Investigating the opportunities for critical minerals in tailings and mine waste

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ASX: COB

CobaltBlue

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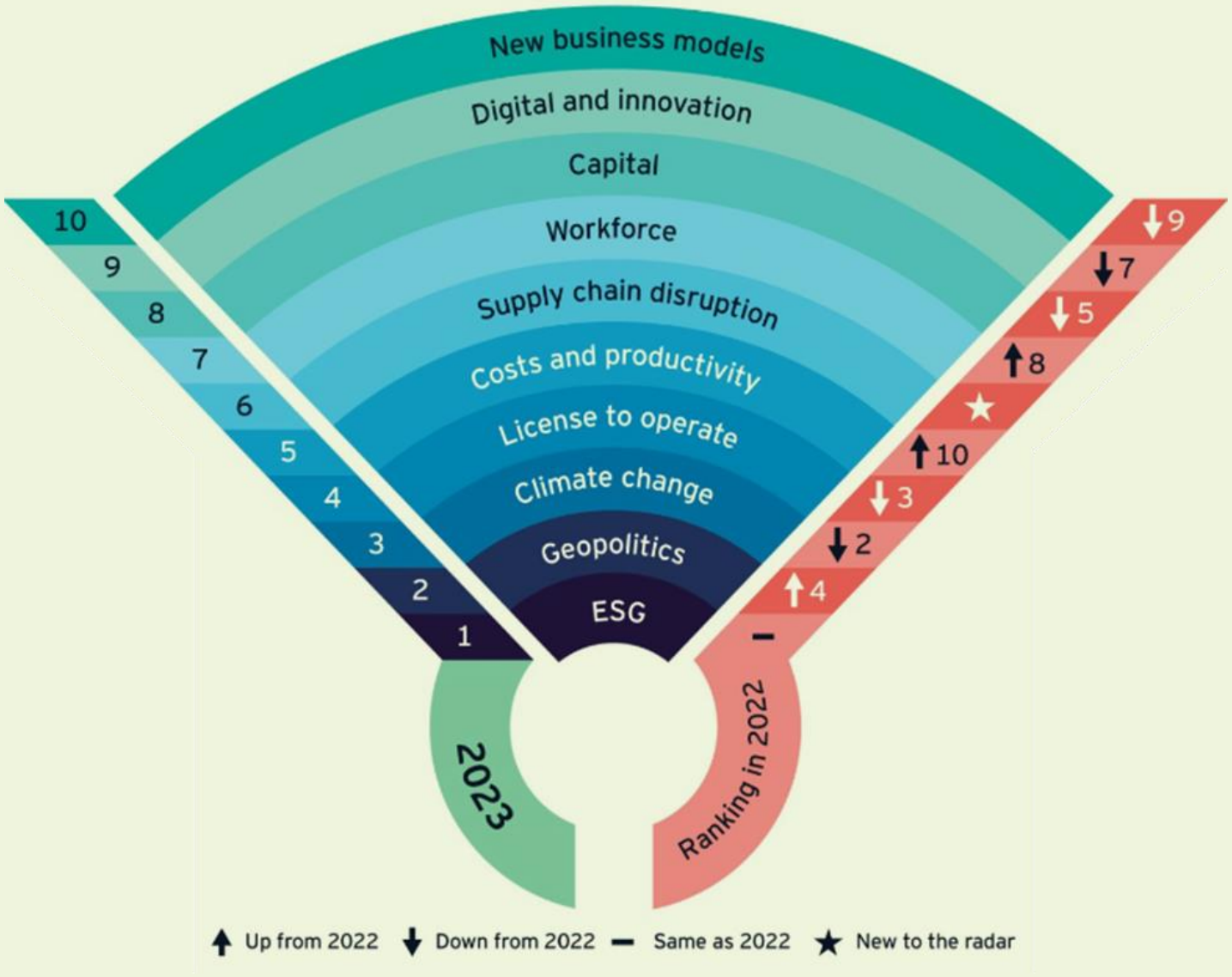
EY Top 10 Risks to Mining 2023



Mining and the Circular Economy

"In the current linear mining value chain, mine waste is considered … a business liability. Employing circular economy principles can redefine the liability to an asset, through the recycling, repurposing or reprocessing of material back into a circular mining value loop."

– L. Nichols (2022)

