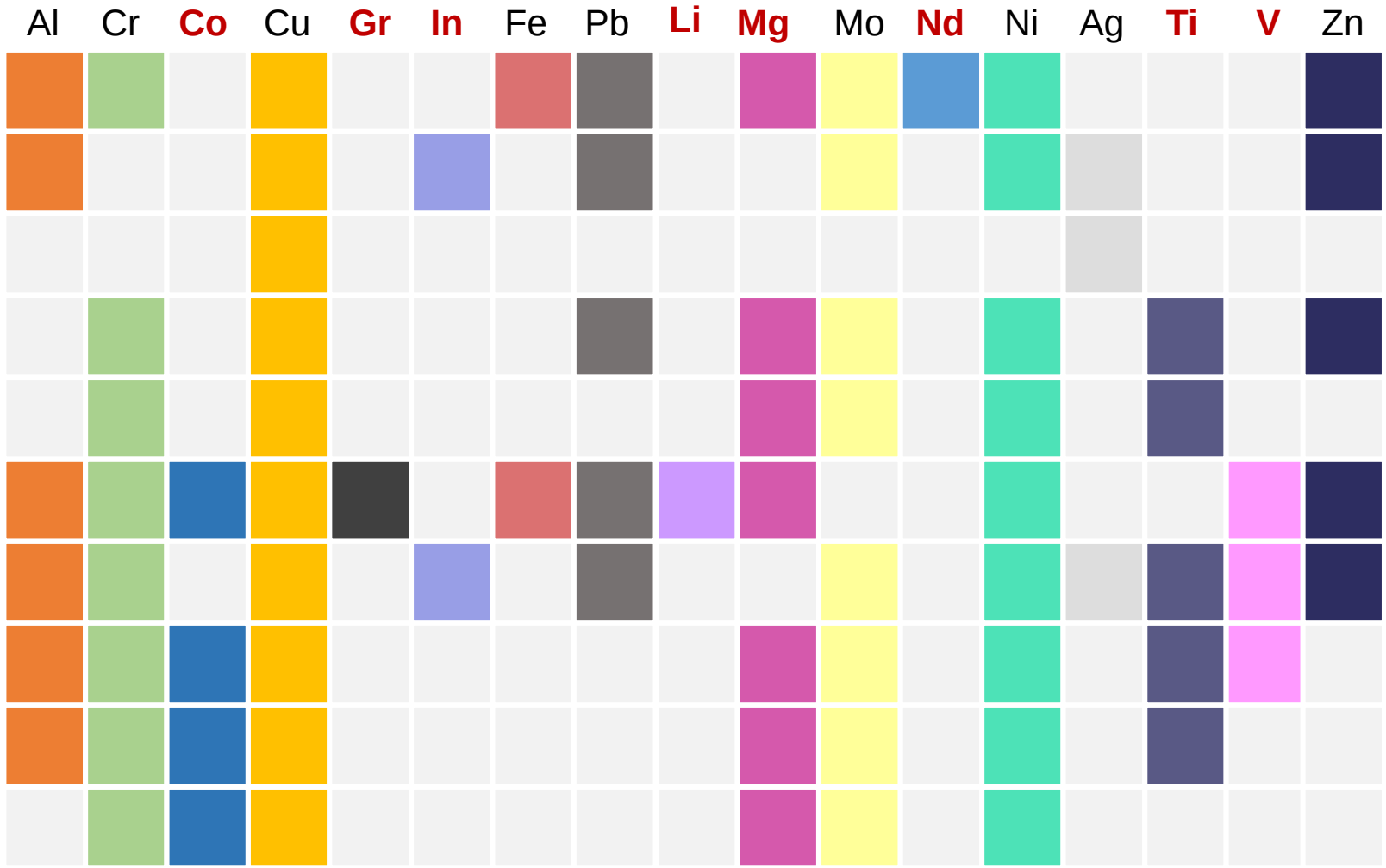
Australian mineral opportunities

Supporting the global energy transition

Kristina Anastasi
Branch Head, Advice, Investment Attraction and Analysis
Minerals Energy and Groundwater Division
Geoscience Australia

Australian Government
Geoscience Australia

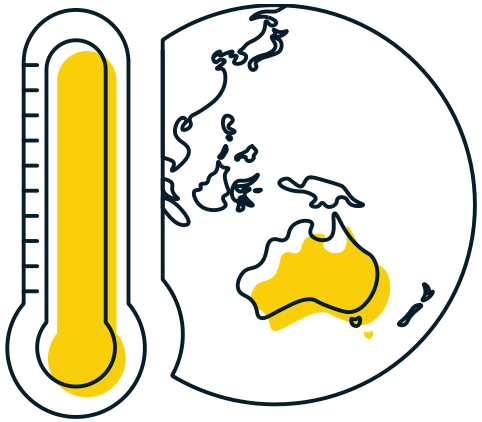
Essential minerals for energy transition



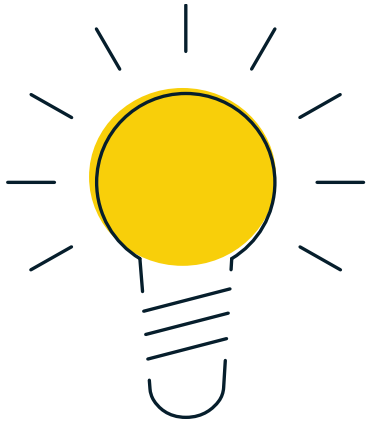
After World Bank Report on Minerals for Climate Action, 2020

Red text = Australian critical mineral

Australian Government resource priorities



Climate change



Energy transition

Economy

Australia Minerals

www.australiaminerals.gov.au

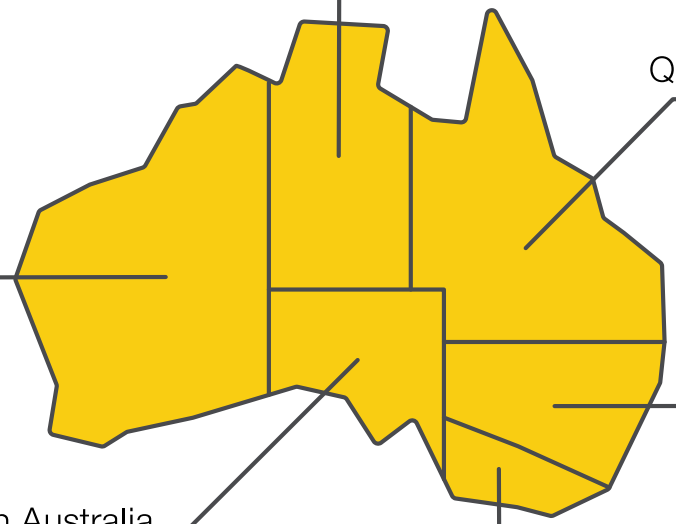
Australian Government
Geoscience Australia

[Exploring for the Future](#) (national)

Northern Territory

AUSTRALIA'S NORTHERN TERRITORY

[Resourcing the Territory](#)



Queensland

Queensland Government
Australia

[New Economy Minerals Initiative](#)

[Collaborative Exploration Initiative](#)

[Queensland Resources Industry Development Plan](#)

[Exploration Incentive Scheme](#)

[Geoscience Data Transformation Program](#)

Government of Western Australia
Department of Mines, Industry Regulation and Safety

Western Australia

New South Wales

[New Frontiers Exploration Program](#)

[Critical Minerals and High Tech Metals Activation Fund](#)

NSW GOVERNMENT

[Accelerated Discovery Initiative](#)

[MinEx CRC National Drilling Initiative](#)

[Sedimentary Copper Mineral Systems](#)

SOUTH AUSTRALIA

Government of South Australia
Department for Energy and Mining

South Australia

Victoria

[State of Discovery—minerals strategy](#)

[Victorian initiatives & projects](#)

VICTORIA Australia

Tasmania

Tasmanian Government

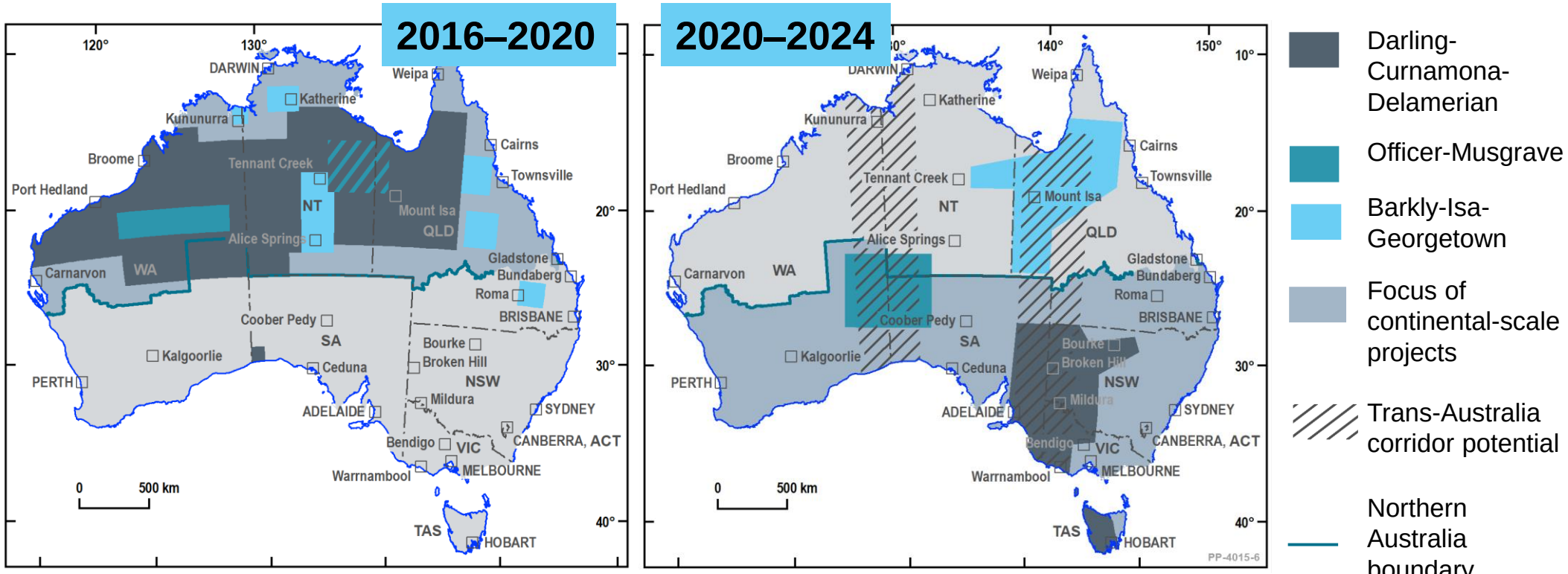
[Supporting Tasmania's Mining Sector](#)

[Exploration Drilling Grant Initiative](#)

Australia's Exploring for the Future program—$225m investment

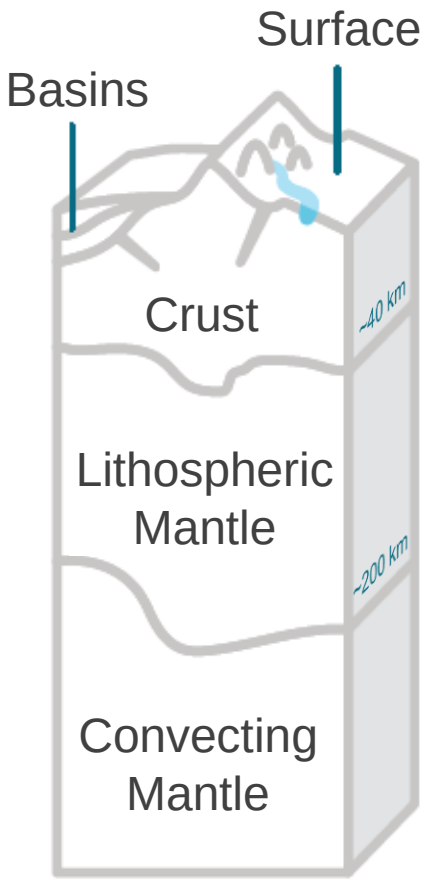
VISION: To support a **strong economy, resilient society** and **sustainable environment** for the benefit of Australians via an integrated geoscience understanding of our mineral, energy and groundwater potential

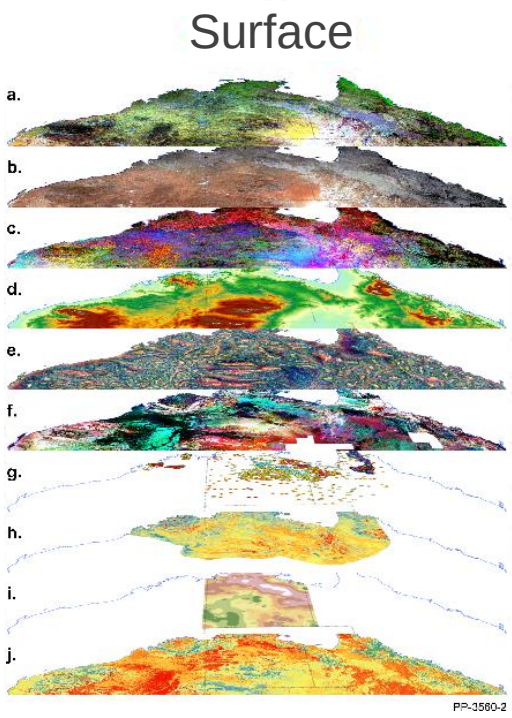
- Minerals
- Energy
- Groundwater
- Minerals northern Australia wide
- Northern Australia boundary

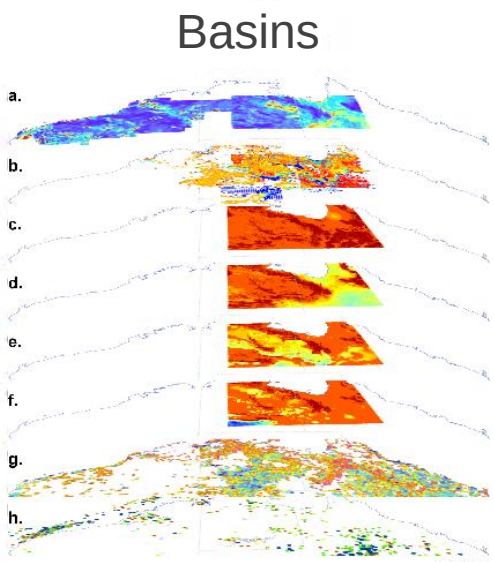


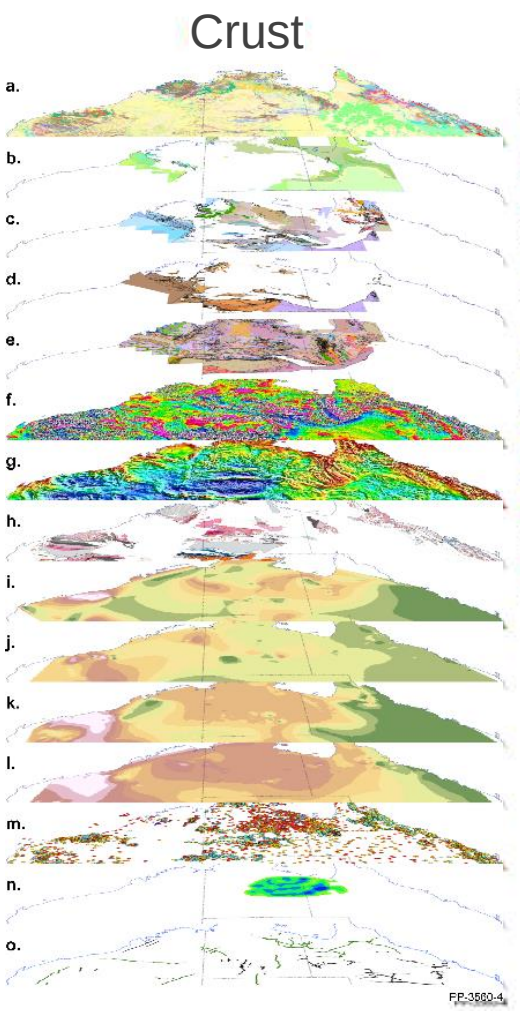
- Darling-Curnamona-Delamerian
- Officer-Musgrave
- Barkly-Isa-Georgetown
- Focus of continental-scale projects
- Trans-Australia corridor potential
- Northern Australia boundary

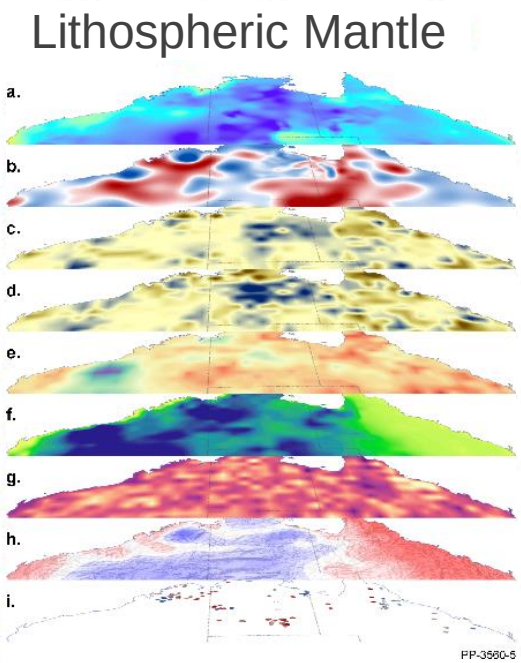
A national treasure—Expanding collection of datasets and knowledge







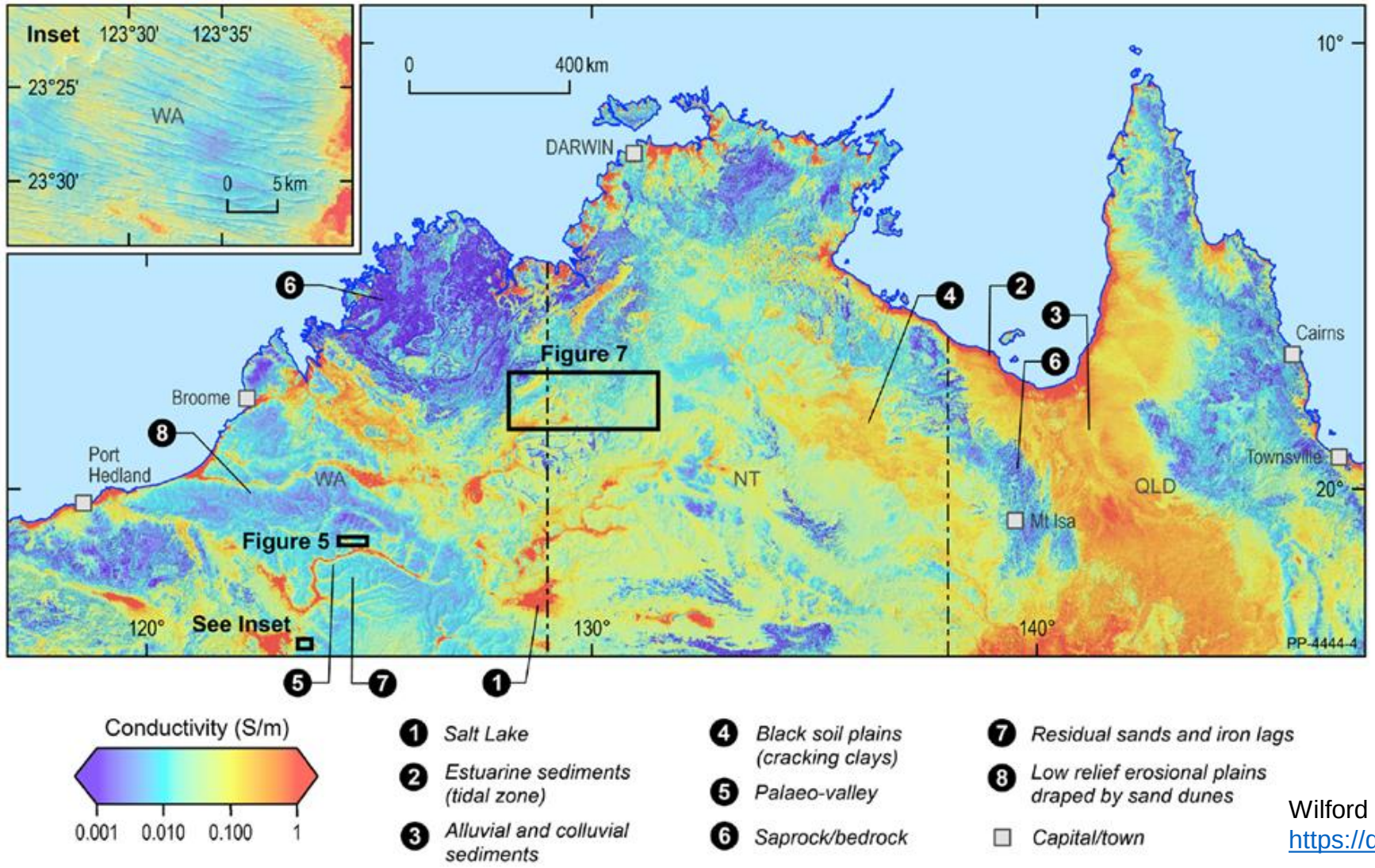




Czarnota et al. (2020, Exploring for the Future Extended Abstracts)