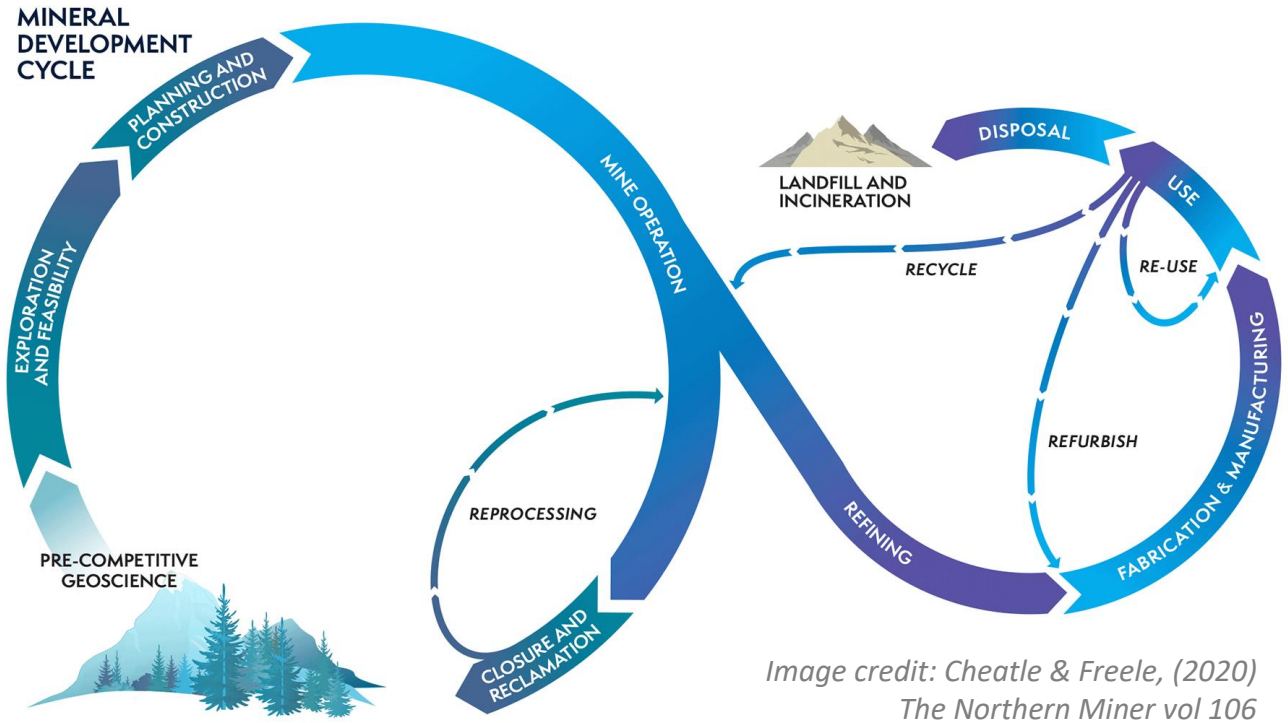
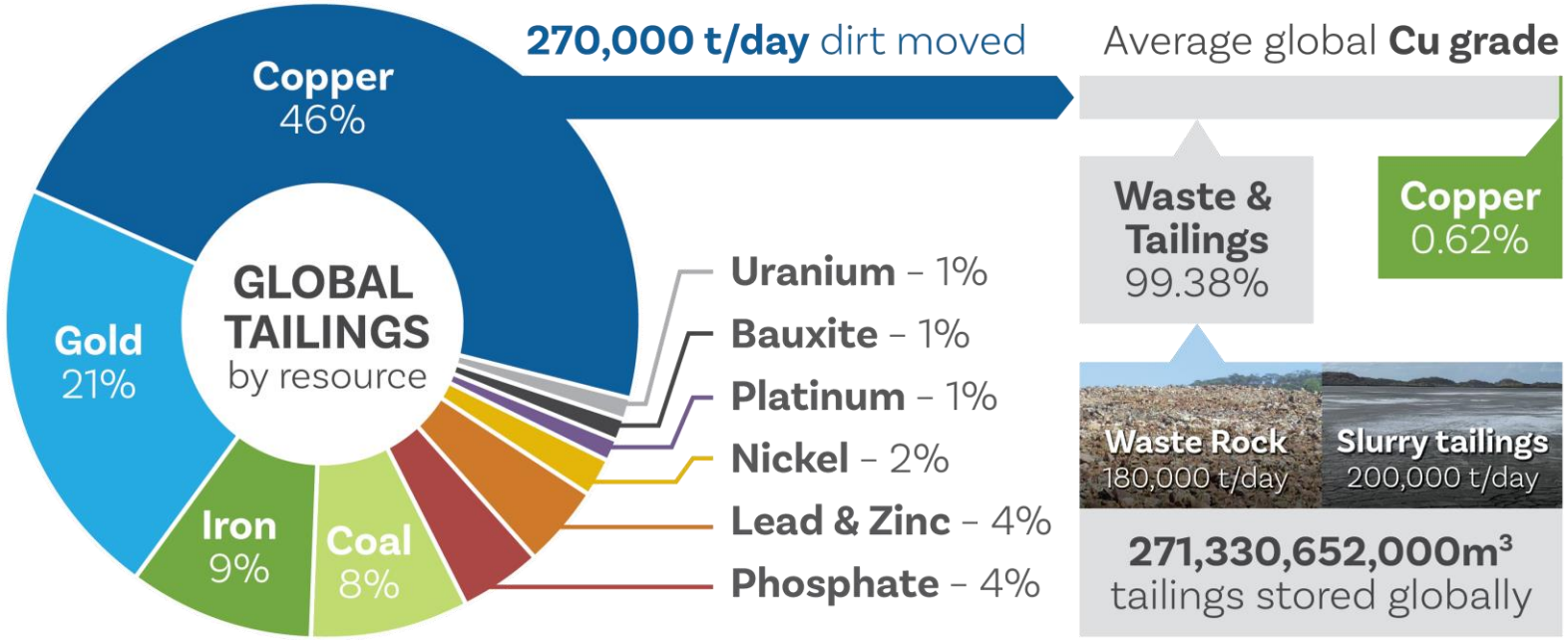