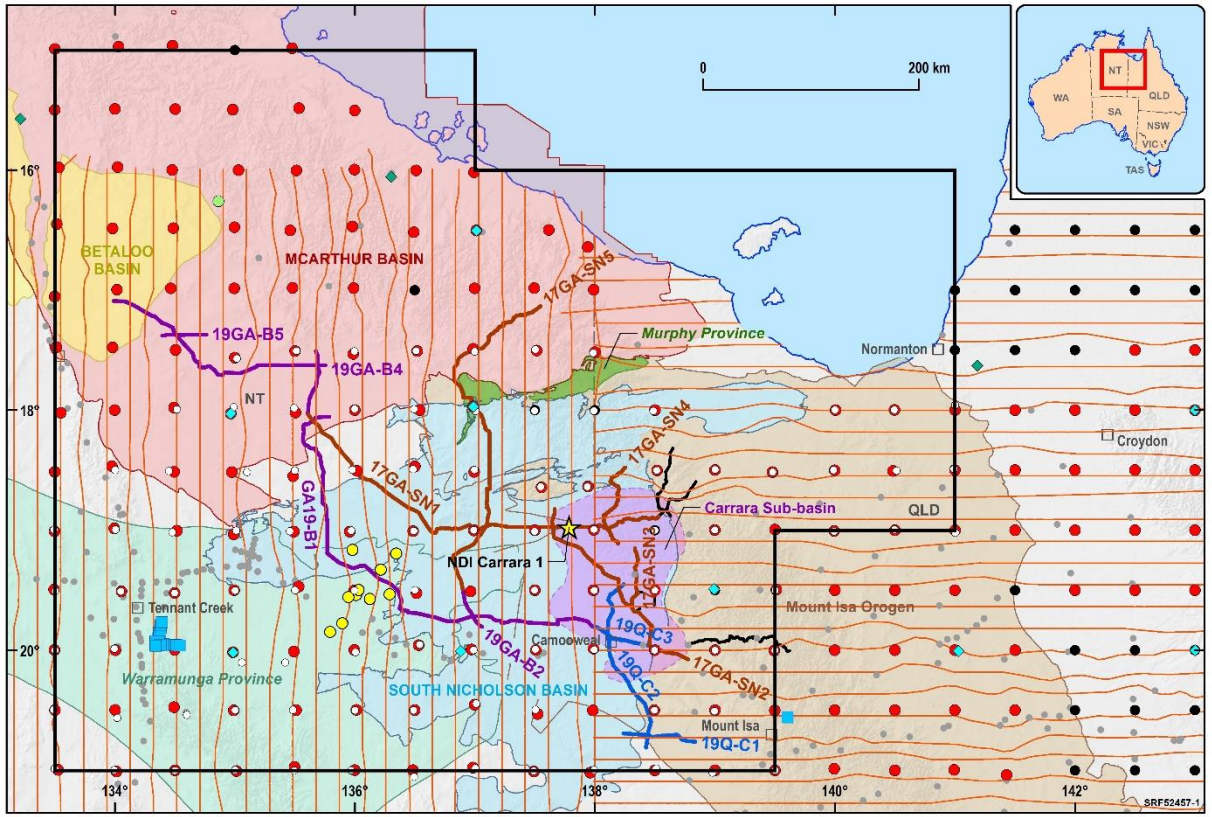
www.ga.gov.au/efttf/extended-abstracts

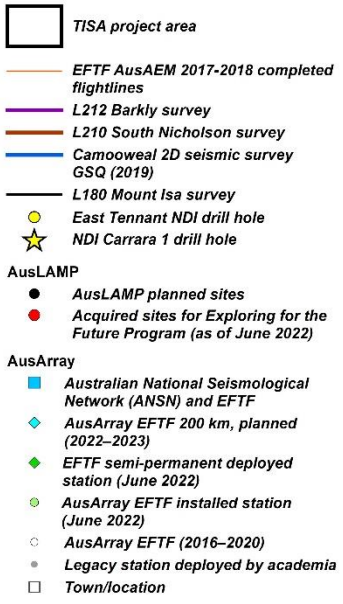
Continuous surface conductivity using Machine Learning

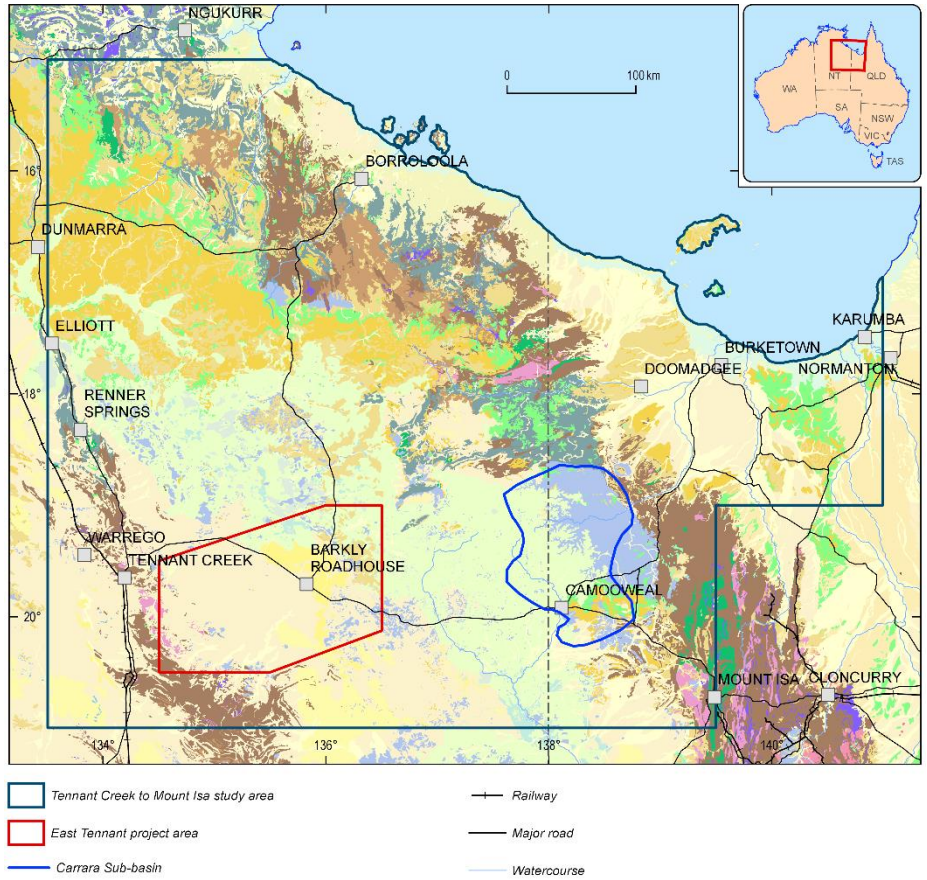


Wilford et al., 2022.
https://dx.doi.org/10.26186/146380

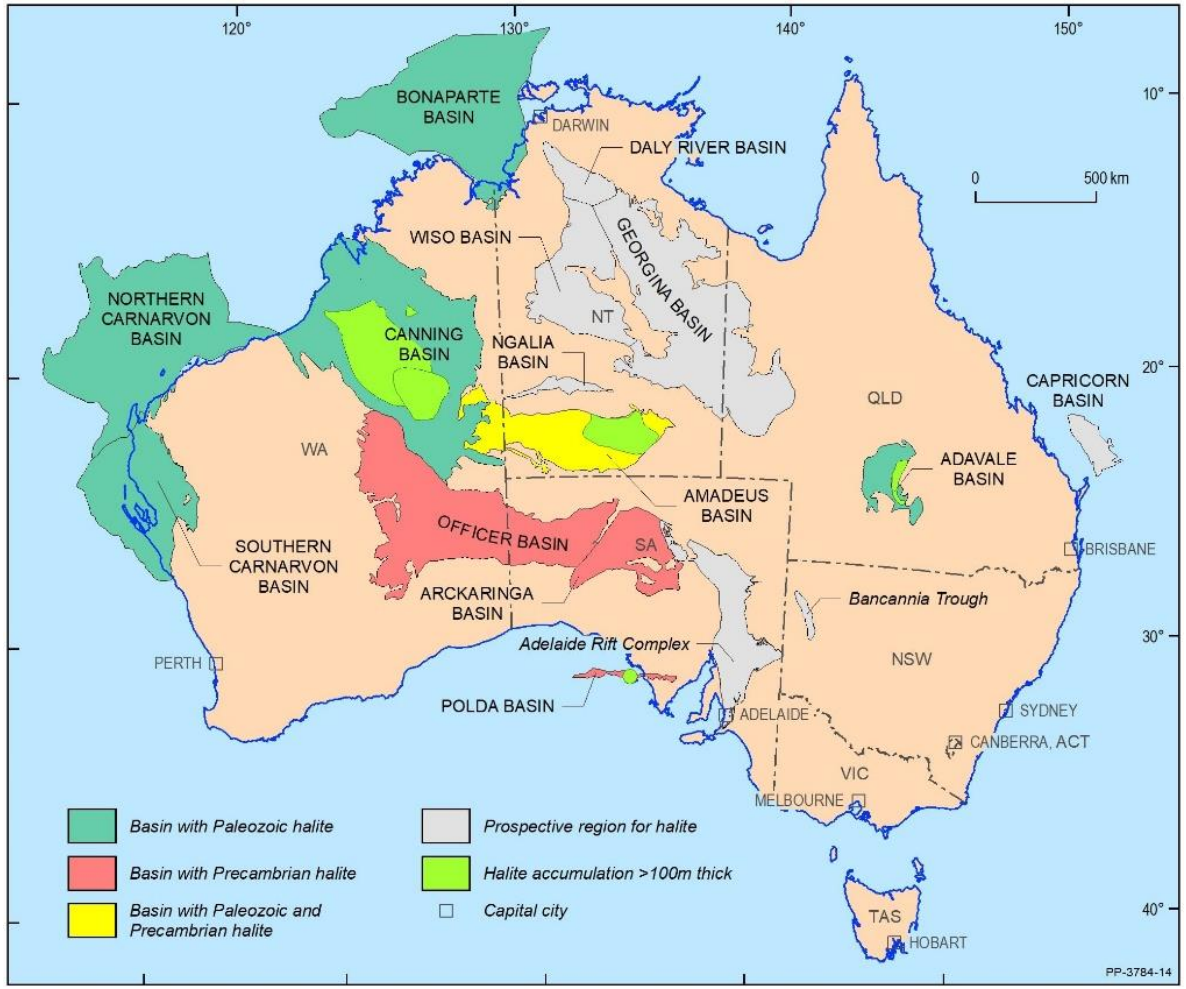
Precompetitive geoscience and scale-reduction







Hydrogen storage in salt caverns



Salt storage

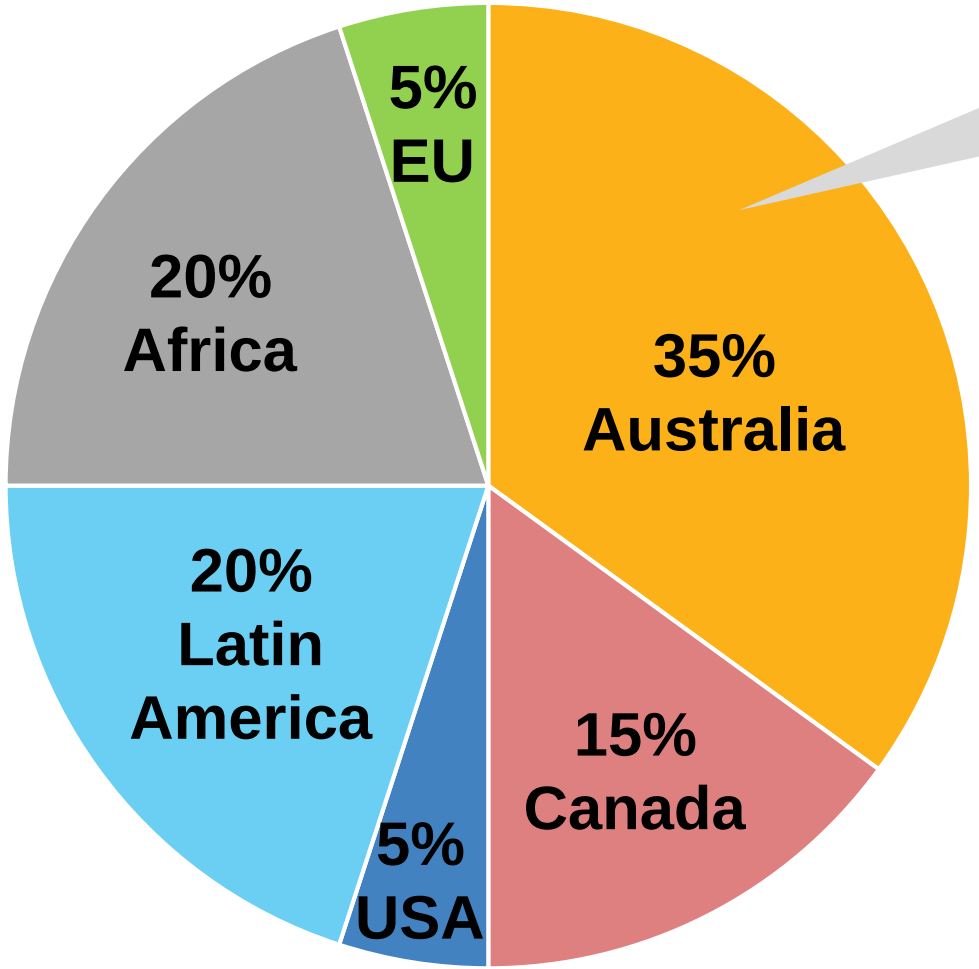
Halite

National Mine Waste Assessment—secondary critical mineral prospectivity

- Accurate location of mine waste
- Model and predict critical mineral content
- Test and refine modelling
- Economic modelling for extraction and modern management of reprocessed mine waste
- Data and decision-making tools

How effective is exploration activity in Australia?

20 Tier 1 & 2 mineral deposits were discovered worldwide in the last 5 years



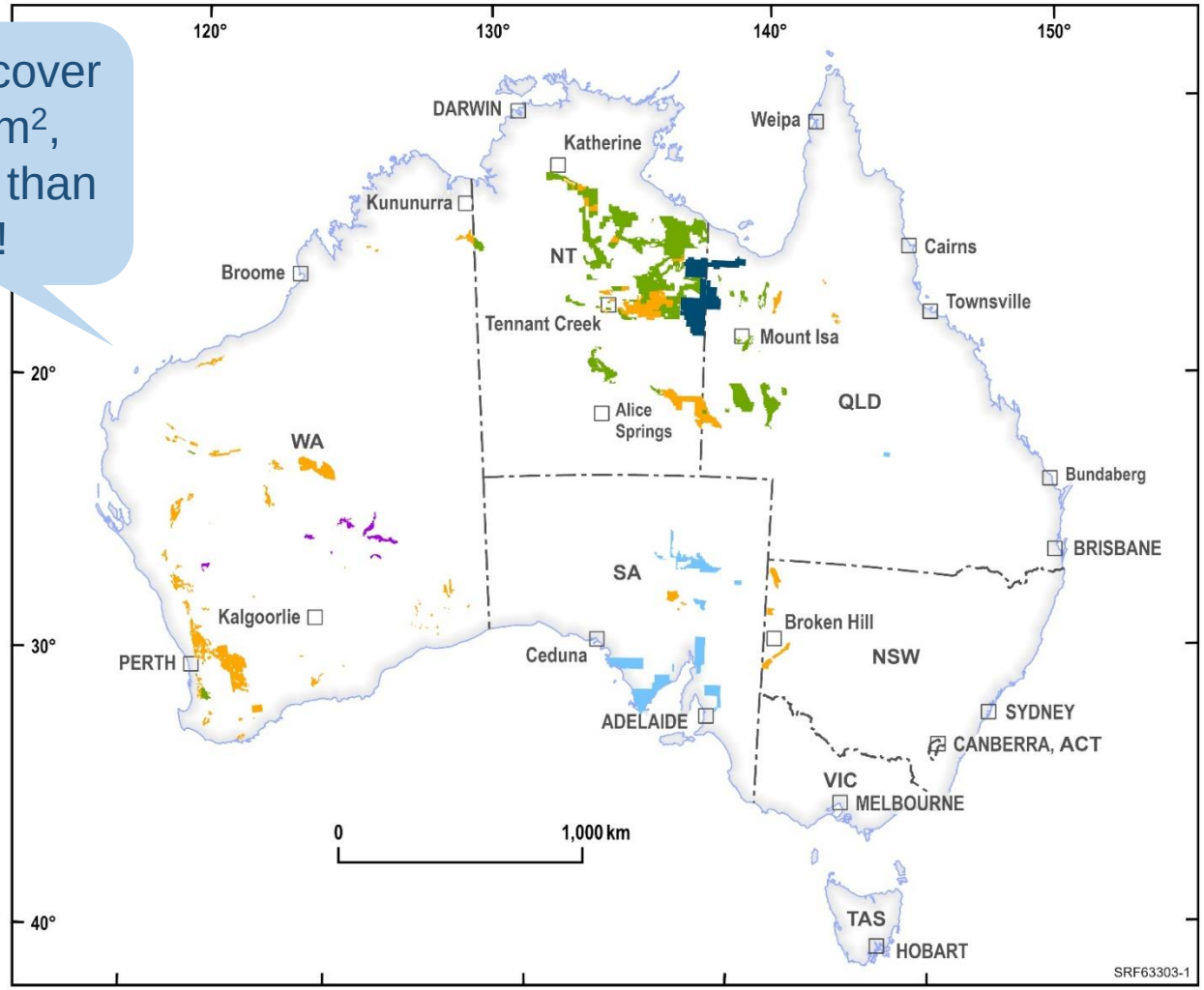
50% (2 of 4) Tier 1 discoveries were in Australia, all underpinned by precompetitive geoscience

Over two thirds of Australia's discoveries were underpinned by precompetitive geoscience

Data source: MinEx Consulting, July 2022
NB number of tier 1 and 2 deposits will grow as deposits are drilled out.

Exploration supported by GA's precompetitive information

Tenements cover 276,671 km^2, that's larger than Victoria!



Tenements taken up or reinvigorated by precompetitive geoscience since 2016

- *Gold*
- *Mineral*
- *Hydrogen*
- *Petroleum*
- *Potash*
- *City/town*

Current as of July 2022

Exploring for the Future and beyond

- Precompetitive data acquisition and analysis has proven its worth and brought about a world-leading step change
- The future will use integrated, holistic, multi-scale resource assessments to inform decisions for government and industry
- Australia has momentum and will be a key source of reliable and responsible supply of critical and other essential minerals as we transition to net zero.

More information

- Australia Minerals: www.australiaminerals.gov.au
- EFTF Website: www.ga.gov.au/eftf
- Data Discovery Portal: www.portal.ga.gov.au
- Recent Showcase, 8–10 August: www.ga.gov.au/showcase
- Critical Minerals: www.ga.gov.au/criticalminerals
- Contacts: mineral.promotions@ga.gov.au eftf@ga.gov.au

AUSTRALIA MINERALS
REALISE THE OPPORTUNITY

Thank you

Kristina Anastasi
Branch Head, Advice, Investment Attraction and Analysis
Minerals Energy and Groundwater Division
Geoscience Australia

Australian Government
Geoscience Australia

AUSTRALIA MINERALS

REALISE THE OPPORTUNITY

WESTERN AUSTRALIA:

A critical and battery mineral powerhouse

Sarah Sargent
Mineral Investment Specialist
Geological Survey and Resource Strategy

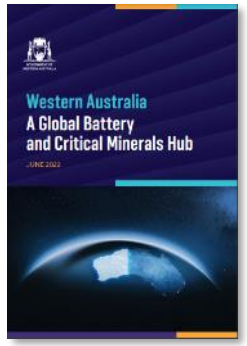
GOVERNMENT OF WESTERN AUSTRALIA

Department of Mines, Industry Regulation and Safety

Western Australia's Battery and Critical Minerals Production

GLOBAL RANKING

			GLOBAL RANKING
3 Li Lithium	55,000 tonnes $2.6 billion	1	
28 Ni Nickel	150,000 tonnes $3.7 billion		5
27 Co Cobalt	5,300 tonnes $380 million	3	
25 Mn Manganese	523,000 tonnes $303 million		8
RARE EARTHS	28,000 tonnes $569 million	4	
29 Cu Copper	149,000 tonnes $1.8 billion		



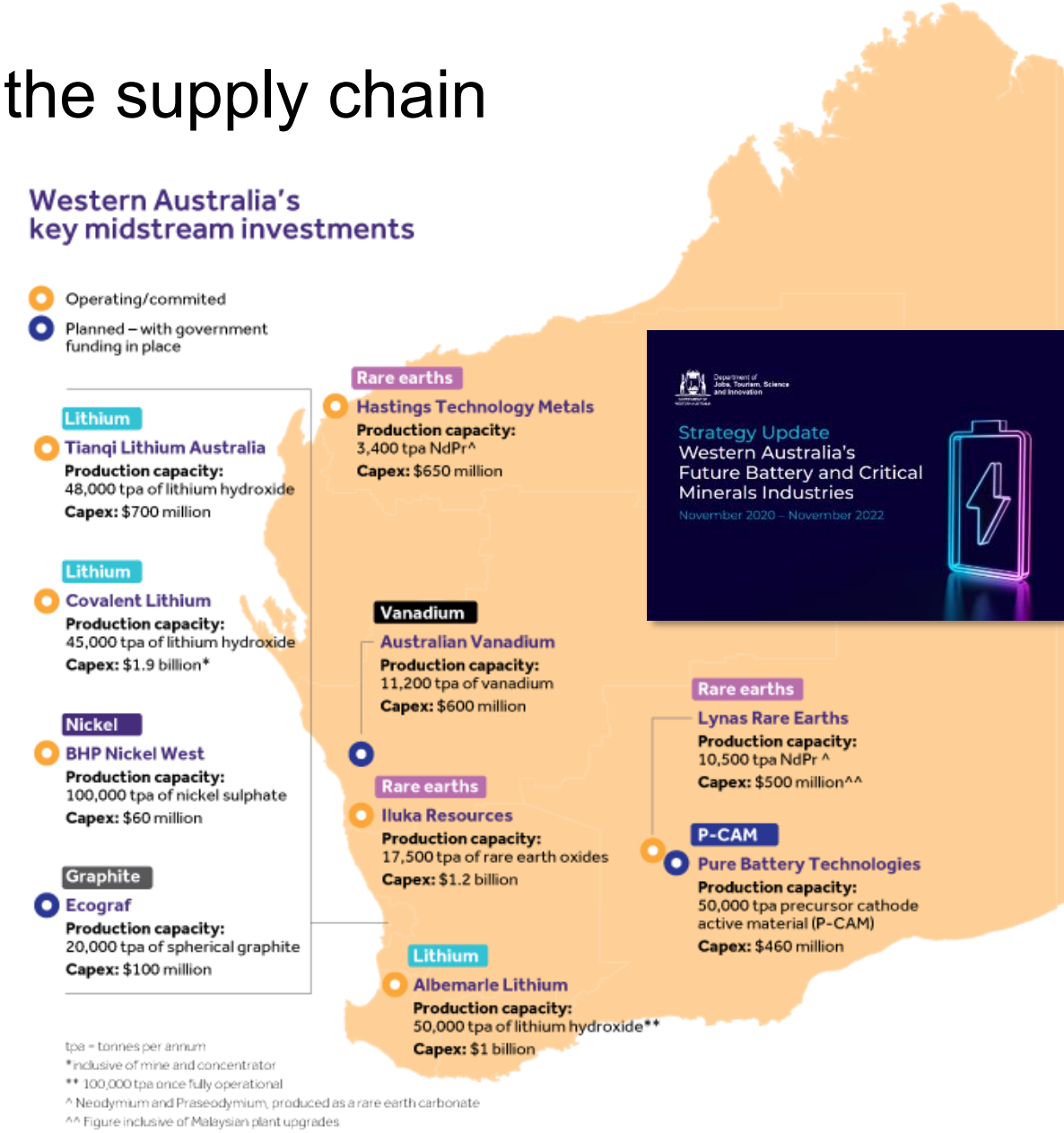
Battery and Critical Minerals Prospectus, June 2022

AUSTRALIA MINERALS | WESTERN AUSTRALIA

Western Australia's expanding role in the supply chain

WA is expanding its role in the resources supply value chain

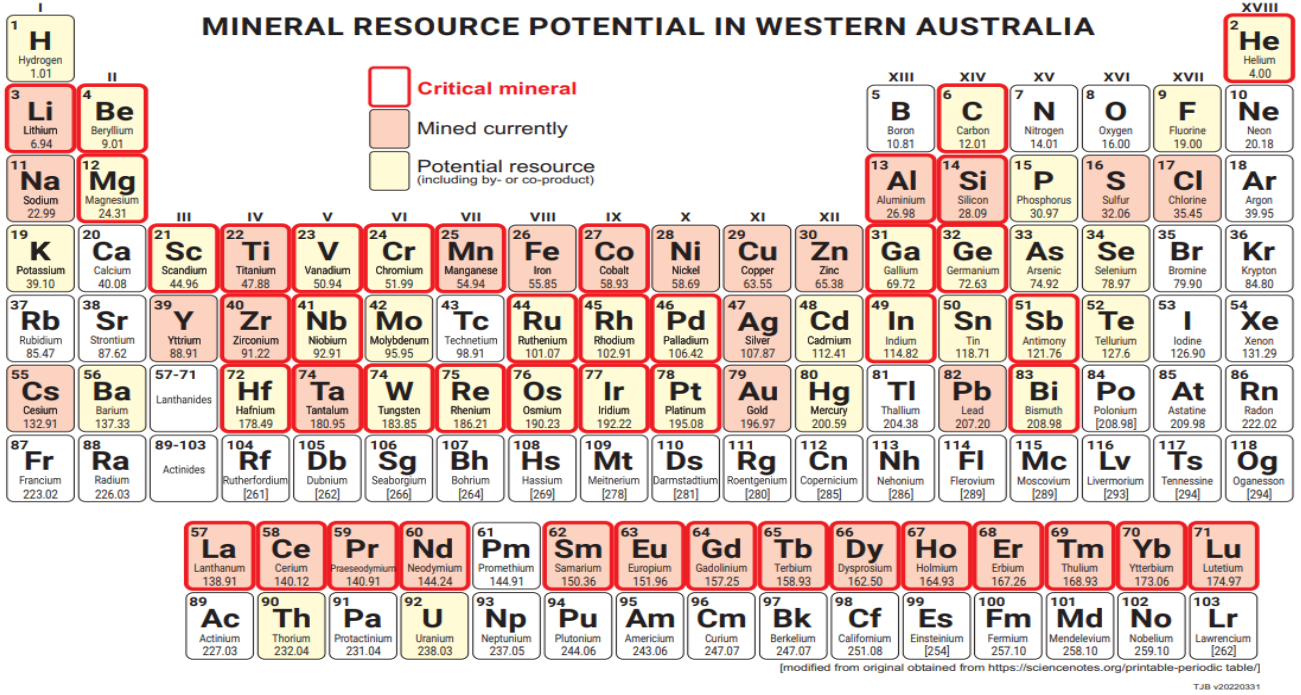
- **Precursor chemical plants**
  - Operating or under construction (lithium, nickel)
  - Planned (vanadium, REE, graphite, HPA, manganese, magnesium)
- **Precursor cathode-active materials (pCAM) plants**
  - Kalgoorlie (Pure Battery Technologies)
  - Perth (Future Battery Industries CRC pilot plant)



Ready markets for WA critical minerals

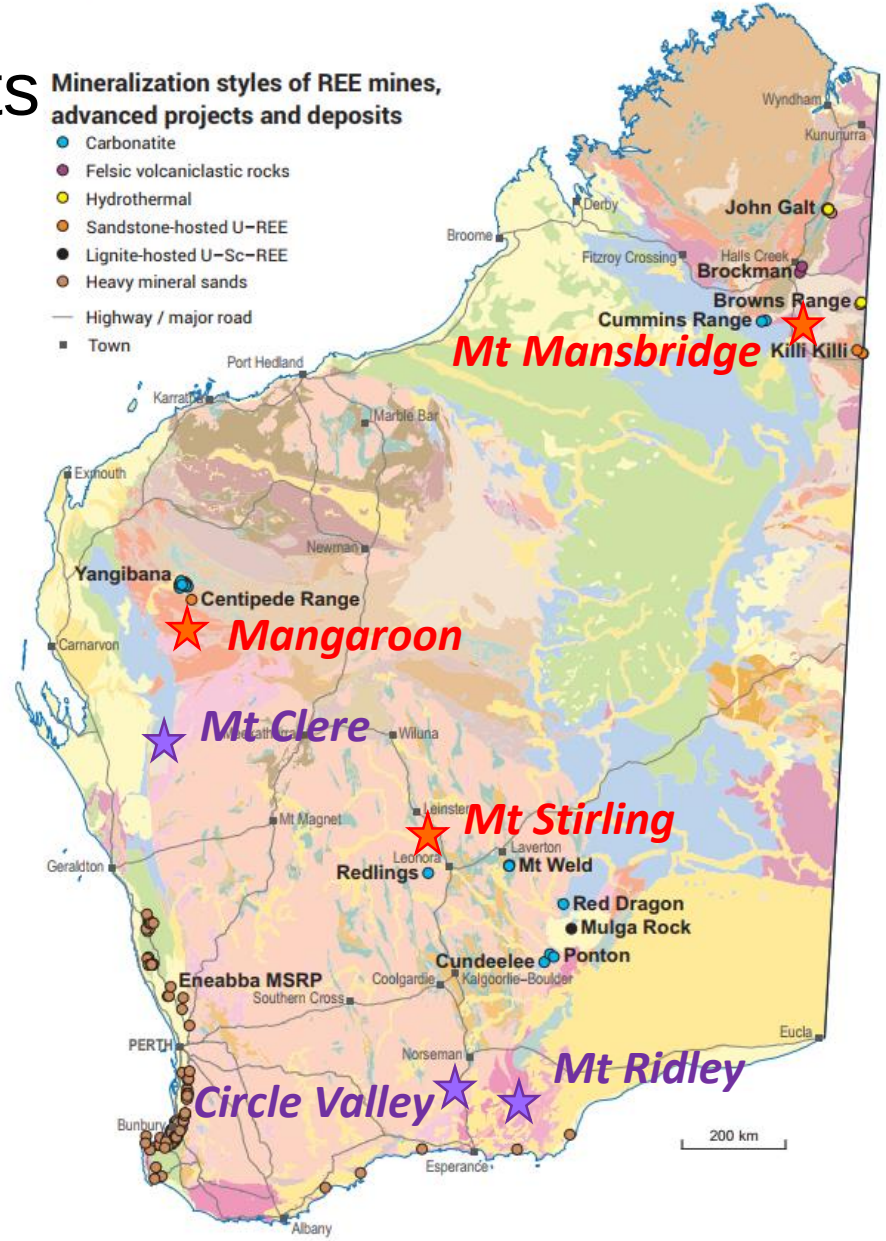
WA	Critical Mineral	Japan
	Chromium	
By-product	Cobalt	
	Rubidium	
	Lithium	
	Nickel	
	Magnesium	
	Manganese	
	Platinum Group Elements	
	Rare Earth Elements	
	Silicon	
	Tantalum	
	Titanium	
	Tungsten	
	Vanadium	
	Zirconium	
Mines	Resources	

Operating *Proposed* *Selected critical minerals listed by Japan*



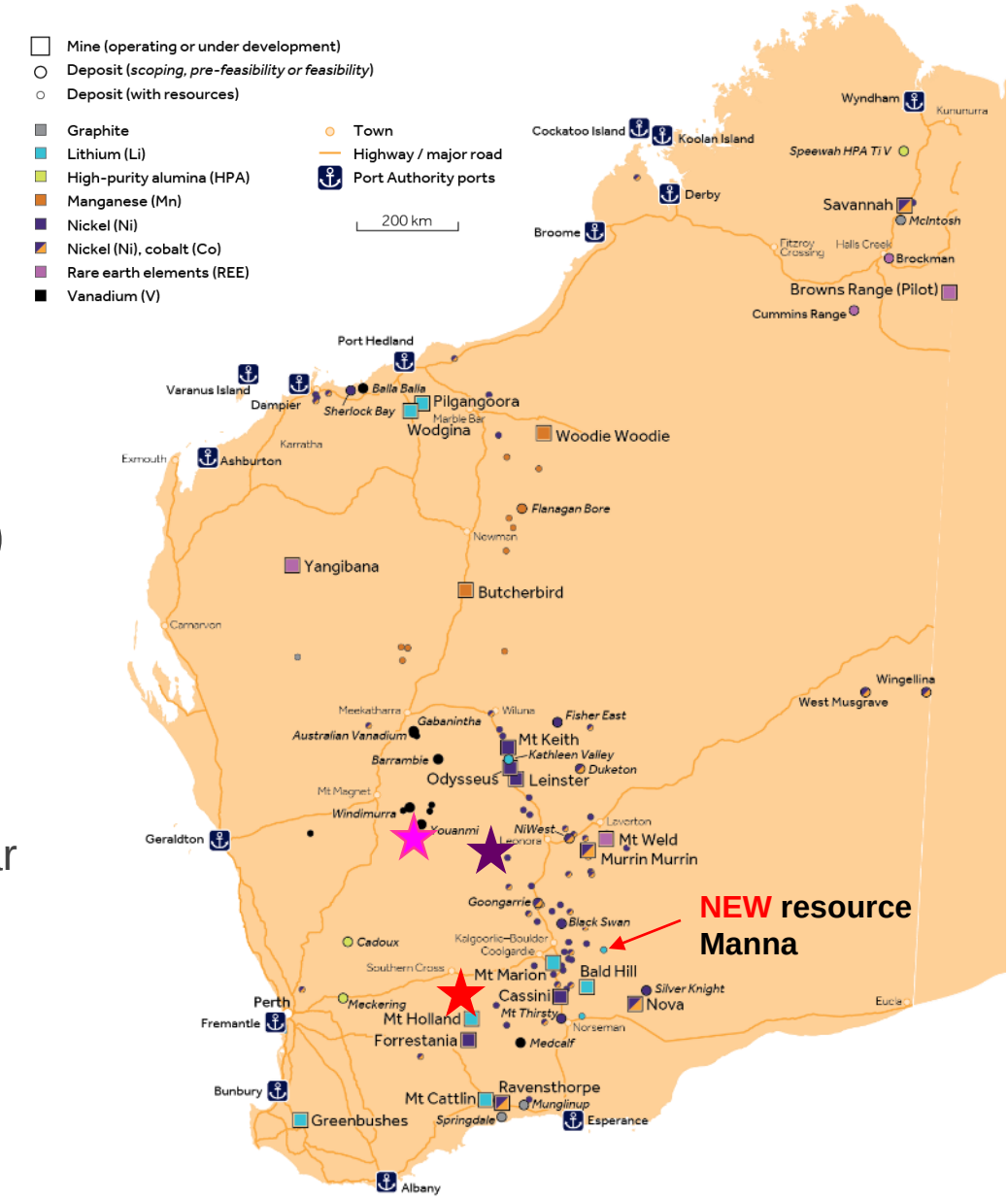
Meeting global demand for rare earth elements

- 4th largest global producer of rare earths
- Mining and processing:
  - Operating – Mt Weld (Lynas)
  - Under development – Yangibana (Hastings)
  - 3 new processing plants planned for Mt Weld, Yangibana and Iluka's Eneabba MSRP
- Resources
  - Resources: 219 Mt @ 1.83% TREO
  - Reserves: 37 Mt @ 4.72% TREO
- Exploration
  - Several recent discoveries including:
    - Dreadnought Resources Mangaroon project
    - New style of mineralisation discovered – ionic clay adsorption



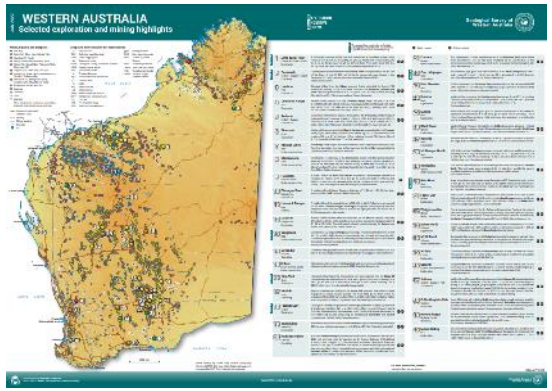
Lithium exploration highlights in 2022

- World's largest Lithium producer
  - 1.6 million tonnes sold in 2021–22 from 5 mines
- 2nd largest reserves globally (USGS 2022):
  - 829 million tonnes @ 1.39% Li_2O
  - New resource announced for Manna (Global Lithium)
- Associated with lithium-caesium-tantalum (LCT) bearing pegmatites
- Exploration is booming
  - Mt Ida (Red Dirt Metals) aiming for a maiden resource this year
- New discoveries
  - Manindi project (Metals Australia) + rubidium
  - Split Rocks project (Zenith Minerals)

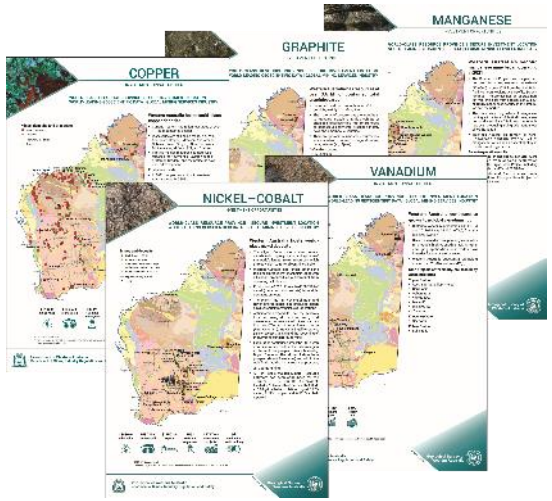


For more WA mining and exploration highlights in 2022

- Exploration and mining highlights January/July 2022



- Commodity flyers



- Western Australia battery and critical minerals strategy

- Western Australia battery and critical minerals prospectus June 2022 (Japanese)

Western Australia's investment opportunities

- Access to reliable, ethical and cost-effective critical minerals
- ESG credibility
- Co-location with Western Australia's resources sector
- Decarbonisation commitments
- Close proximity to Asia creating export market opportunity
- A long, stable partnership between Western Australia and Japan
- Government commitment – WA Strategy & National Battery and Critical Mineral Strategy

Signing Ceremony of MOU in the Department of Jobs, Tourism, Science and Innovation of WA State 2020（Ms. Rebecca Brown, Director General, WA State and Mr. Tetsuhiro Hosono, Chairman & CEO, JOGMEC）

AUSTRALIA MINERALS
REALISE THE OPPORTUNITY

Thank you

Sarah Sargent
Geological Survey Western Australia
sarah.sargent@dmirs.wa.gov.au

GOVERNMENT OF WESTERN AUSTRALIA
Department of Mines, Industry Regulation and Safety