Image credit: Cheatle & Freele, (2020) The Northern Miner vol 106

Size of the Problem

For Copper processing

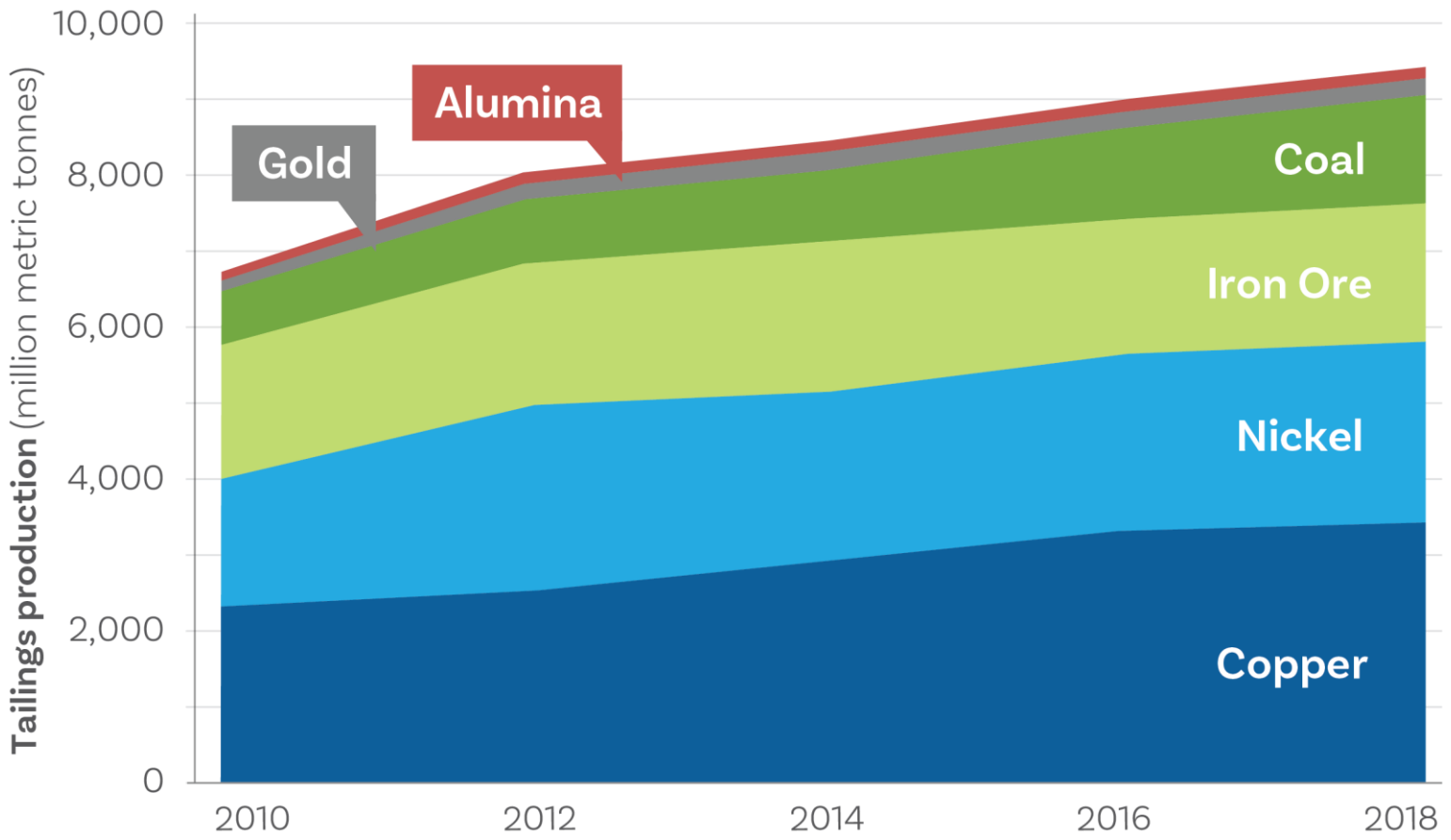
- **Processed material:** 90,000t/day
- **Process water:** 114,000m³/day
- **Concentrate:** 1,750t/day