AUSTRALIA MINERALS

REALISE THE OPPORTUNITY

Northern Territory

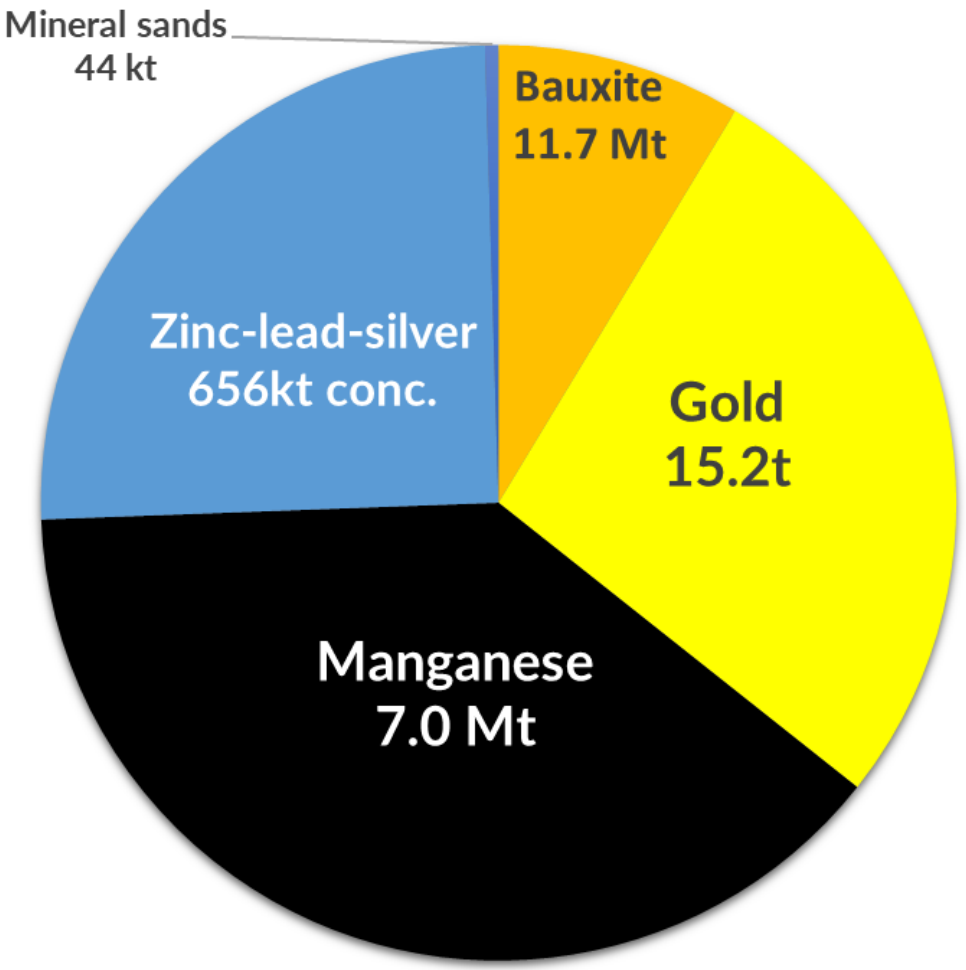
Ian Scrimgeour
Senior Executive Director
Northern Territory Geological Survey

AUSTRALIA'S NORTHERN TERRITORY

Northern Territory's minerals sector

- The Northern Territory is a major producer of manganese, bauxite, lead-zinc-silver, gold and LNG
- The Territory's mining sector is set to expand into critical minerals and copper
- The Territory's first lithium mine is commencing production
- There are 21 projects in the approvals or financing process, primarily for copper, gold and/or critical minerals
- Exploration is booming for copper across the Northern Territory, with increasing exploration for cobalt, lithium and nickel
- The Northern Territory Government has a strong focus on encouraging downstream processing of critical minerals

NT mineral production by value 2021/22

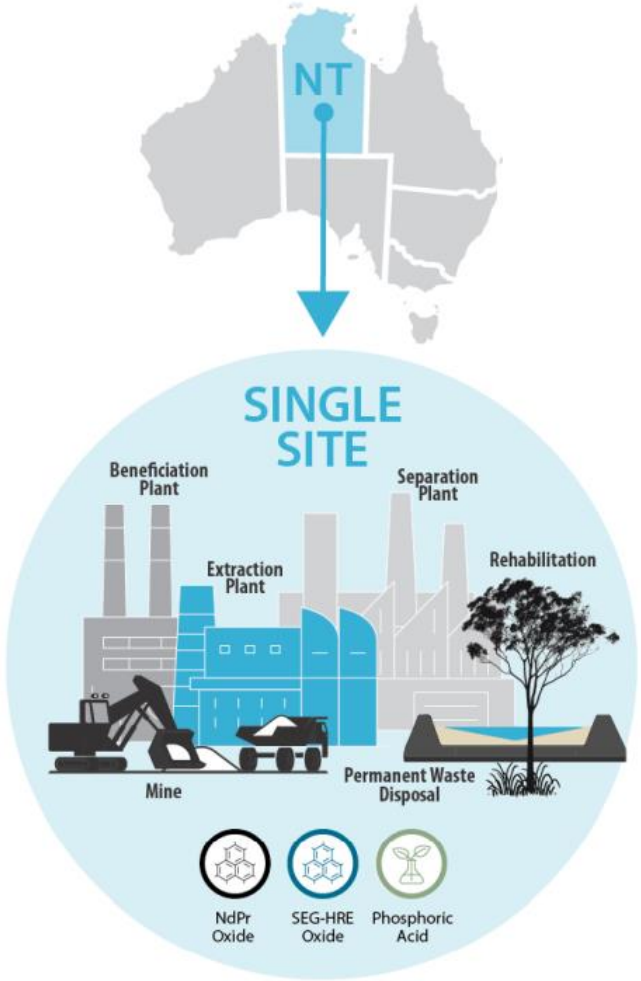


Northern Territory becomes a lithium producer

- **Core Lithium's Finniss** lithium project in advanced stage of construction

- Spodumene concentrate production by end of 2022
- Ongoing resource growth
- Current reserves support >12 year mine life
- 40,000m regional RC drilling campaign underway
- Substantial lithium exploration underway across NT
- Numerous companies commencing lithium exploration in Barrow Creek and Mount Peake pegmatite fields in central Australia

Advanced manufacturing onsite
– Ore to oxide at a single site –
First of its kind in Australia



Nolans NdPr project approaching FID

Arafura Resources – Nolans

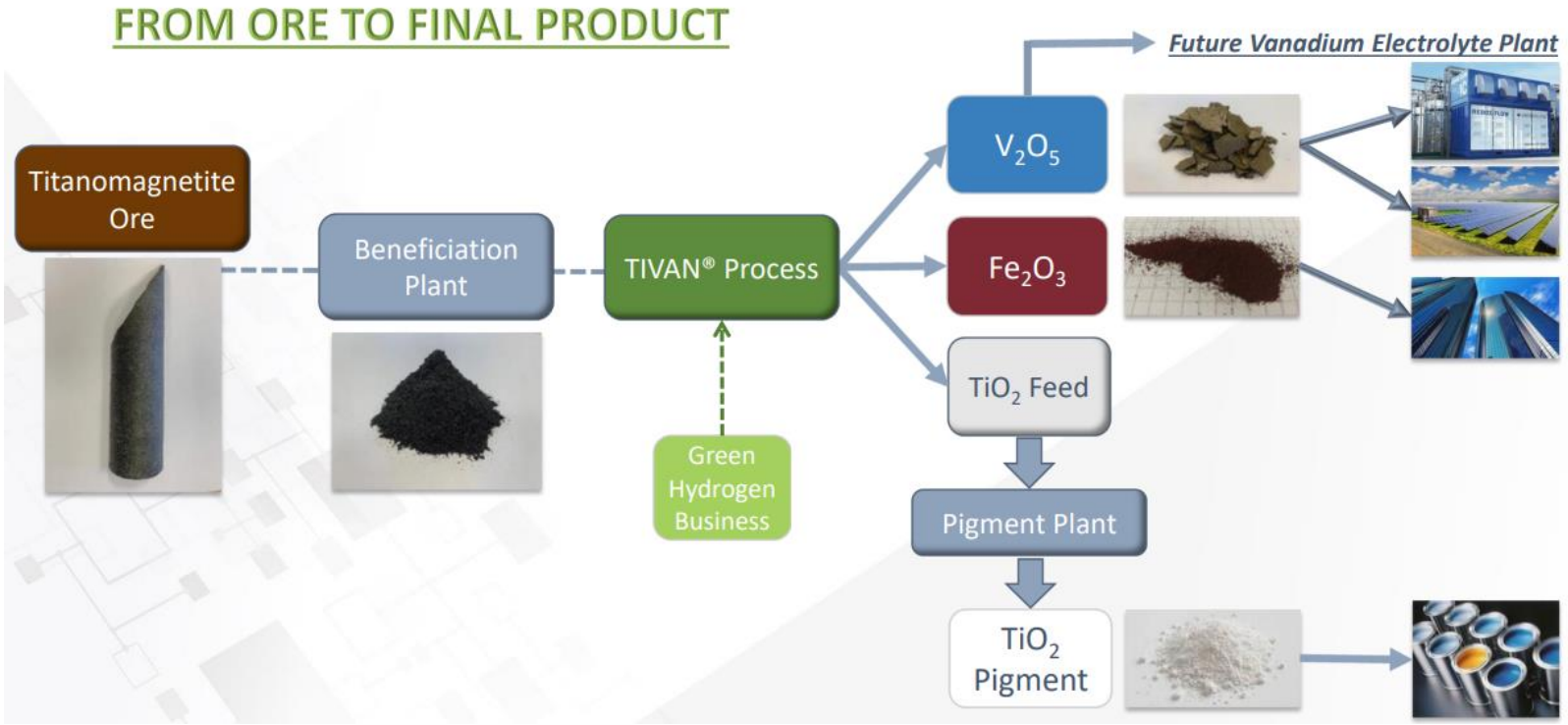
- World-class resource of magnet-feed rare earths (NdPr), >39 year mine life
- On-site downstream processing to produce separated rare earth products (including NdPr oxide) and phosphoric acid
- $300M in letters of support for funding from Australian Government concessional loan facilities
- MOUs for offtake signed with Hyundai Motor Co and GE Renewable Energy
- Environmental approvals in place, mining lease granted, final mining approvals under assessment
- Targeting FID before end 2022; production by 2025

- Exploration for rare earths increasing in central Australia, Pine Creek Orogen and Tennant Creek

Vanadium and titanium

TNG Ltd – Mount Peake

- Flat-lying, near surface vanadium-rich magnetite resource near railway, 200 km north of Alice Springs
- On-site processing planned using hydrometallurgical TIVAN process to produce high-purity vanadium pentoxide, titanium dioxide pigment and ferric oxide fines



Recent updates:

- Environmental and mining approvals being amended for revised single-site project configuration
- $800M in letters of intent from Australian, German and Korean export credit agencies
- FID planned for 2023

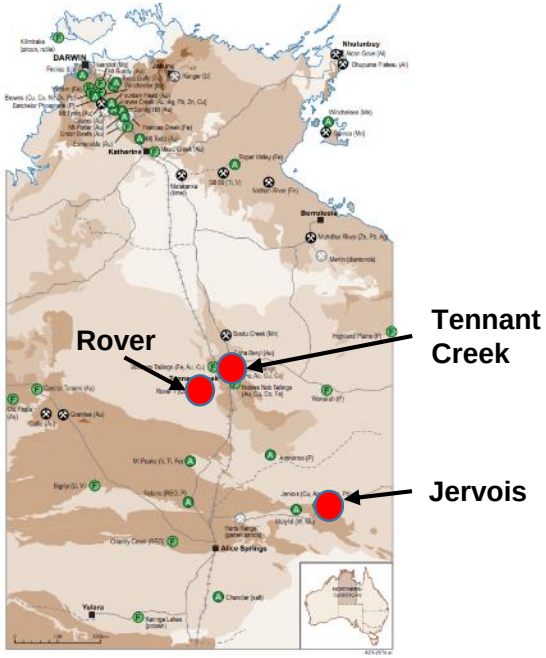
Other commodities

Phosphate (Avenira Ltd and Verdant Minerals Pty Ltd)

- Australia's largest undeveloped rock phosphate resources; potential for production of phosphoric acid, fertiliser and or precursors to $LiFePO_4$ batteries
- MoU signed September 2022 between Avenira Ltd, Aleees (Taiwanese cathode manufacturer) and NT Government regarding $LiFePO_4$ cathode production in Darwin

Cobalt

- Significant cobalt associated with copper-gold deposits at Tennant Creek
- Castile Resources planning production of cobalt metal from planned Rover 1 mine
- Elmore Ltd planning to extract 1600 t of cobalt from tailings at Peko (Tennant Creek) from early 2023



Copper

- KGL Resources approaching FID on Jervois copper project
- Exploration for sediment-hosted copper (-cobalt) booming in Proterozoic basins

Strong NT Government support for resources exploration and development

RESOURCING THE TERRITORY

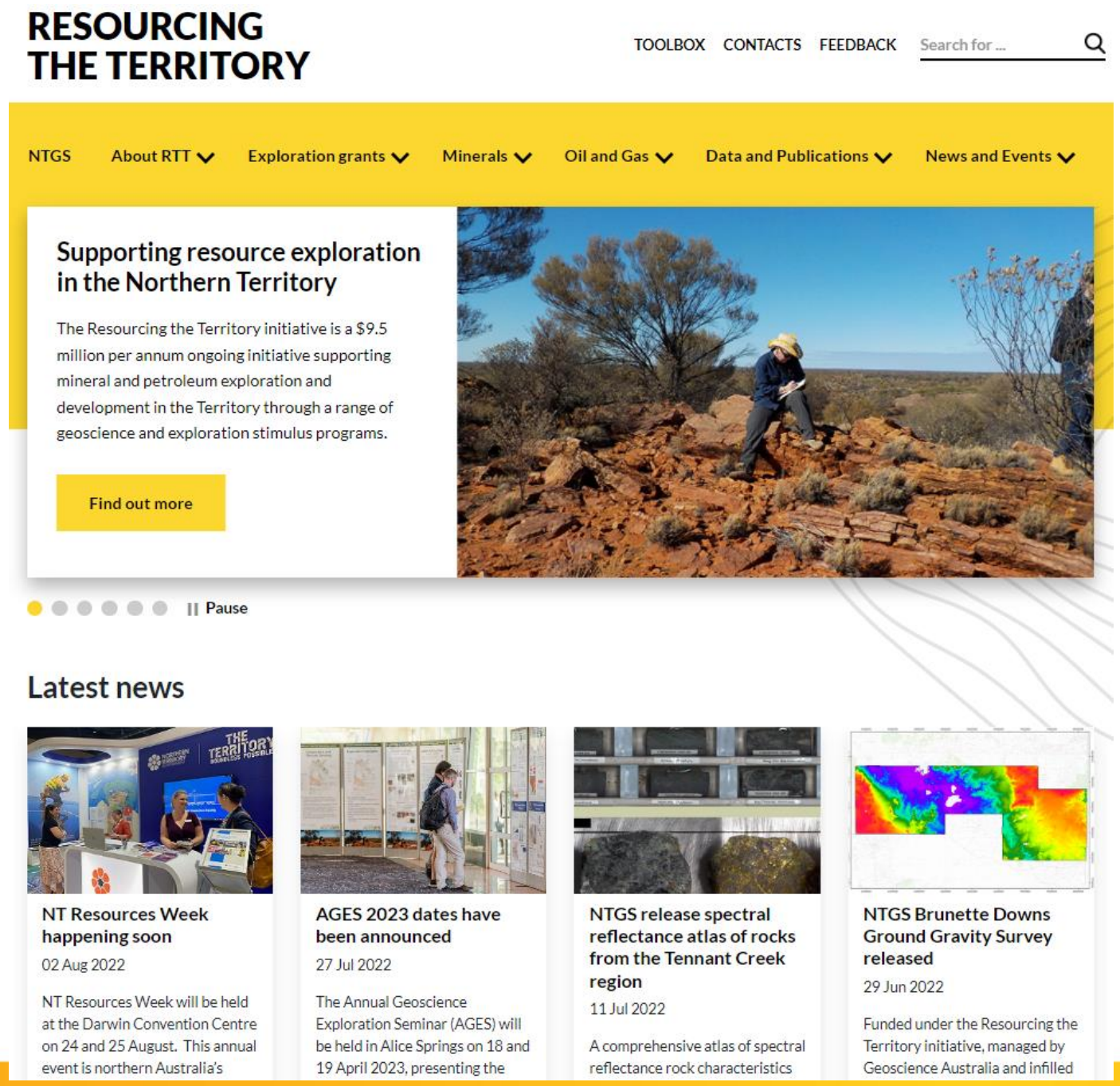
A$9.5 million per year, ongoing initiative to support resource exploration, commencing July 2022

Recent highlights

- $3.04 million in grants awarded to co-fund 29 exploration projects in 2022 (including drilling, geophysics and innovative exploration targeting)
- 57,000 km^2 gravity survey acquired to support undercover copper-gold and sediment-hosted copper and zinc exploration
- New project commenced to sample mine waste for critical minerals potential

The Northern Territory welcomes Japanese investment in our resources sector

- The Northern Territory is the home of Japan's largest single overseas investment – INPEX LNG in Darwin
- The Northern Territory sees Japan as a stable, trusted and reliable partner for the development of our mineral resources, and the establishment of secure supply chains for critical minerals



NT investment information

invest.nt.gov.au

Resourcing the Territory website

www.resourcingtheterritory.nt.gov.au

Geoscience data and products

gemis.nt.gov.au
or email: geoscience.info@nt.gov.au

Geoscience and titles web mapping

strike.nt.gov.au

Contact me directly

Ian Scrimgeour
ian.scrimgeour@nt.gov.au
+61 8 8999 5377

AUSTRALIA MINERALS
REALISE THE OPPORTUNITY

Thank you

Ian Scrimgeour
Senior Executive Director
Northern Territory Geological Survey

AUSTRALIA'S NORTHERN TERRITORY

AUSTRALIA MINERALS

REALISE THE OPPORTUNITY

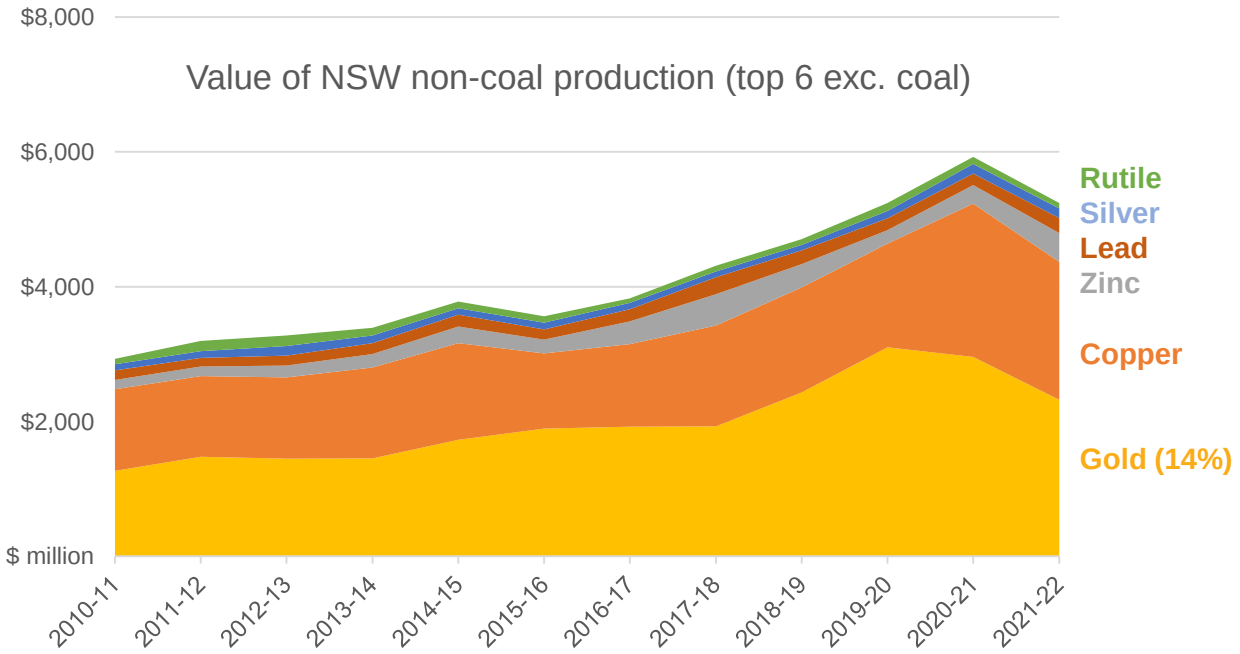
New South Wales

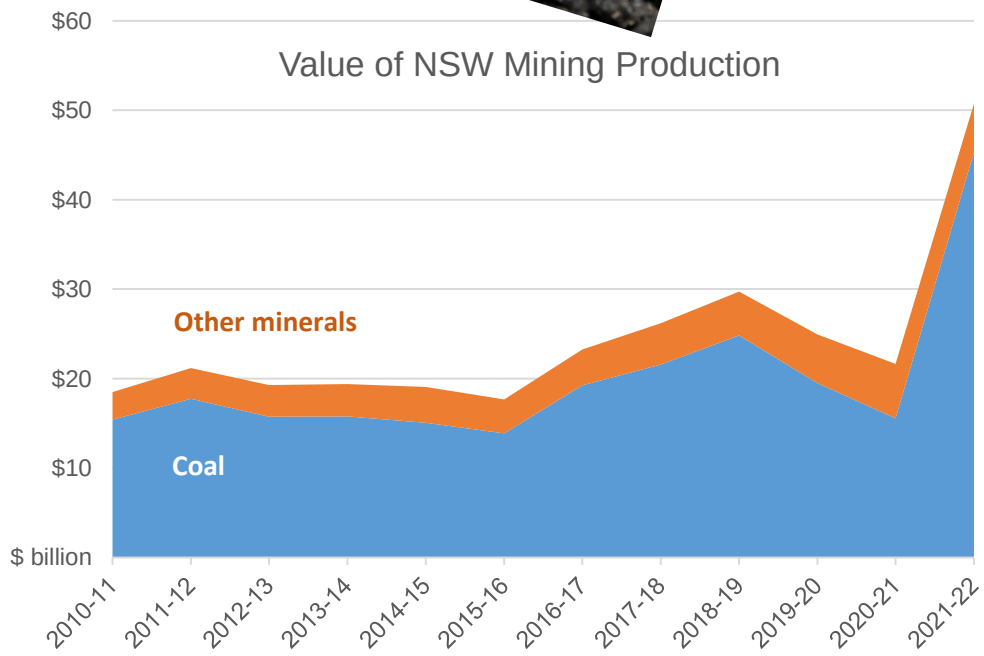
Critical Minerals Opportunities

Yvette Lloyd
Director Industry Development
Mining, Exploration & Geoscience
Department of Regional New South Wales