Size of the Problem

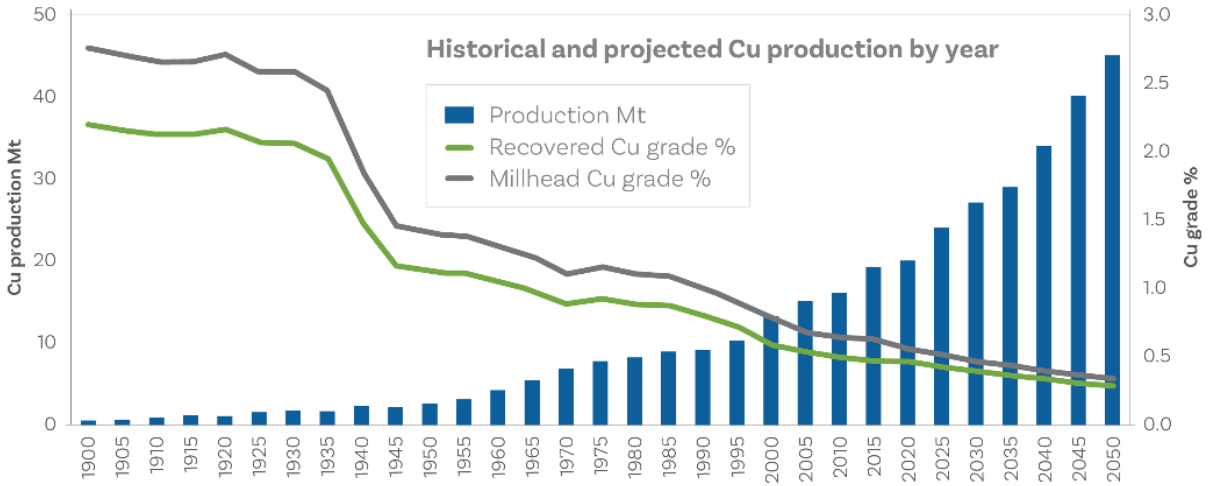
Estimate of global annual tailings production by commodity

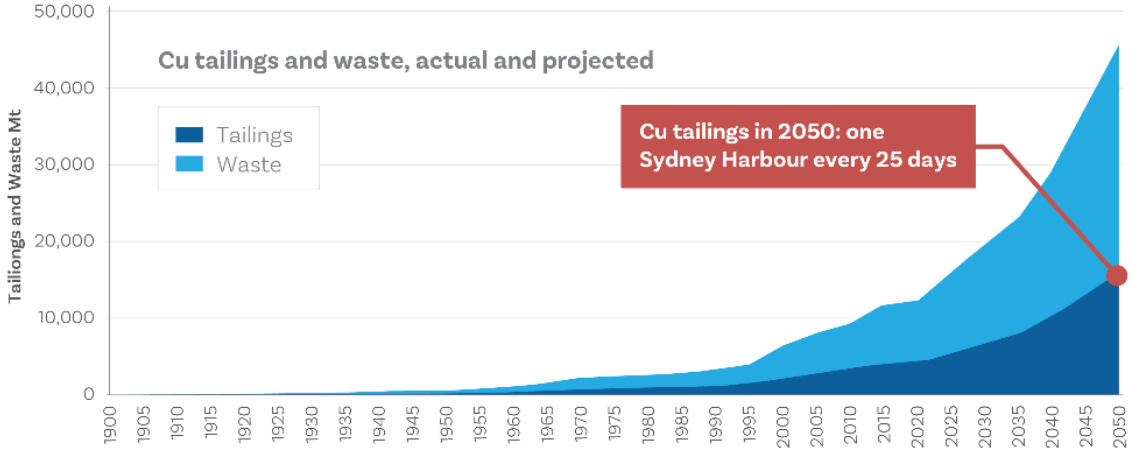
- 3.4 billion tonnes tailings produced annually from copper tailings in 2018
- Copper by far the most
- Declining grades, increasing demand, mean the volume of tails per tonne Cu produced is going up