NSW GOVERNMENT

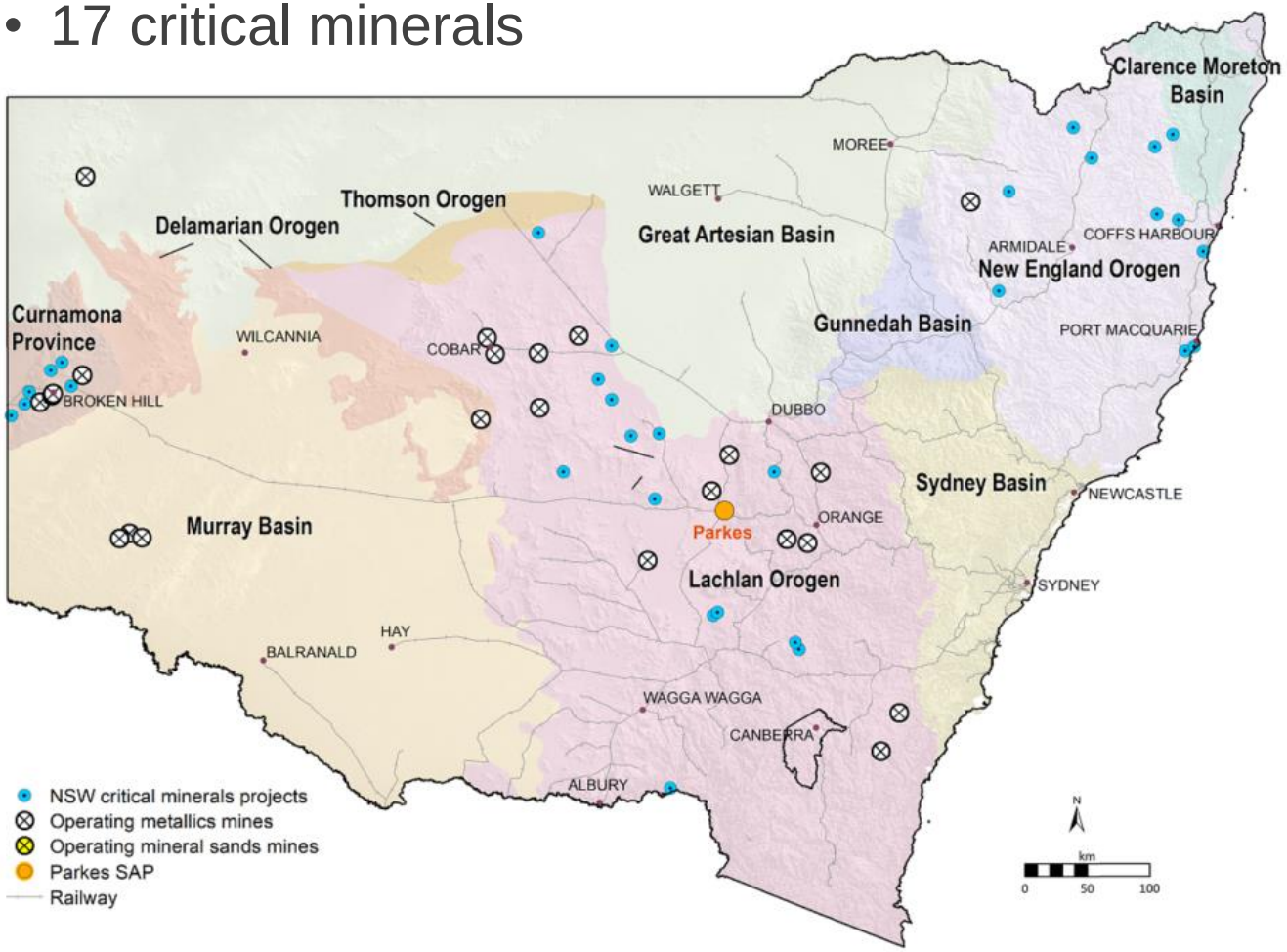
The NSW minerals industry





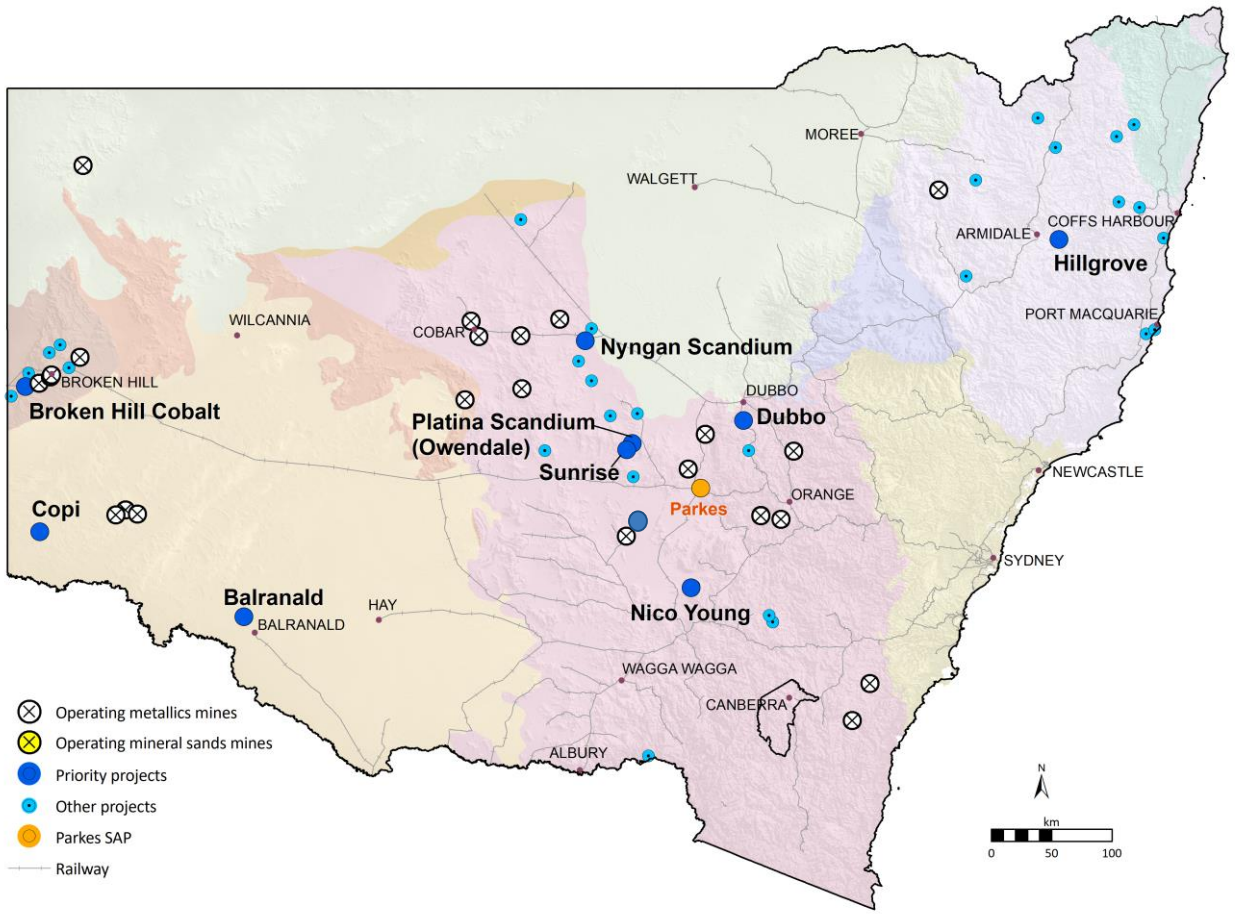
Critical Minerals in NSW

- 44 critical mineral projects including nine advanced
- 17 critical minerals



Broken Hill	Murray Basin	Lachlan Orogen	New England
Cobalt PGE Tungsten	Titanium Zirconium	Bismuth Cobalt Gallium Hafnium Indium Lithium Magnesium Niobium PGE REE Rhenium Scandium Tantalum Tungsten Zirconium	Antimony Cobalt Indium PGE Scandium Tungsten

Investment-ready projects



Project	Company	Stage	Critical Minerals
Nyngan Scandium	Scandium International Mining	Approved	Sc (LREE)
Balranald	Iluka Resources	Approved	Minerals sands (Ti, Zr)
Dubbo Project	Australian Strategic Materials	Approved	REE (+ Zr, Nb, Hf, Ta)
Sunrise	Sunrise Energy Metals	Approved	Co, Sc
Hillgrove	Red River Resources	Approved, undergoing options study	Sb
Broken Hill Cobalt Project	Cobalt Blue Holdings	Progressing development consent application. BFS underway	Co
Platina Scandium	Platina Resources	Progressing development consent application	Sc
Copi	RZ Resources	Progressing development consent application	Minerals sands (Ti, Zr)
Nico Young	Jervois Global	Feasibility – advanced exploration	Ni, Co

NSW Government incentives and support across the supply chain

Helping explorers target new discoveries through regional-scale geophysical surveys, the largest ever in NSW

Supporting early stage exploration through the AU$1.5 million revamped New Frontiers Exploration Program

AU$130 million Critical Minerals and High-Tech Metals Activation Fund to accelerate project development

Supporting industry through the planning and approvals process, investment attraction and facilitation service

For further information

Yvette Lloyd

Director, Industry Development
Mining, Exploration & Geoscience, Department of Regional New South Wales

E: Yvette.Lloyd@regional.nsw.gov.au

M: +61 427 973 951

Grant McLatchie

Executive Director, Geological Survey of New South Wales
Mining, Exploration & Geoscience, Department of Regional New South Wales

E: Grant.McLatchie@regional.nsw.gov.au

M: +61 457 447 315

www.regional.nsw.gov.au/meg

AUSTRALIA MINERALS

REALISE THE OPPORTUNITY

Thank you

Yvette Lloyd
Director Industry Development
Mining, Exploration & Geoscience
Department of Regional New South Wales

NSW GOVERNMENT

AUSTRALIA MINERALS

REALISE THE OPPORTUNITY

Victoria's Critical Minerals

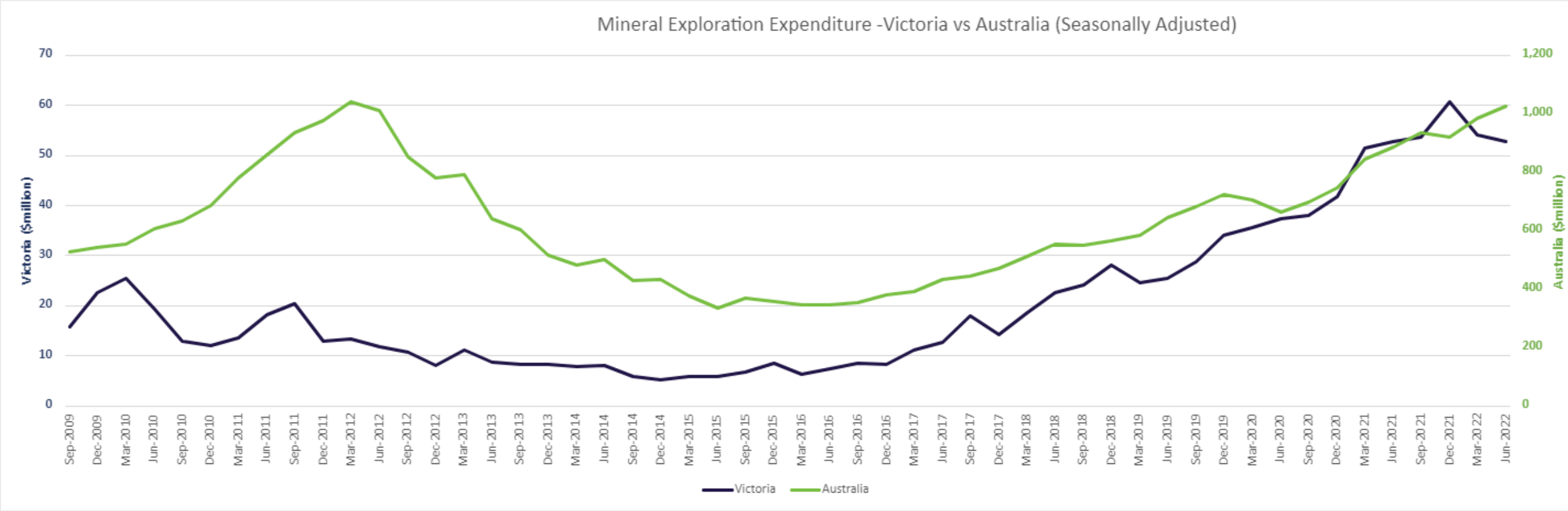
Kate Bassano
Geological Survey of Victoria

VICTORIA Australia

Victorian Government Mineral Resources Strategy

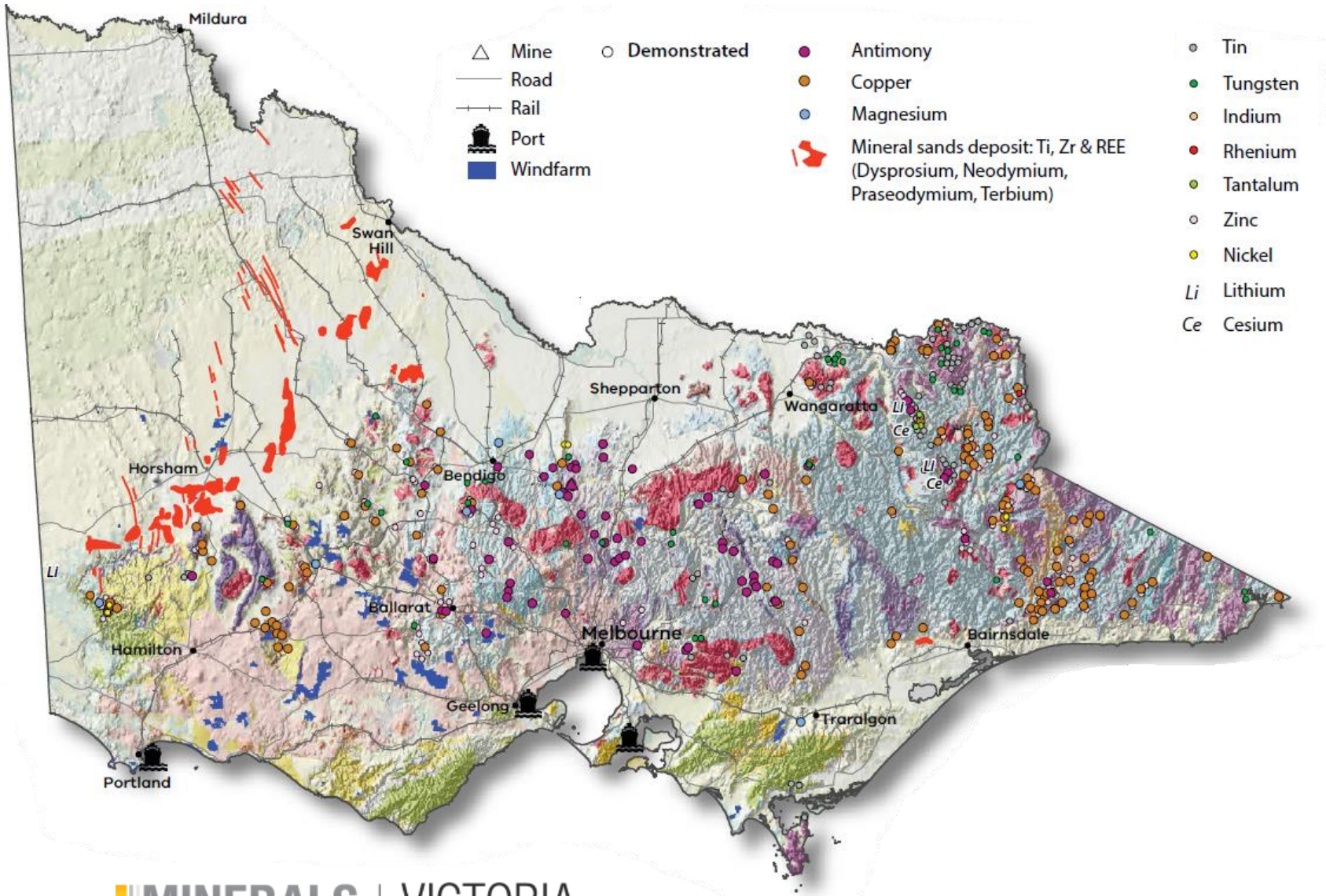
1. Confident communities and responsible explorers
2. Advancing geoscience and encouraging mineral exploration and development
3. Victoria as a global mining hub
4. Improve regulation practice and industry compliance
5. Deliver modern, fit-for-purpose laws

Victoria – Unprecedented Mineral Exploration Investment



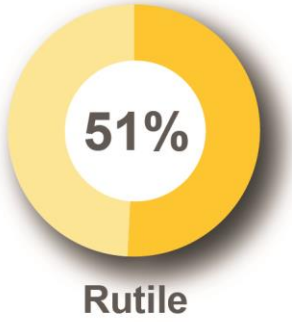
Source: Australian Bureau of Statistics

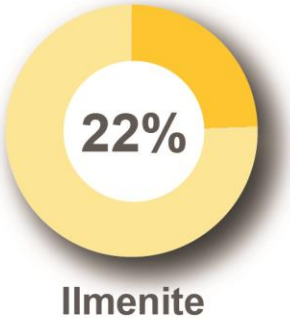
Critical Minerals in Victoria

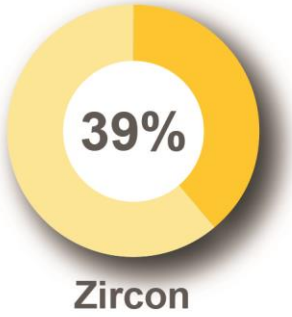


Western Victoria Mineral Sands

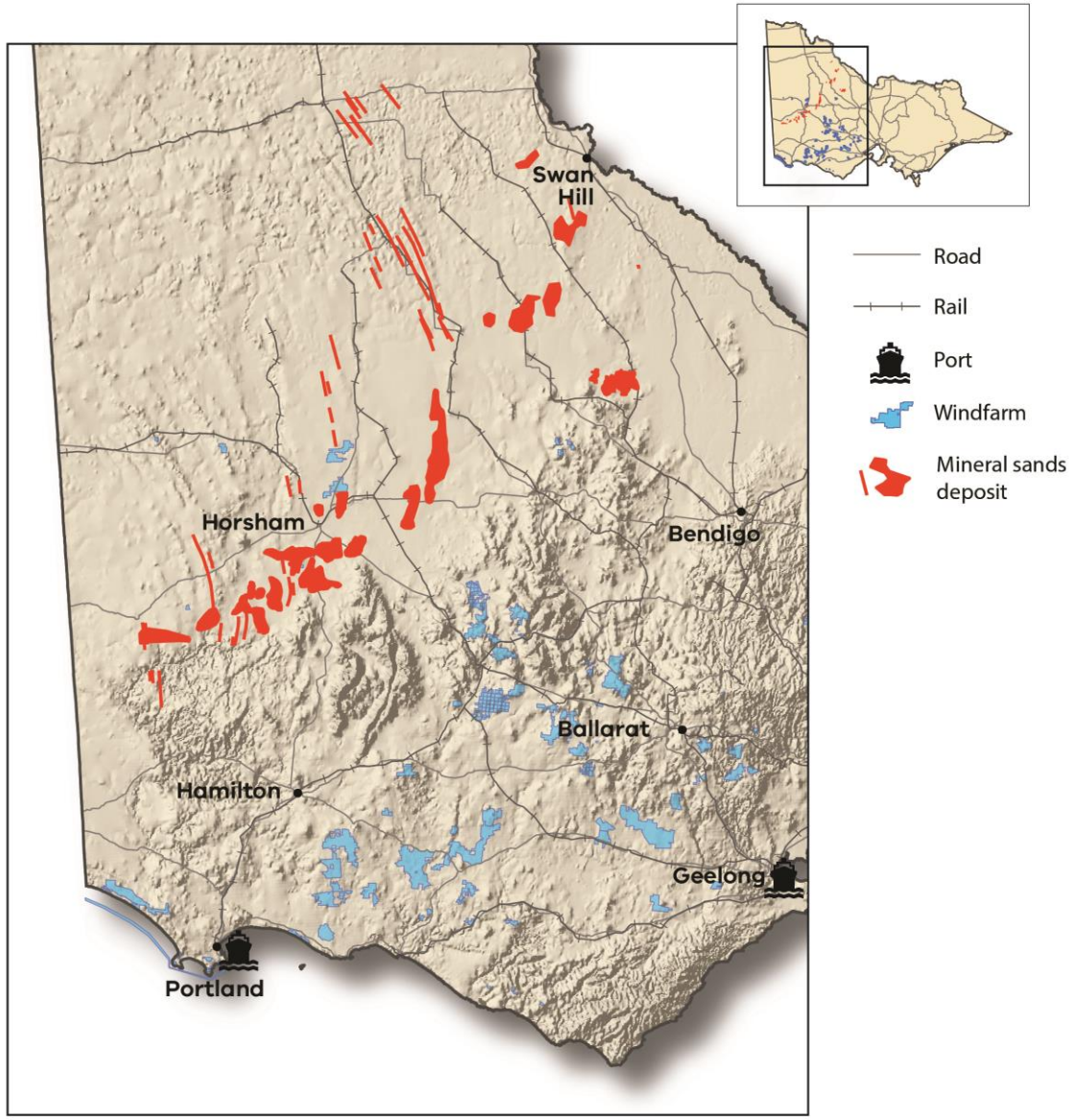
Victoria's share of Australia's mineral sands







Source: Geoscience Australia & Minerals Council of Australia[1]



More information, including resources and reserves:
[Australian Critical Mineral Prospectus 2021]

Rare Earth Elements

Murray Basin – Heavy Mineral Sands

West / Northwest Victoria

- Excellent infrastructure, existing route to market
- Potential renewable energy offtake opportunities
- Multiple long-life deposits, billions of tonnes each

Composition

- zircon, ilmenite, rutile, leucoxene, monazite, xenotime
  - **Heavy REE (e.g. dysprosium, terbium)**
  - **Light REE (e.g. neodymium, praseodymium)**

Murray Basin Mineral Sand Sample

Gippsland Basin – Heavy Mineral Sands

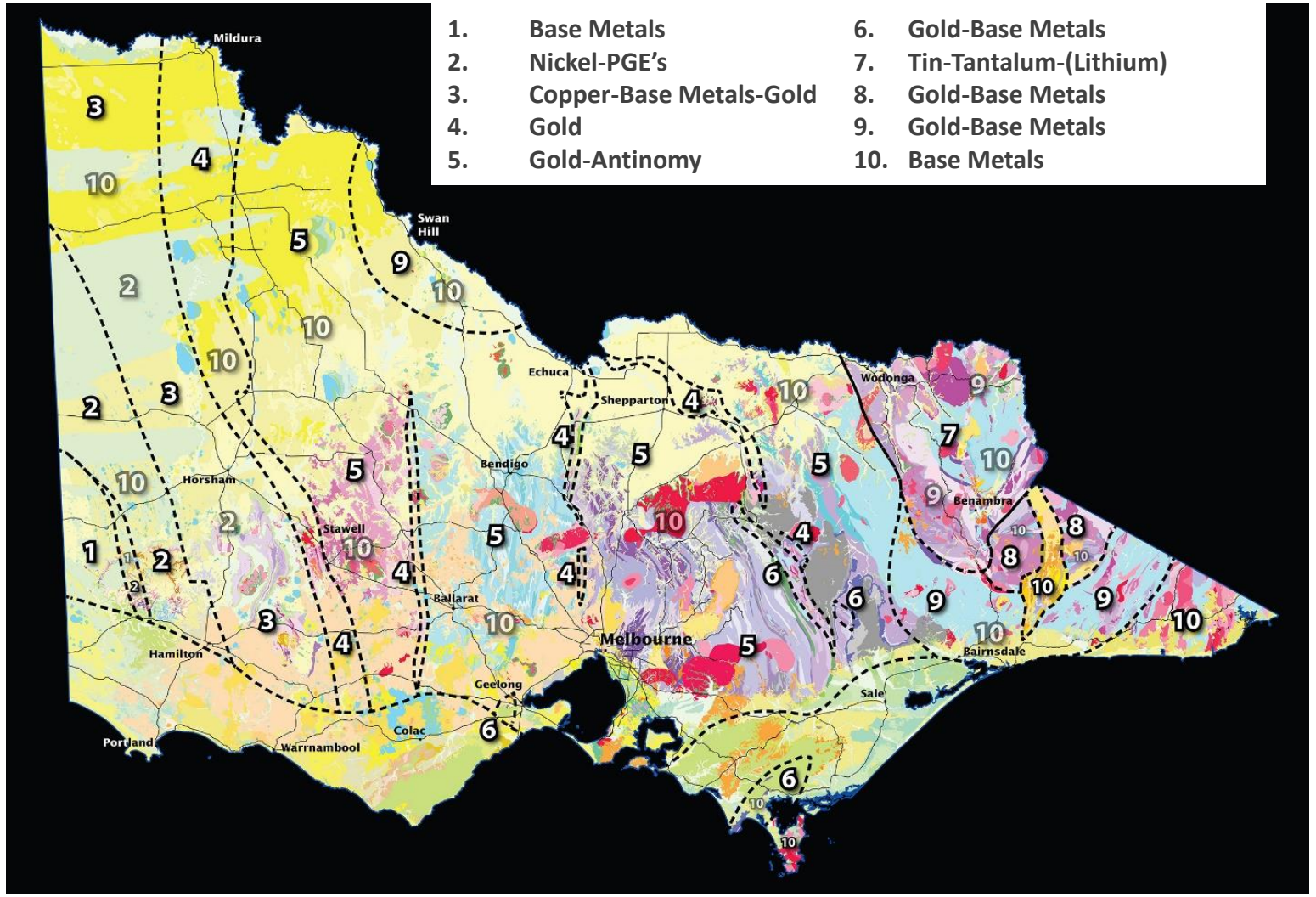
Southeast Victoria

- Emerging province

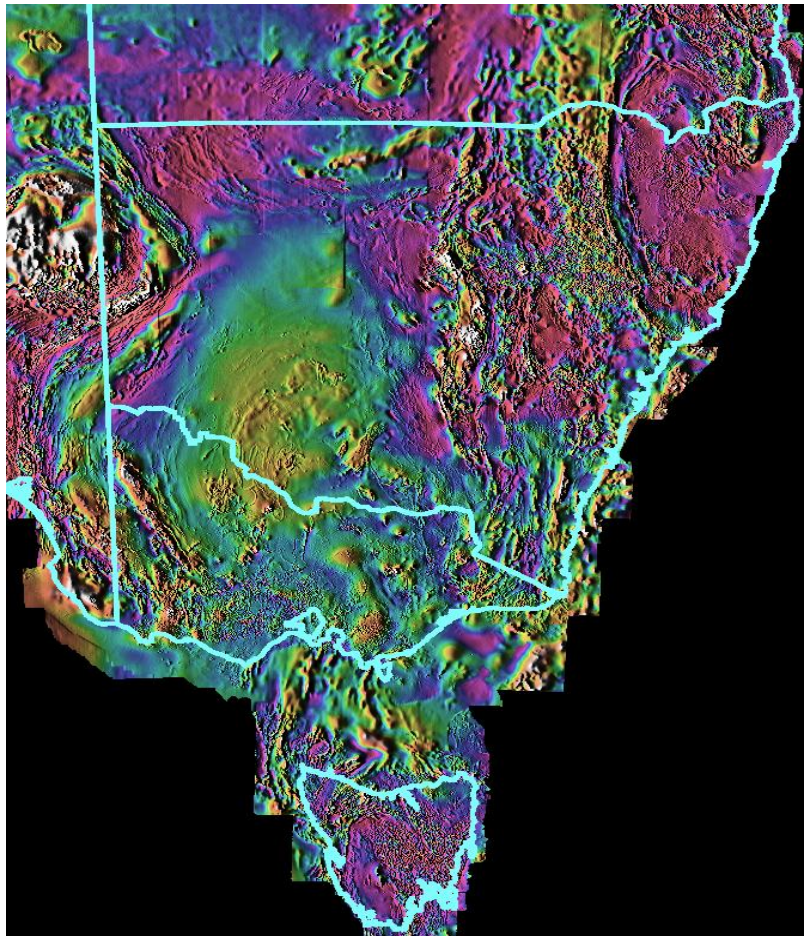
Composition

- zircon, ilmenite, rutile, monazite
  - **Heavy REE (e.g. dysprosium, terbium)**

Victorian Mineral Systems Model – Driving Critical Minerals Exploration

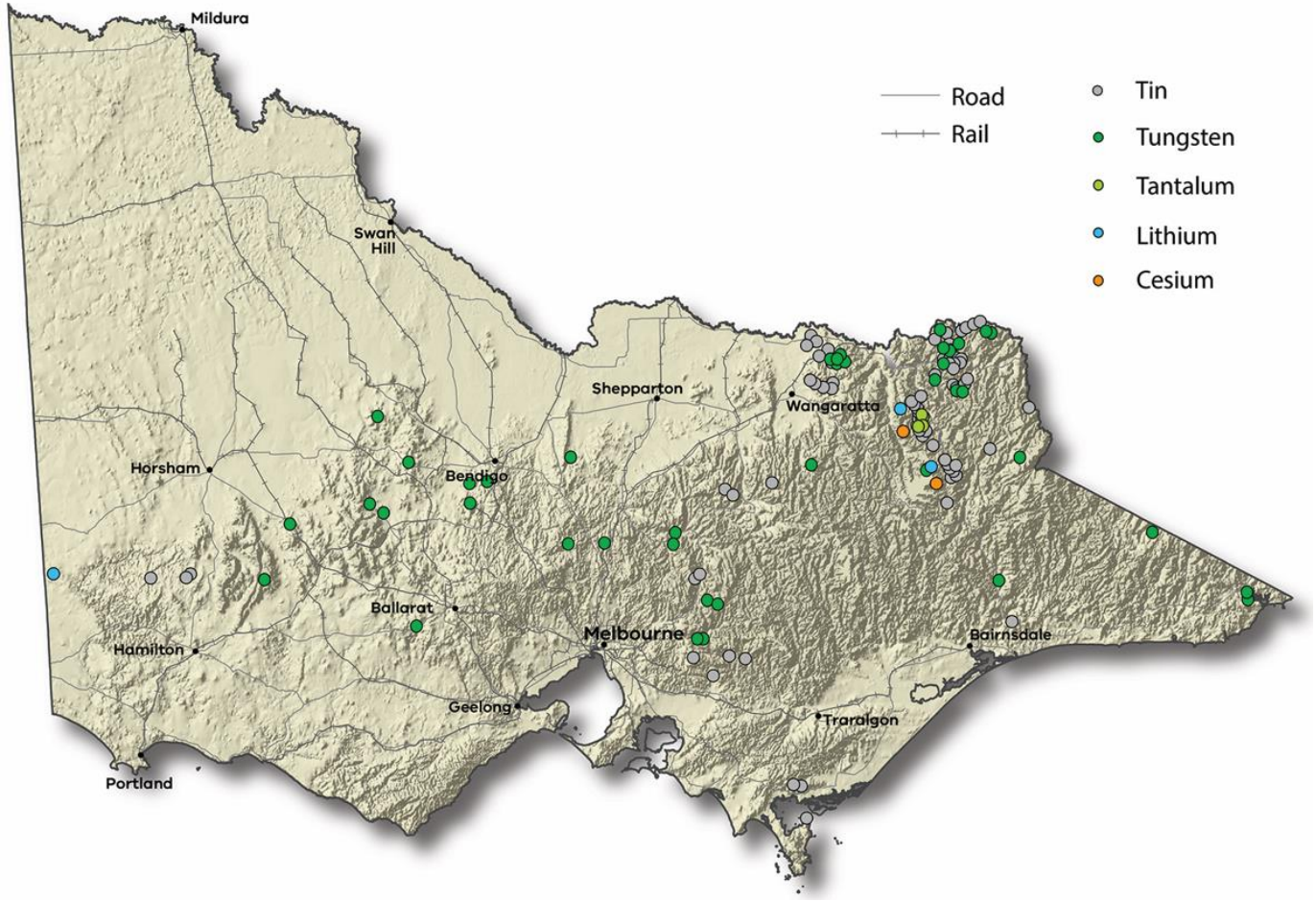


1. Base Metals
2. Nickel-PGE's
3. Copper-Base Metals-Gold
4. Gold
5. Gold-Antinomy
6. Gold-Base Metals
7. Tin-Tantalum-(Lithium)
8. Gold-Base Metals
9. Gold-Base Metals
10. Base Metals



Total Magnetic Intensity

Lithium (Cesium, Tin, Tantalum)



GSV Search Catalogue

Lithium-Cesium-Tantalum

Pegmatite dykes
Petalite, Spodumene
Early-stage exploration

Tin

Historical production

Tungsten

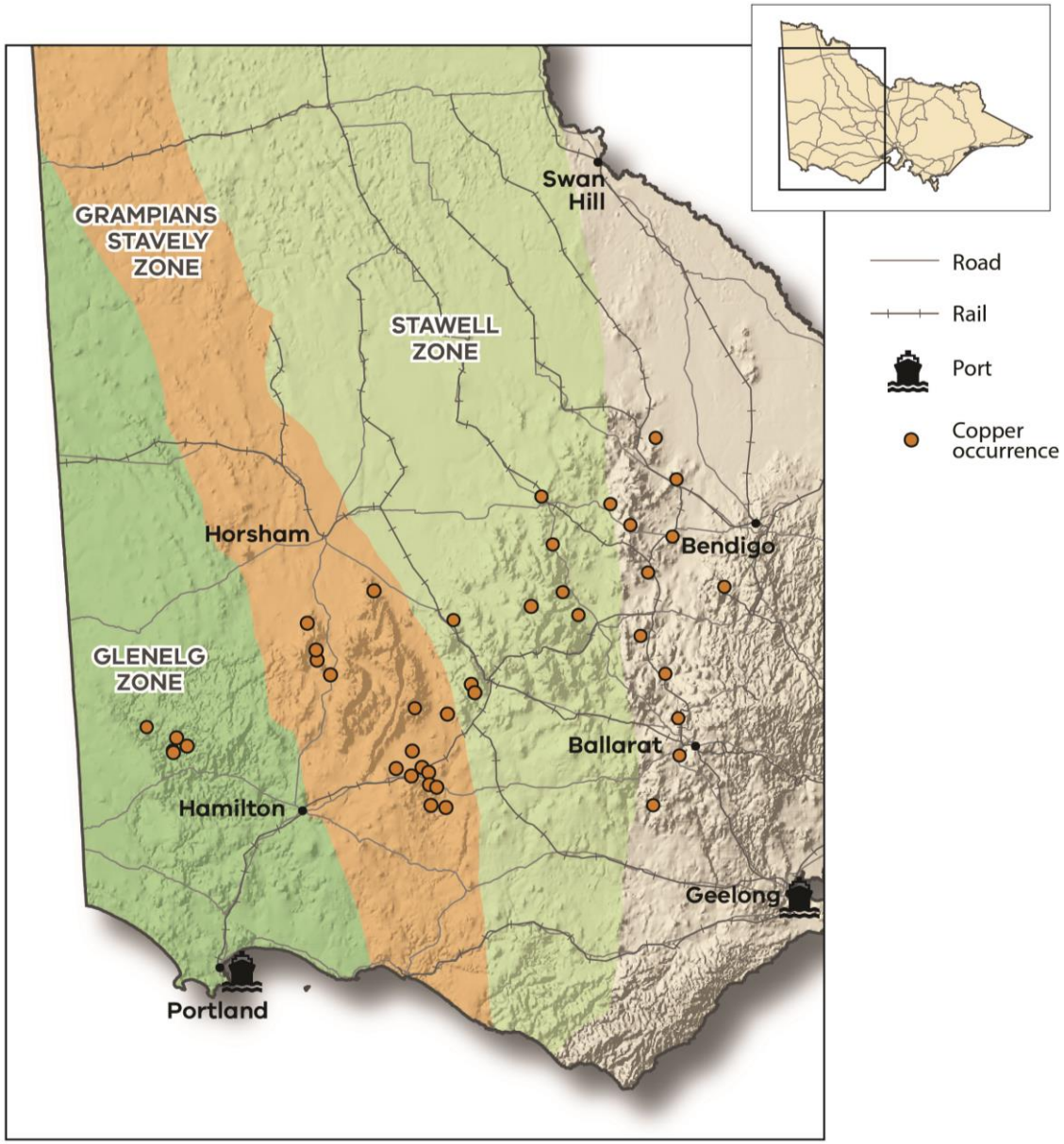
Historical production

Dorchap North Pegmatite dyke with large (14x7cm) petalite crystals

Emerging Copper Province

Stavely Minerals Hole SMD050 from 62 m:
32 m @ 5.88% Cu, 1 g/t Au and 58 g/t Ag including
2 m @ 40% Cu, 3 g/t Au, 517 g/t Ag*

Hematite-specular hematite-magnetite-quartz-chalcopyrite @ 423.5m
Stavely Minerals Hole SMD182 from 421 m:
10.4 m @ 4.34% Cu, 3.17 g/t Au, 11 g/t Ag*

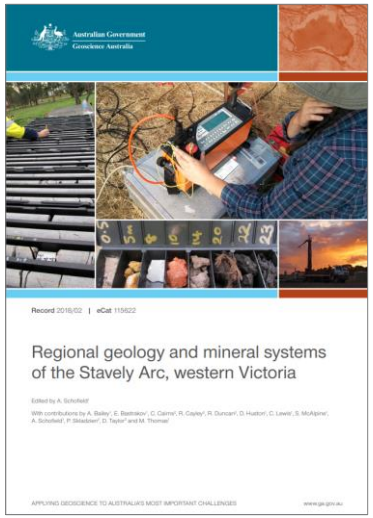


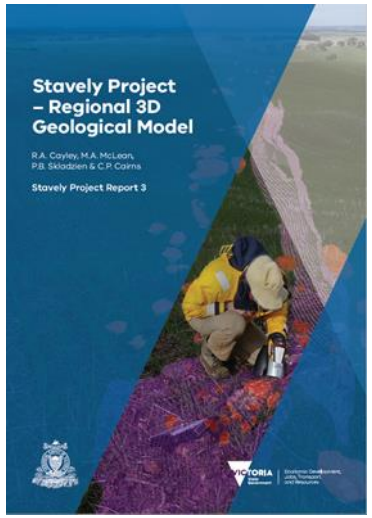
*Stavely Minerals ASX Release - RIU Sydney Resources Round-up Presentation 05/05/22