Tailings – major source of AMD

Cu tailings – 2050





Source: R. Valenta 2021

Mining and the Circular Economy

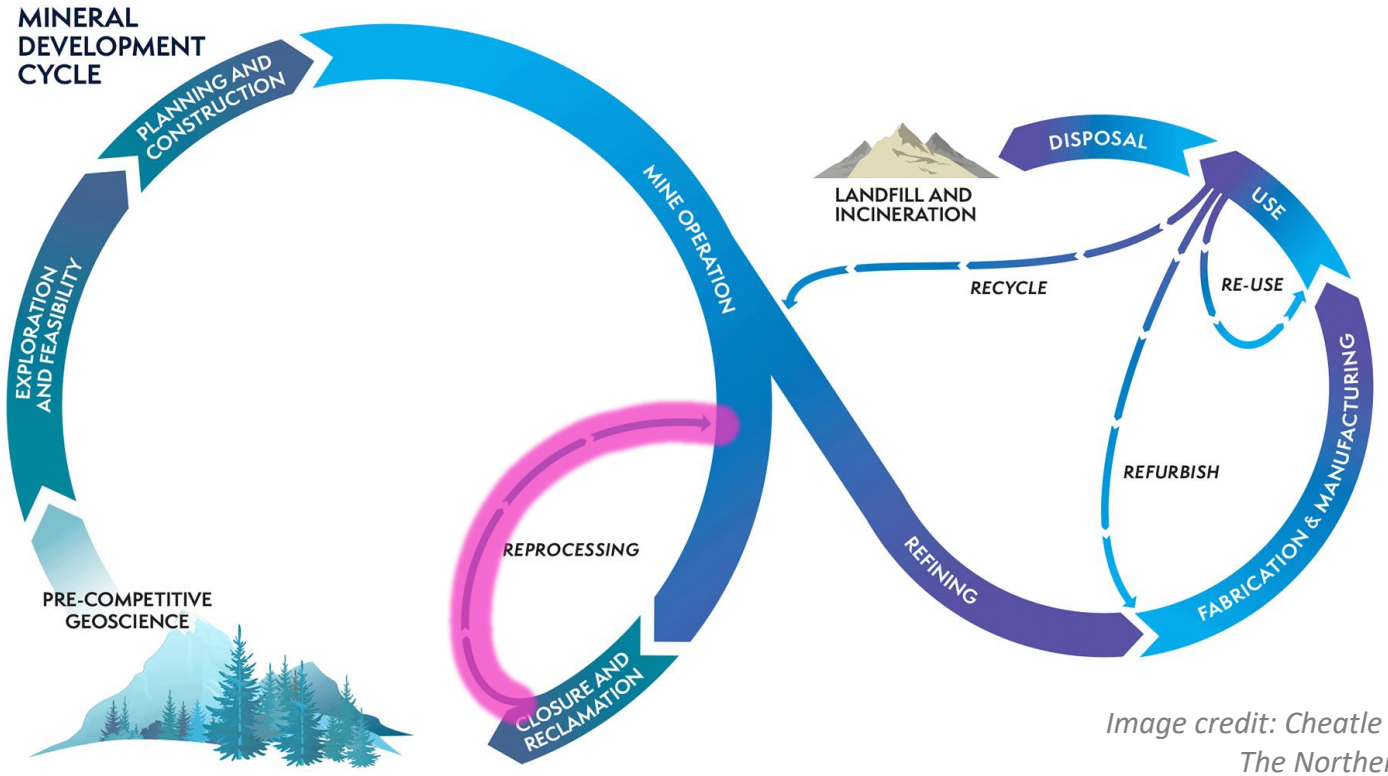
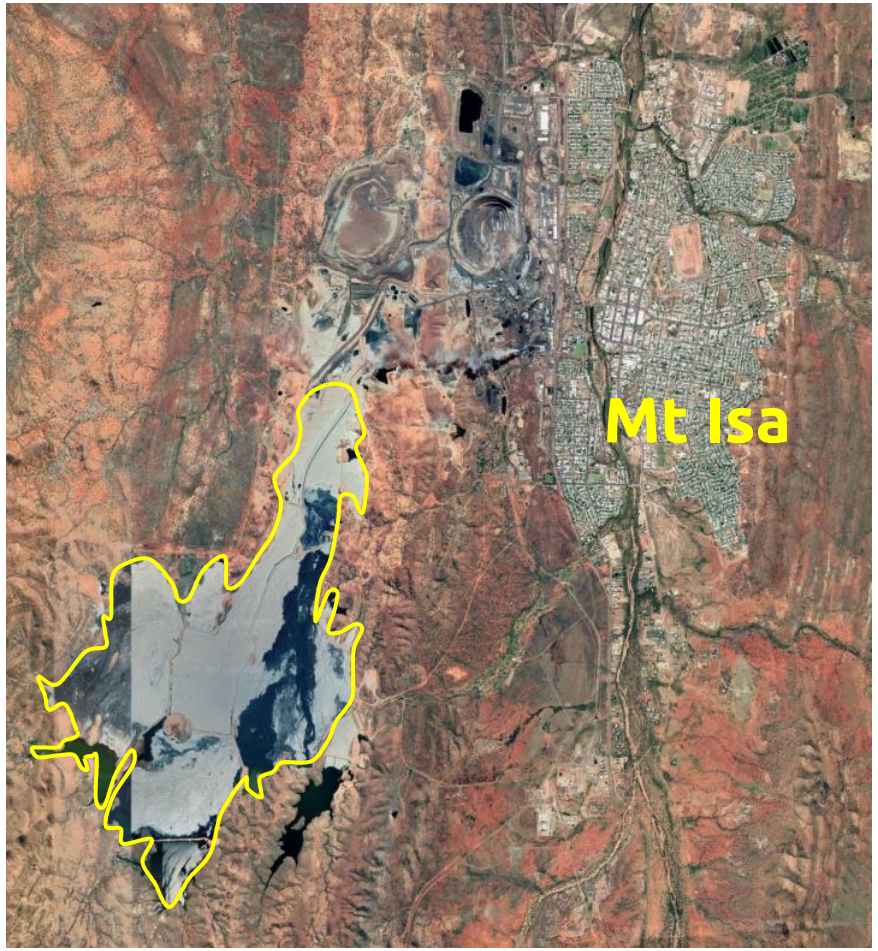