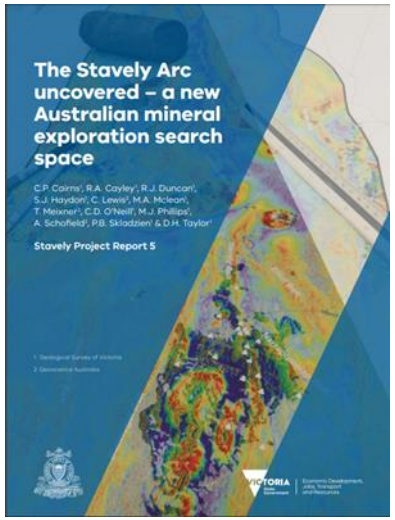
The Stavely Arc

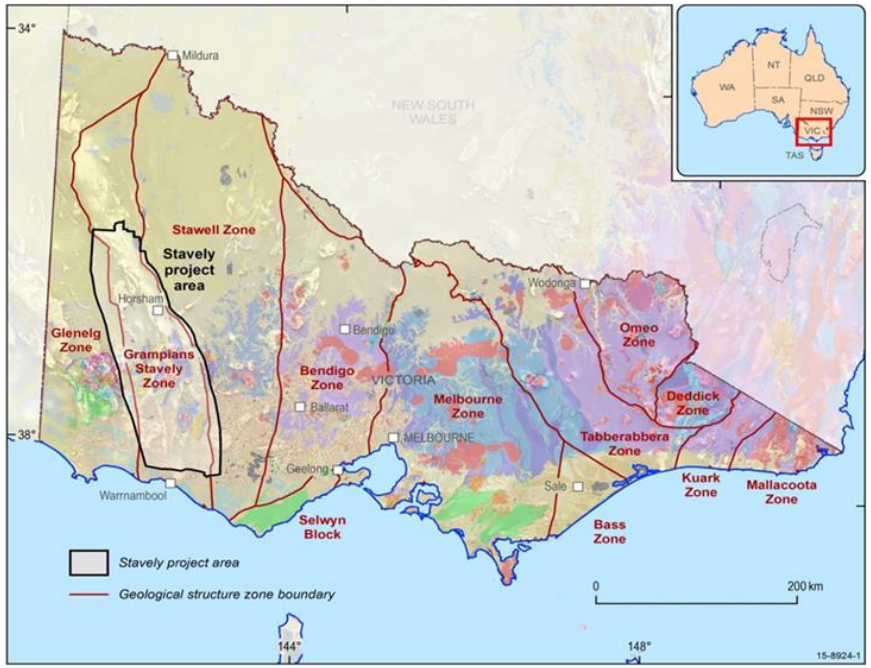
Geological Survey of Victoria – Geoscience Australia
Pre-competitive data, 22 reports
3D geology (structural) model
Presentations
Short film

Applied research for exploration under cover
Geophysics – predicting depth of cover
Hydrogeochemistry – detecting mineral footprints
New drilling technology – RoXplorer® field trial









Victoria's Mining, Engineering, Technology Services (METS)

$26B annual revenue (pre-COVID), 50% is generated in minerals and mining*

Highly skilled workforce exporting to Australia and internationally

Victorian METS have the highest median spend on research and development in Australia*

IMARC

INTERNATIONAL MINING AND RESOURCES CONFERENCE+EXPO
2 - 4 NOVEMBER 2022

Australia's largest mining event

>7,500 delegates from >100 countries
>450 mining leaders and resource experts
>800 mining companies
>340 technical talks / discussions / presentations
FREE Exhibition
>200 leading service companies

* Austmine 2020 National METS survey

AUSTRALIA MINERALS
REALISE THE OPPORTUNITY

Thank you

Dr. Kate Bassano
Manager Exploration & Development
Geological Survey of Victoria
E: Kate.Bassano@ecodev.vic.gov.au

www.earthresources.vic.gov.au

VICTORIA
Australia

AUSTRALIA MINERALS

REALISE THE OPPORTUNITY

Minerals investment opportunities in Tasmania

Tasmania 2022

Andrew McNeill
Chief Government Geologist
Mineral Resources Tasmania

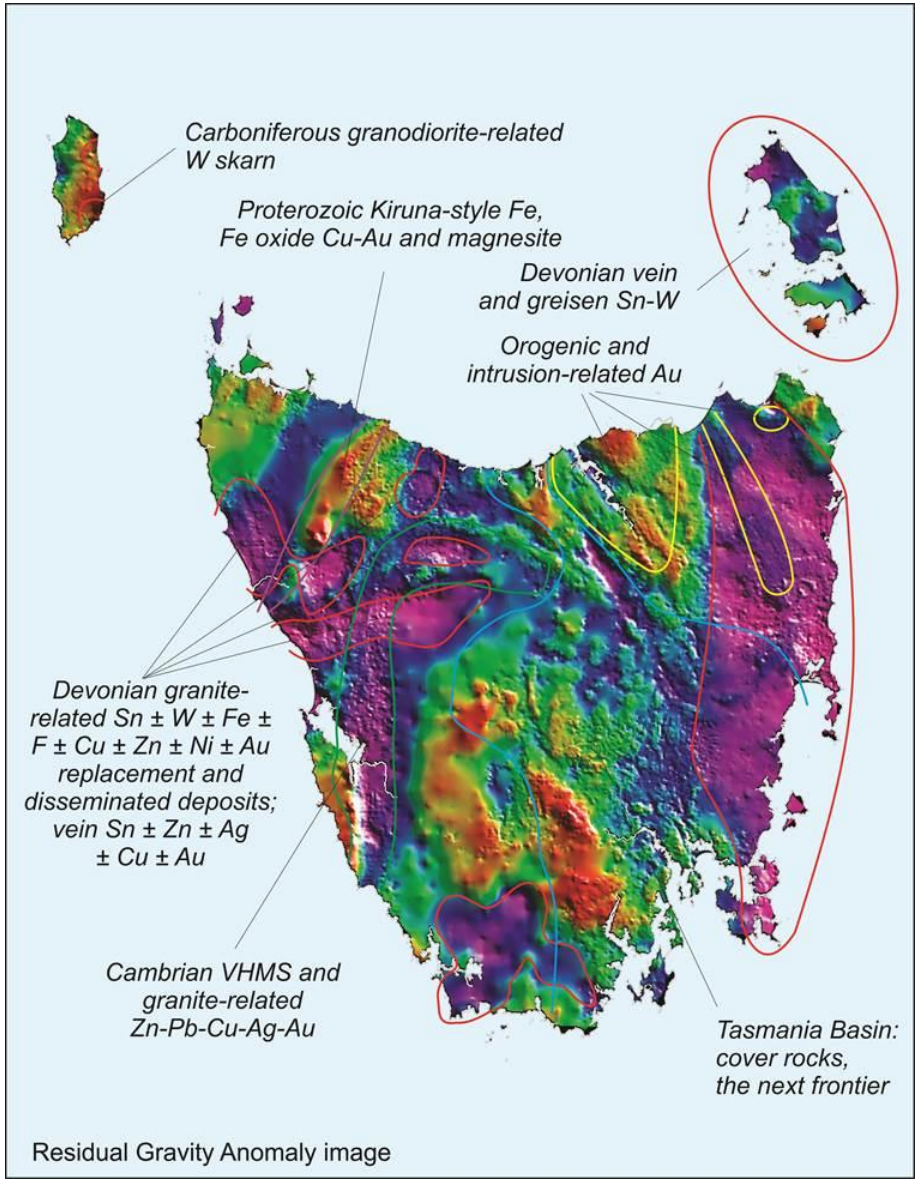
Tasmanian Government

Why Tasmania?

Mineral endowment

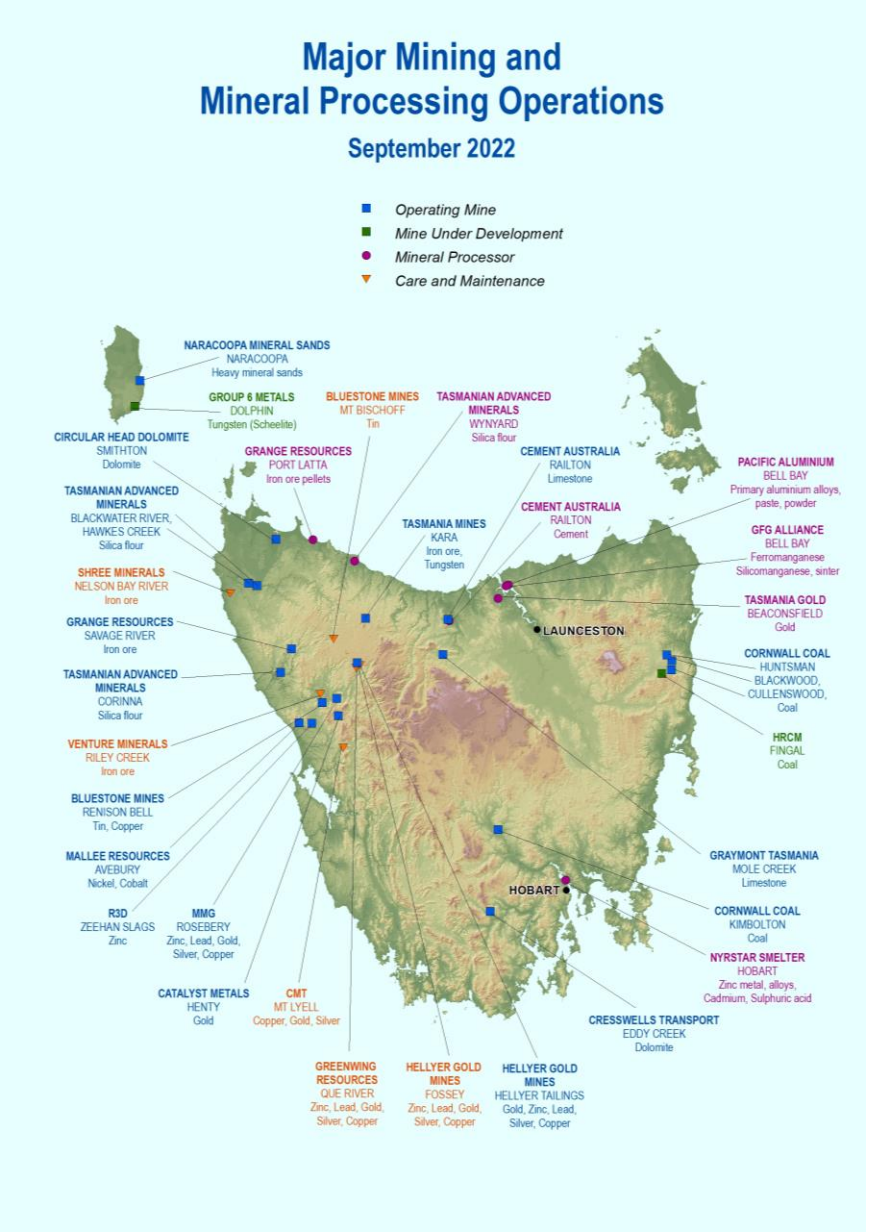
Current **production** of, and projects for, diverse commodities:

- ***Cu, Zn, Pb***
- ***Au, Ag***
- ***Sn, W***
- ***Ni***, *Co, Li*
- *REE*
- **Fe** (**magnetite**, hematite), Mg
- **Al (bauxite)**
- **Si (silica flour)**
- **Heavy mineral sands**
- **Coal**, oil, geothermal, hydrogen
- **Limestone, dolomite**



Setting

- Currently net zero emissions (2013–2020)
- 100 percent self-sufficient in renewable energy
- Aiming for 200 percent renewable energy supply by 2040 (wind, pumped-hydro)
- Hydrogen—green (multiple) and brown (one)—proposals
- Hydrogen—natural: exploration licence applications lodged
- Bell Bay Industrial precinct—adjacent to port facilities—preferred site for downstream processing & energy projects
- Capacity upgrades to rail and ports—funded by Government



Government facilitation and support

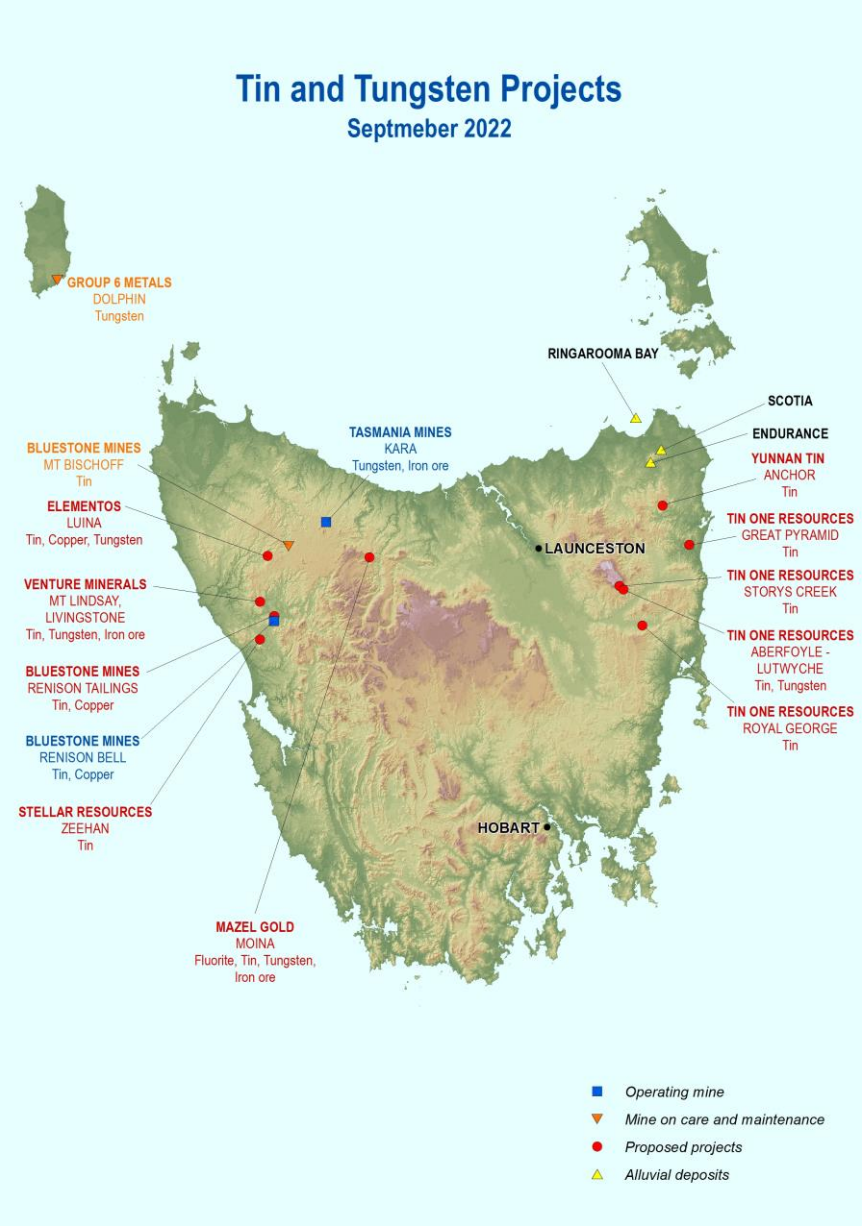
- Loans and other support, particularly for re-starting existing operations; e.g. $10 million to King Island Scheelite
- Applications for support to independent Tasmania Development Board (TDB)
- Single point of contact for investment advice and coordination at Office of Coordinator General (www.cg.tas.gov.au)
- For Mineral tenements all processes, including environmental approvals for exploration, are managed by Mineral Resources Tasmania (www.mrt.tas.gov.au)
- Mining permits—issued by local government with input from State and (possibly) Commonwealth environmental agencies(www.epa.tas.gov.au)
- Government initiatives
  - $2.0M pre-competitive Geoscience Initiative (2021–2025)
  - $3.5M co-funded greenfield exploration drilling—EDGI (2018–2025)

Investment opportunities

Tin and Tungsten

80% and 20% of EDR, respectively

- Defined resources:
  - 540,000 t contained Sn (35% at Renison)
  - 183,000 t contained WO_3 (52% on King Island)
- Re-development of Dolphin commenced
- Opportunities:
  - Exploration (including existing mine sites)
  - Advanced Projects
  - Increased production (e.g. Kara)
  - Downstream processing (W)
  - Secondary prospectivtiy



Investment opportunities

Rare Earth Elements

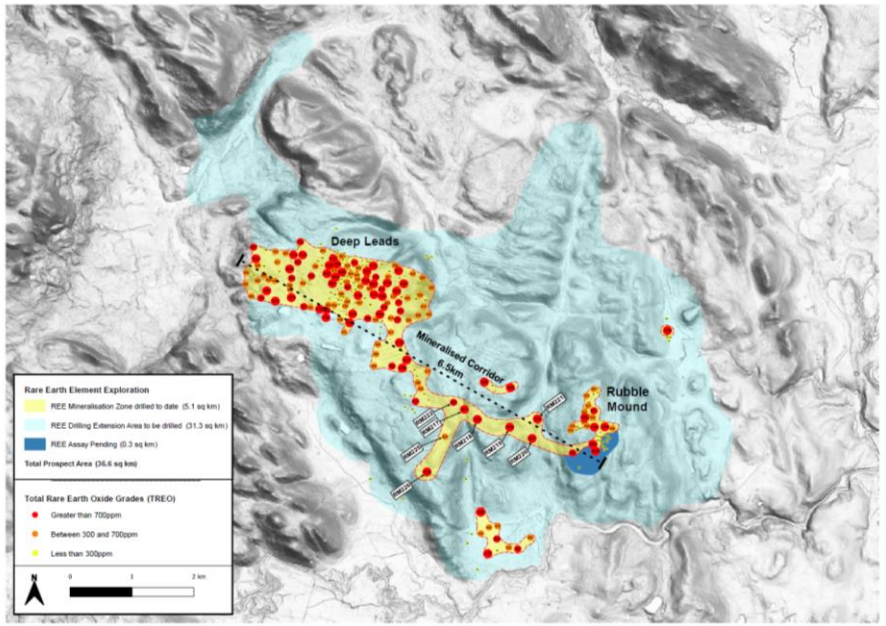
Ionic adsorption Clay (IAC) type

Drilling program in northern Tasmania by ABx (EDGI support)

Exploration stage: no resources

TREE+Y = 500–1800 ppm; high Nd

Initial test work indicates 50–75% recovery by leaching



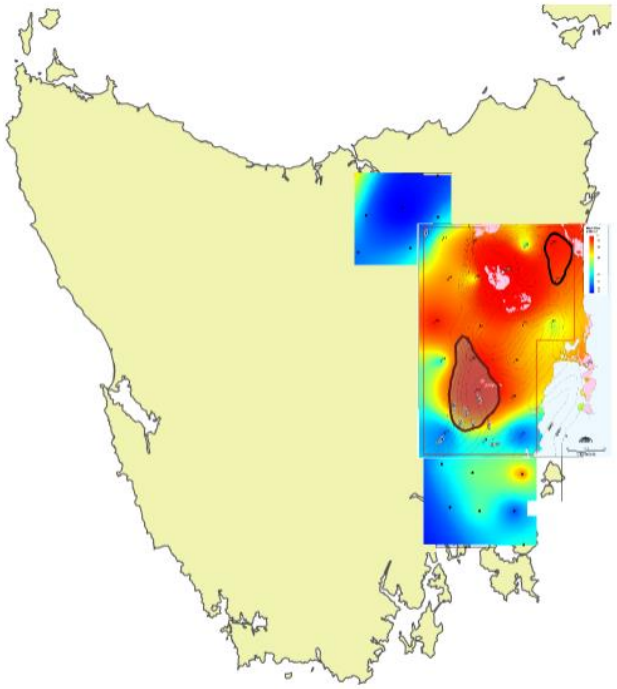
Venture Minerals – Reward Sn Prospect Western Tasmania

Exploration stage: no resources

REE (La+Ce) in soils for Sn exploration

Re-assay drill pulps – 400–1800ppm TREE+Y; High Y

Investment opportunities



Lithium

- Li in brine – New exploration target for state
  - Based on previously defined geothermal anomalies/resources
  - Exploration yet to commence

Secondary prospectivtiy

- Lead/zinc – Hellyer gold mines (Tailings), R3D (slags)
- Rentails DFS in progress – 22 Mt reserve, Sn+Cu
- Other opportunities – Sn+Cu at Cleveland, Co at Mt Lyell and Savage River

Summary

- Diverse mineralisation with long-life (>100 years) mining operations
- 100 percent self-sufficient in renewable energy
- Aiming for 200 percent renewable energy supply by 2040
- Products of mining and mineral processing constitute >60 per cent of mercantile exports
- Highly supportive Government with policies and legislation to reduce Sovereign risk
- High quality, freely available geoscience data sets to de-risk exploration
- Battery and new technology minerals including tin, tungsten, REE, and Li
- There are many ways in which Japanese groups can become involved

For further information

Andrew McNeill

Andrew.Mcneill@stategrowth.tas.gov.au

+61 439 357 387

Or contact the Mineral Resources Tasmania team:

- info@mrt.tas.gov.au
- +61 3 6165 4800

AUSTRALIA MINERALS
REALISE THE OPPORTUNITY

Thank you

Dr. Andrew McNeill
Chief Government Geologist
Mineral Resources Tasmania

Tasmanian Government

AUSTRALIA MINERALS

REALISE THE OPPORTUNITY

Japan - Australia Mineral Resources

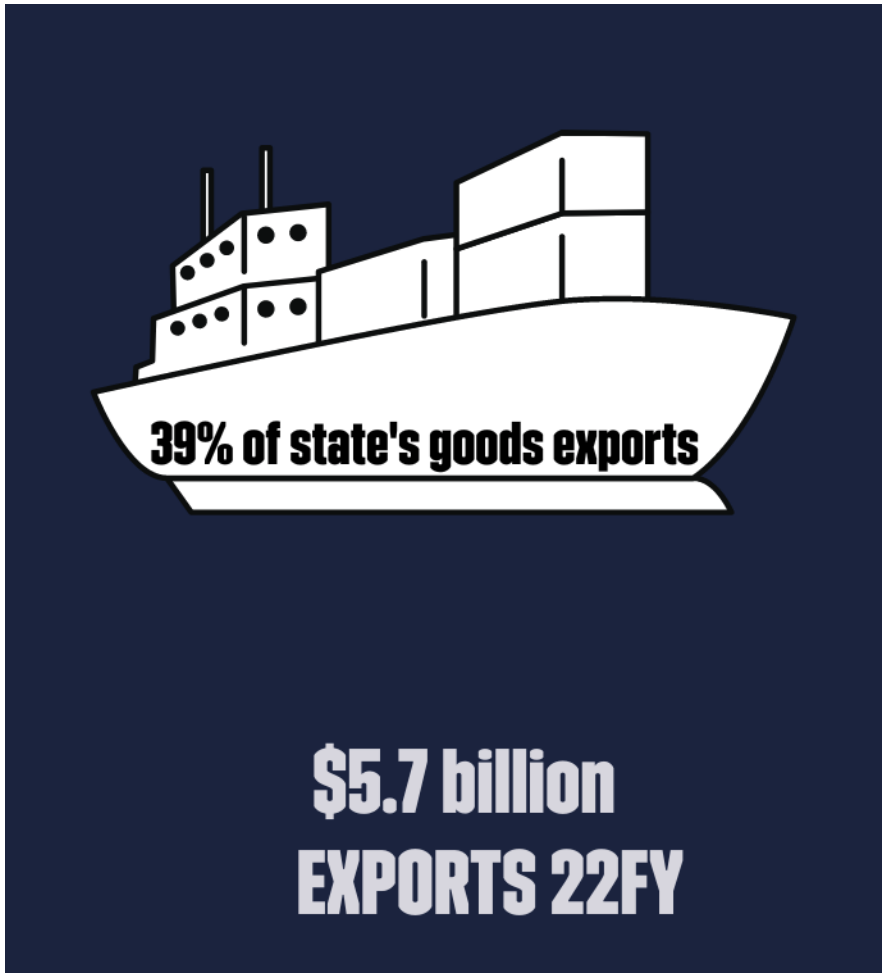
Critical Minerals in South Australia

Rohan Cobcroft
Director, Geological Survey of South Australia
Mineral Resources Division, Department for Energy and Mining

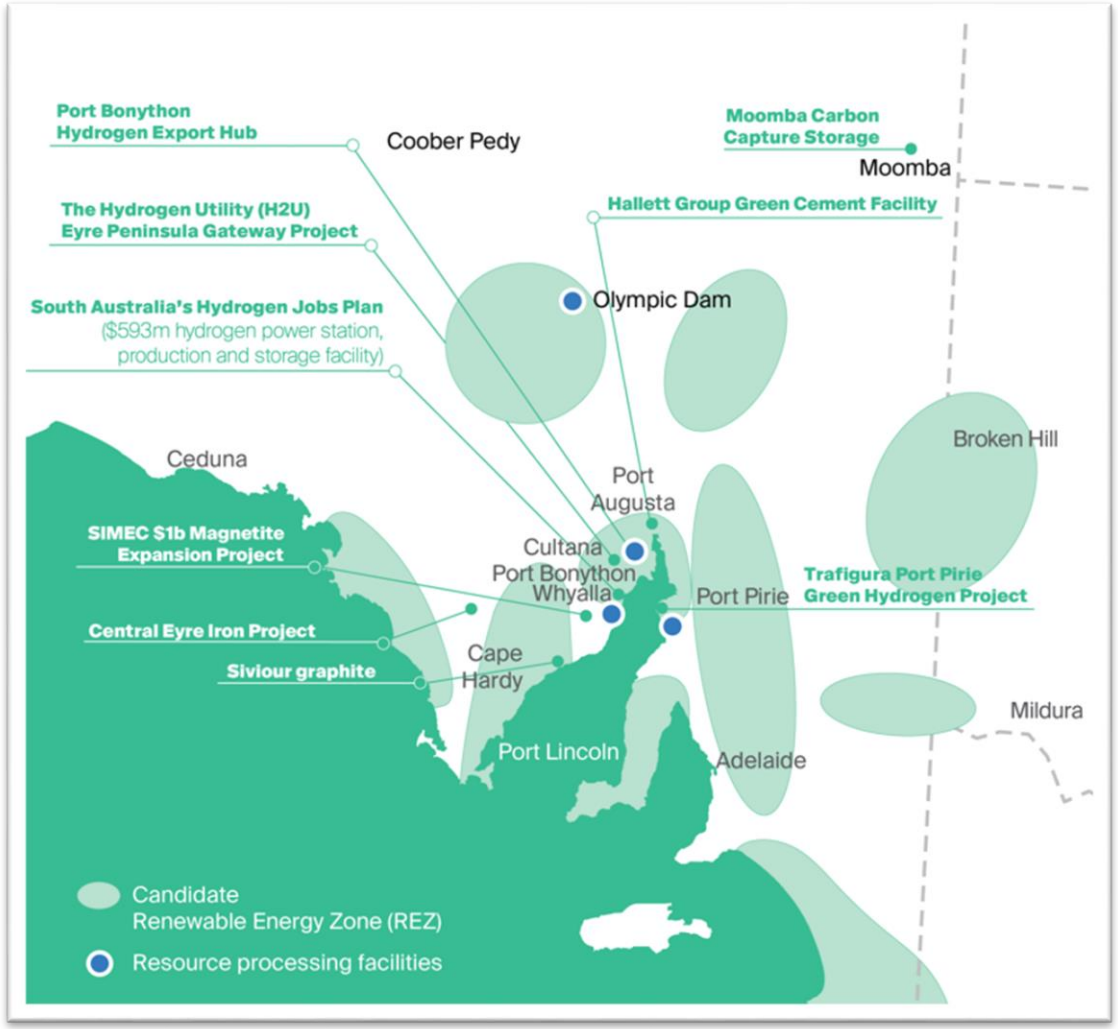
SOUTH AUSTRALIA

Government of South Australia
Department for Energy and Mining

Minerals sector – delivering value to South Australia

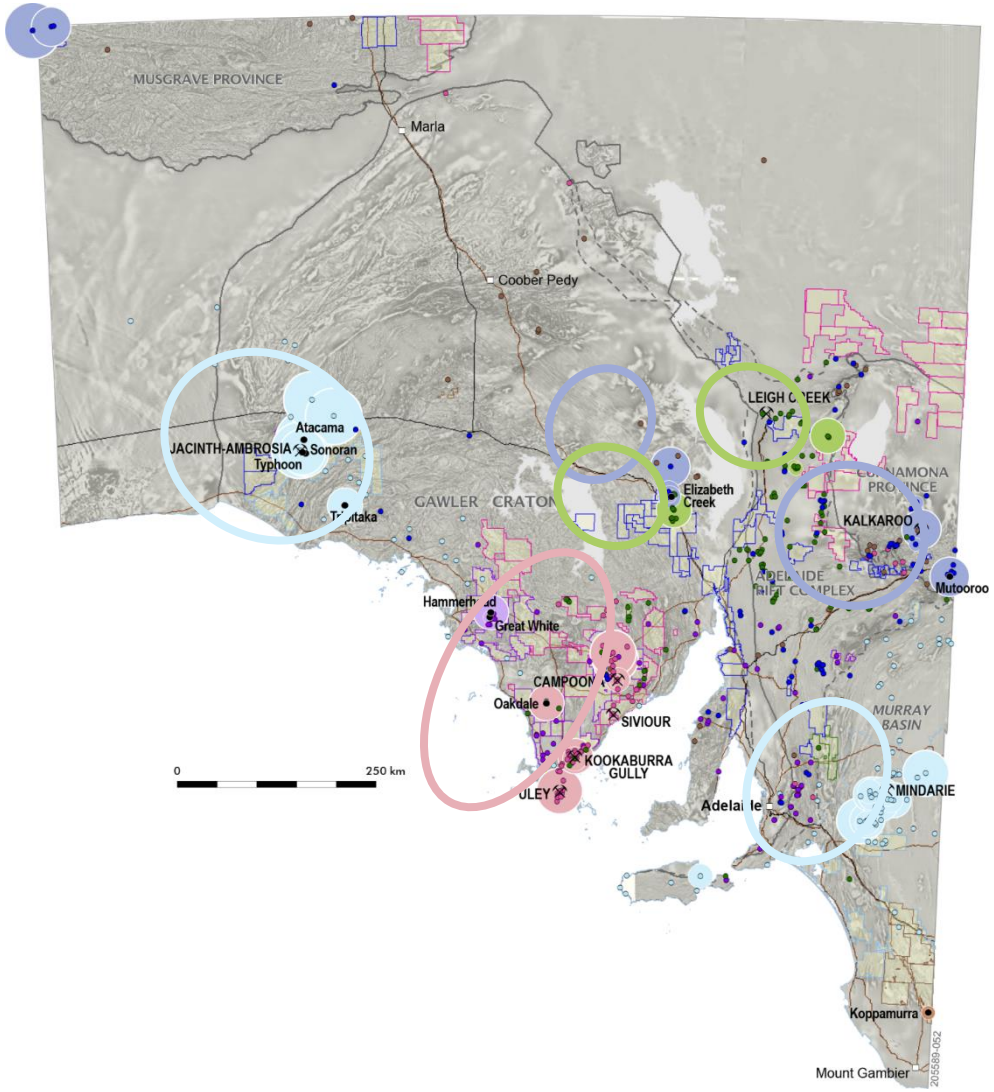


South Australia—developing regions and capacity



- Recharging the resources pipeline – new mines | expansion | critical minerals
- 68% of electricity derived renewable energy – companies making purchase agreements
- Develop Spencer Gulf as major renewable hydrogen hub
- Pathway to deliver green steel, green copper, green critical minerals
- Global energy crunch, reinforces case for hydrogen energy power plant

Current Critical Mineral resources and known occurrences



Cobalt contained resource (tonne)
- Less than 1000
- 1000 - 9999
- 10 000 - 49 999
- Greater than 50 000

Graphite contained resource (tonne)
- Less than 100 000
- 100 000 - 249 999
- 250 000 - 499 999
- 500 000 - 999 999
- Greater than 1 000 000

Kaolin contained resource (mill tonne)
- Less than 15
- Greater than 15

Manganese contained resource (tonne)
- Less than 10 000
- Greater than 10 000

Mineral sands contained resource (tonne)
- Less than 100 000
- 100 000 - 499 999
- 500 000 - 999 999
- 1 000 000 - 2 499 999
- Greater than 2 500 000

Rare earths contained resource (tonne)
- Less than 30 000

Current September 2022
- MAJOR MINES (approved)
- Developing projects
- Cobalt occurrences
- Graphite occurrences
- Kaolin occurrences
- Manganese occurrences
- Mineral sands occurrences
- Rare earths occurrences

- Tenements under exploration for cobalt
- Tenements under exploration for graphite
- Tenements under exploration for kaolin
- Tenements under exploration for manganese
- Tenements under exploration for mineral sands
- Tenements under exploration for rare earths

Highway — Railway

Company activity—searching for critical minerals

- Growing number of announcements from companies now active in critical minerals space
  - Past 12 months: ~20 announcements regarding updates to existing projects (increased resources) or new discoveries
  - Across a range of geological domains and mineral systems
  - Often not the main or initial exploration target
  - Include: Graphite, Copper-REE, Copper-Cobalt, Ionic clay REE, saprolite and basement hosted REE, Kaolin – Halloysite

Government response—stimulating along the value chain

Geoscience

- Accelerated Discovery Initiative (co-funded exploration)
- Exploring for the Future
- Sedimentary Copper – (GSSA/CSIRO)
- Critical Minerals – South Australia
- Mine Waste

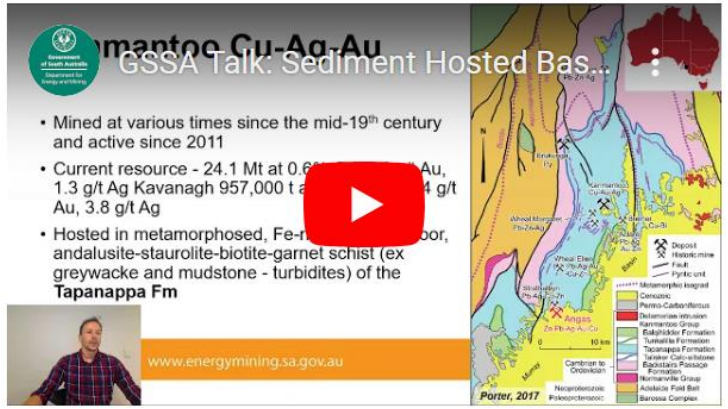
Supply chain

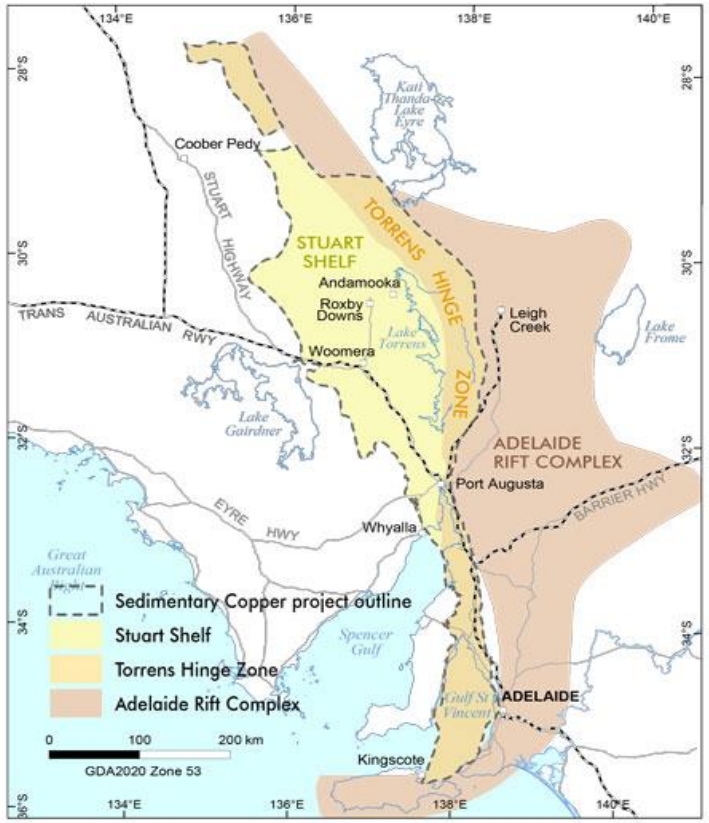
- Thinking Critical – SA

New geoscience initiatives—Sedimentary Copper

- With CSIRO on this joint project to develop a robust model and understanding of the basin architecture of the Stuart Shelf
- Sedimentary-hosted copper deposits are the second most important source of copper in the world
- Stuart Shelf has long been considered as having considerable potential for sedimentary-hosted Cu resources due to similarities with the world-class African Copper belt.
- This deposit type is the main source of cobalt

https://www.energymining.sa.gov.au/industry/geological-survey/gssa-projects/sedcu





New geoscience—Critical Minerals South Australia

“Critical Minerals Project”

Key deliverables are:

- Improve understanding of known critical minerals and their systems – ‘mineral systems approach’
- Geochemical sampling, hyperspectral core and sample scanning, petrophysics to uncover SA potential for critical minerals
- SA focused Mine-Waste assessment
- Developing high quality data sets and reports to be progressively released to the public at specific milestones
- Encouraging and assisting potential explorers to come to SA, with data availability and resource advice
- Economic and Market Analysis Report for Critical Minerals in South Australia

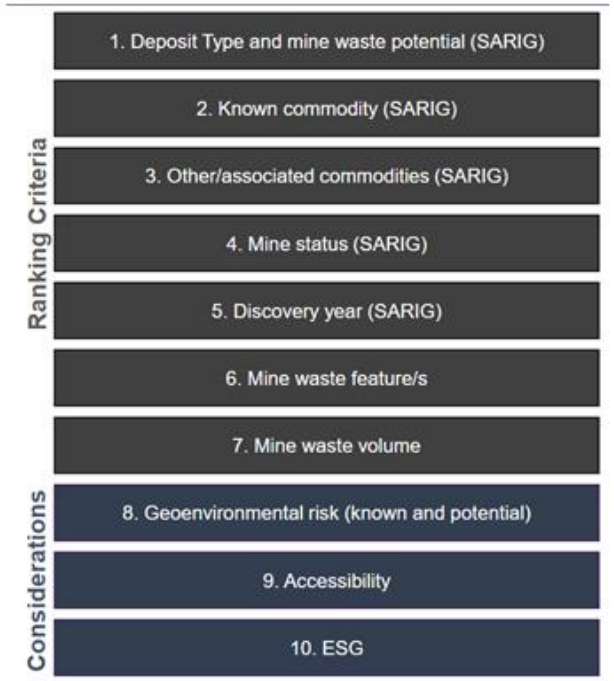
Secondary Prospectivity of SA's Mine-Waste

Easy pickings?

- Tailings dams and other mine wastes are potential environmental hazards
- But they also offer an incredible opportunity to extract critical minerals that have been discarded over time
- With the added benefit of treating and cleaning up these historical sites
- Will form part of national database

Beneficial for the environment

- Potential source of minerals
- Cleaning up existing sites



THINKING CRITICAL

Wining companies:

- Rockburst Technologies
- NDB Technology
- QL Space
- CBSM Mining
- Scantech International

- South Australia's focus on leading global decarbonisation requires critical minerals.
- South Australia has critical mineral resources.
- We needed to develop the critical minerals supply chain to highlight the benefits of South Australia as a critical minerals centre.
- Open international call for critical minerals projects and companies to come to South Australia – focus on manufacturing and processing.
- 11 entries from 40 submissions invited to final round and 5 winners selected.

Research programs

Research projects currently underway on a range of fronts:

- Origins of REE accumulations in South East
- Nickel + PGE mineralisation in Musgraves / Western Gawler
- Lithium pegmatite mineralogy and tracing
- Series of honours projects: project on sourcing minerals sand in the Murray Basin, Mine Waste characterisation, Palladium mineralisation IOCGs,
- ARC Linkage project value-add metals from mine streams and wastes from Olympic Dam (with BHP)
- Mineral Exploration Cooperative Research Centre MinEx CRC
- UniSA assessment underway on critical minerals and net zero mining as a major research focus
- ARC research training centre in Critical Minerals

University of South Australia

THE UNIVERSITY of ADELAIDE

Recycling for critical minerals

- Nyrstar Australia's Port Pirie smelter has been in continuous operation for more than 130 years, employing over 800 people and 300 contractors.
- One of the world's largest multi-metal smelters, producing lead, silver and by-products such as sulphuric acid.
- In a recent announcement: Single-use alkaline batteries, can be recycled at Nyrstar Port Pirie into zinc and copper
- Nyrstar Australia is expected to recycle up to 2,000 tonnes per year (approximately 88 million AA alkaline batteries)
- Well positioned to play an important role in the transition to a greener economy.

Green minerals processing and energy hub in SA

- Tailored initiative programs under the ‘green minerals for a green future’ banner
- Multiple mines – multi commodity
- Feeding centralised processing points powered by green energy
- Advance manufacturing value adding to the raw commodities to build future technologies
- Established R&D capability
- Skilled and developing workforces
- Achieving the vision ‘SA’s role in contributing to Australia being a global critical minerals power house.’

For further information

- Contact the SA team:
  - DEM.CustomerServices@sa.gov.au
  - energymining.sa.gov.au

- Contact person:
  - Rohan Cobcroft – Director Geological Survey of South Australia
  - rohan.cobcroft@sa.gov.au

AUSTRALIA MINERALS
REALISE THE OPPORTUNITY

Thank you

Rohan Cobcroft
Director, Geological Survey of South Australia
Mineral Resources Division, Department for Energy and Mining

SOUTH AUSTRALIA
Government of South Australia
Department for Energy and Mining