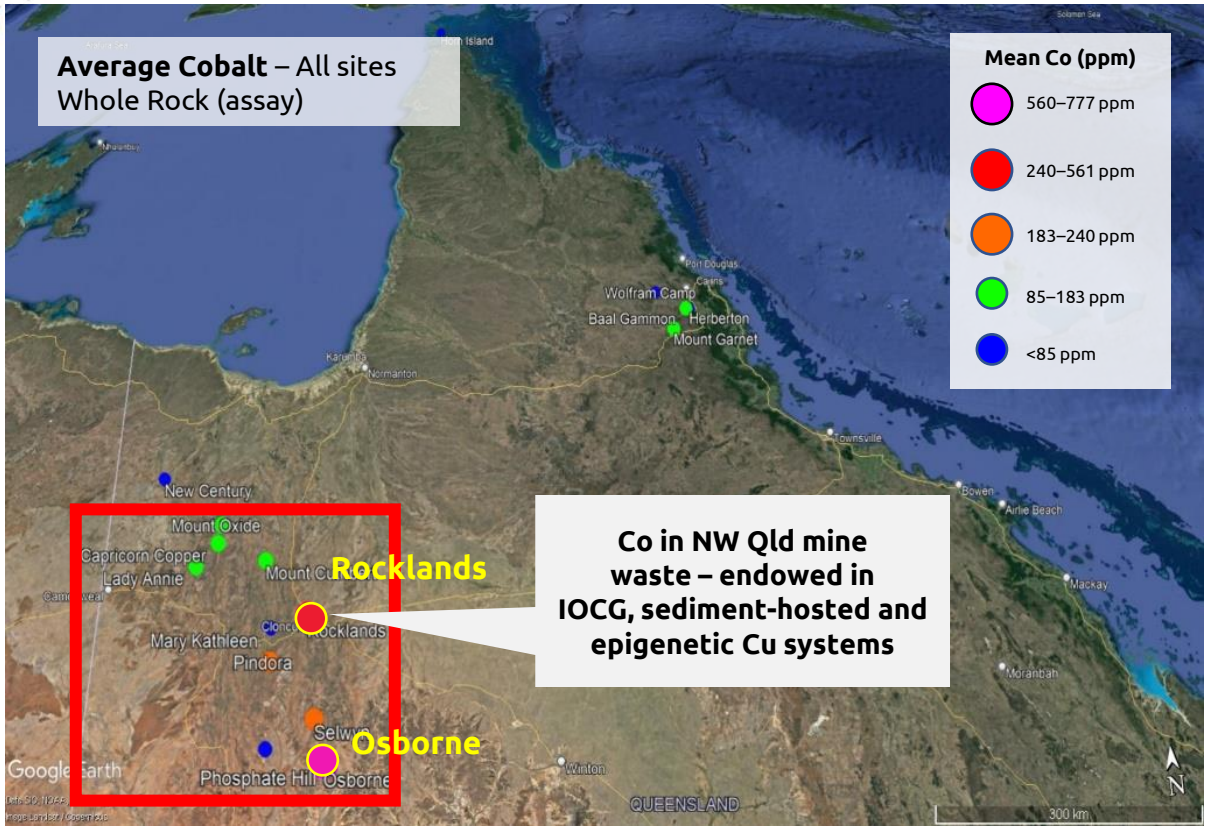
Image credit: Cheatle & Freele, (2020) The Northern Miner vol 106

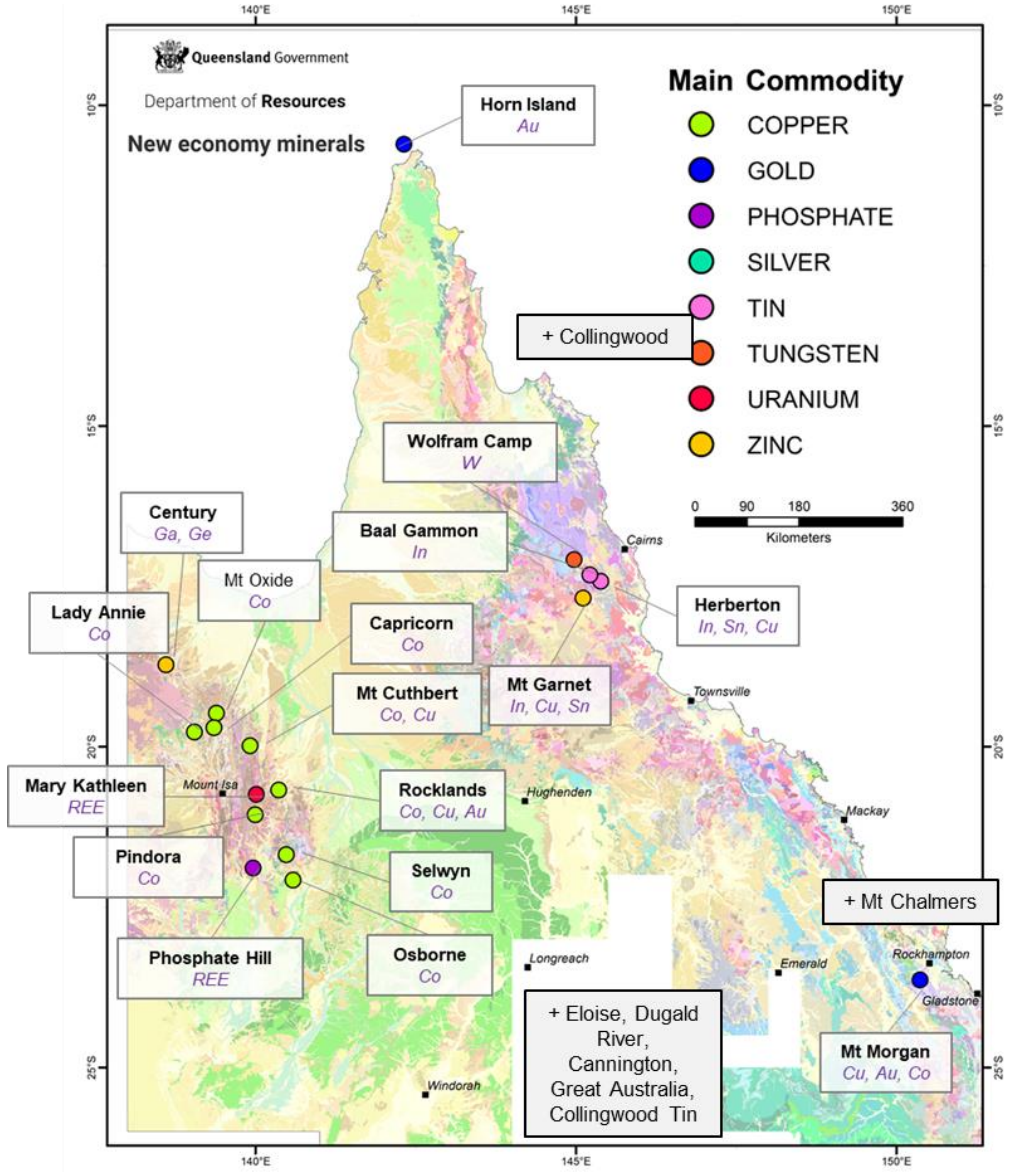
The opportunity of secondary prospectivity

Example – Mount Isa copper mine:

- Reported spot grades up to 9% Cobalt
- No cobalt production since 1990's
- Approx 22km^2 tailings




Average Cobalt – All sites
Whole Rock (assay)
Mean Co (ppm)
560–777 ppm
240–561 ppm
183–240 ppm
85–183 ppm
<85 ppm
Wolfram Camp
Baal Gammon
Herberton
Mount Garnet
New Century
Mount Oxide
Capricorn Copper
Lady Annie
Rocklands
Mary Kathleen
Pindora
Osborne
Phosphate Hill
Mount Isa
Townsville
Bowen
Airlie Beach
Mackay
Winton
QUEENSLAND
Co in NW Qld mine waste – endowed in IOCG, sediment-hosted and epigenetic Cu systems


Queensland Government
Department of Resources
New economy minerals
Main Commodity
COPPER
GOLD
PHOSPHATE
SILVER
TIN
TUNGSTEN
URANIUM
ZINC
Horn Island
Au
+ Collingwood
Wolfram Camp
W
Century
Ga, Ge
Baal Gammon
In
Mt Oxide
Co
Lady Annie
Co
Capricorn
Co
Herberton
In, Sn, Cu
Mt Cuthbert
Co, Cu
Mt Garnet
In, Cu, Sn
Mary Kathleen
REE
Rocklands
Co, Cu, Au
Pindora
Co
Selwyn
Co
+ Mt Chalmers
Phosphate Hill
REE
Osborne
Co
+ Eloise, Dugald River, Cannington, Great Australia, Collingwood Tin
Mt Morgan
Cu, Au, Co
Cairns
Townsville
Mackay
Mount Isa
Hughenden
Longreach
Emerald
Rockhampton
Gladstone
Windorah
0 90 180 360
Kilometers

CobaltBlue

Ethical and reliable cobalt for a more sustainable world

Our aim: clean, responsible cobalt supply

The integrated Broken Hill Cobalt Project offers responsibly sourced cobalt

Targeted project life +20 years:

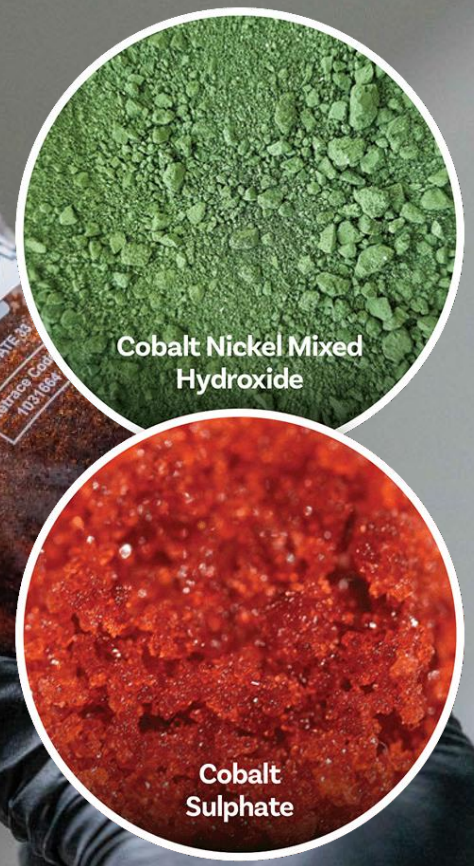
- Mineral Resource of 118Mt* for 81,400t cobalt.

Primary cobalt:

- 3,500 tpa of cobalt (as MHP or Cobalt Sulphate).
- 300,000 tpa of Elemental Sulphur.

Patented minerals processing tech for treating pyrite feedstocks:

- 90–95% recovery of cobalt from ore to product.



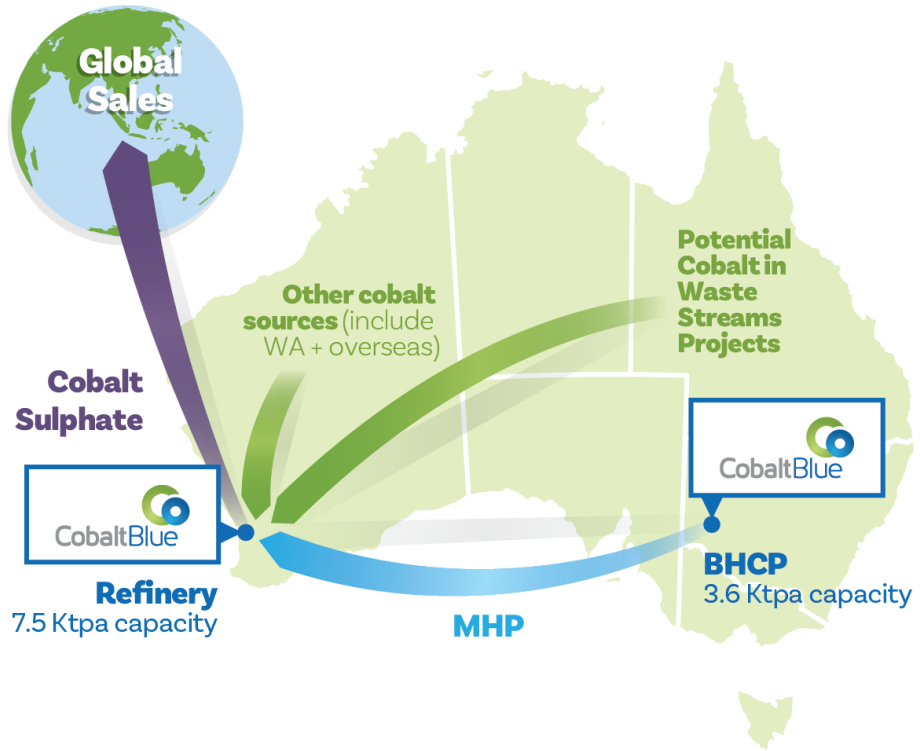
Source: Cobalt Blue Holdings Limited

** See Compliance Statement at end of presentation*

Our Aim: One of world's largest cobalt suppliers

Cobalt Blue will produce battery-grade cobalt sulphate via an integrated mine (Broken Hill) and refinery (Kwinana). COB can also process other sources of cobalt from Australia or overseas.

COB will become one of the largest producers of battery-grade cobalt in the world.



Global mined cobalt operations (ex-DRC), 2026 (Kt Co)

Weda Bay (Indo)	8.7
Nornickel (Russia)	6.0
Coral Bay (Philippines)	6.0
Morowali (Indo)	5.2
Ambatovy (Madagascar)	5.0
Obi Island (Indo)	4.2
Cobalt Blue	**3.6**
Murrin Murrin (Australia)	3.6
Moa Bay (Cuba)	3.5
Ramu (PNG)	3.1
Voisey's Bay (Canada)	3.0
Ravensthorpe (Australia)	2.0
Nickel West (Australia)	1.5
Jervois (USA)	1.5

Global battery-grade cobalt sulphate capacity, 2026 (Kt Co)

China (Various)	110
Australia (Cobalt Blue)	**7.5**
Finland (Umicore, Jervois)	5
Canada (Electra)	4
Belgium (Umicore)	1

Source: Cobalt Blue Holdings Limited

Cobalt Blue: Waste Streams Project

Project Aim

- To generate opportunities for re-mining of key battery metals from mine waste
- To work with existing operations to develop synergies for secondary metal extraction
- Turning ‘trash’ into ‘treasure’

Waste Streams Project

March 2021

- Desktop reviews, focus on Northwest Minerals Province

December 2021

- Execution of MOU with Queensland Dept of Resources to collaborate on the Secondary Prospectivity project
  - Examining the prospectivity of mine waste for critical minerals
  - Identify opportunities for further development

GSQ-UQ secondary prospectivity project

Stream 1

FIRST PASS INVESTIGATION OF MINE WASTE

Initial characterisation of up to 24 mine sites targeting mine waste from a range of commodities including cobalt.

Stream 2

DETAILED SITE INVESTIGATIONS

Fertile sites representative of different deposit styles selected for detailed analysis considering the relationship between geology, mineralisation and critical metal fertility.

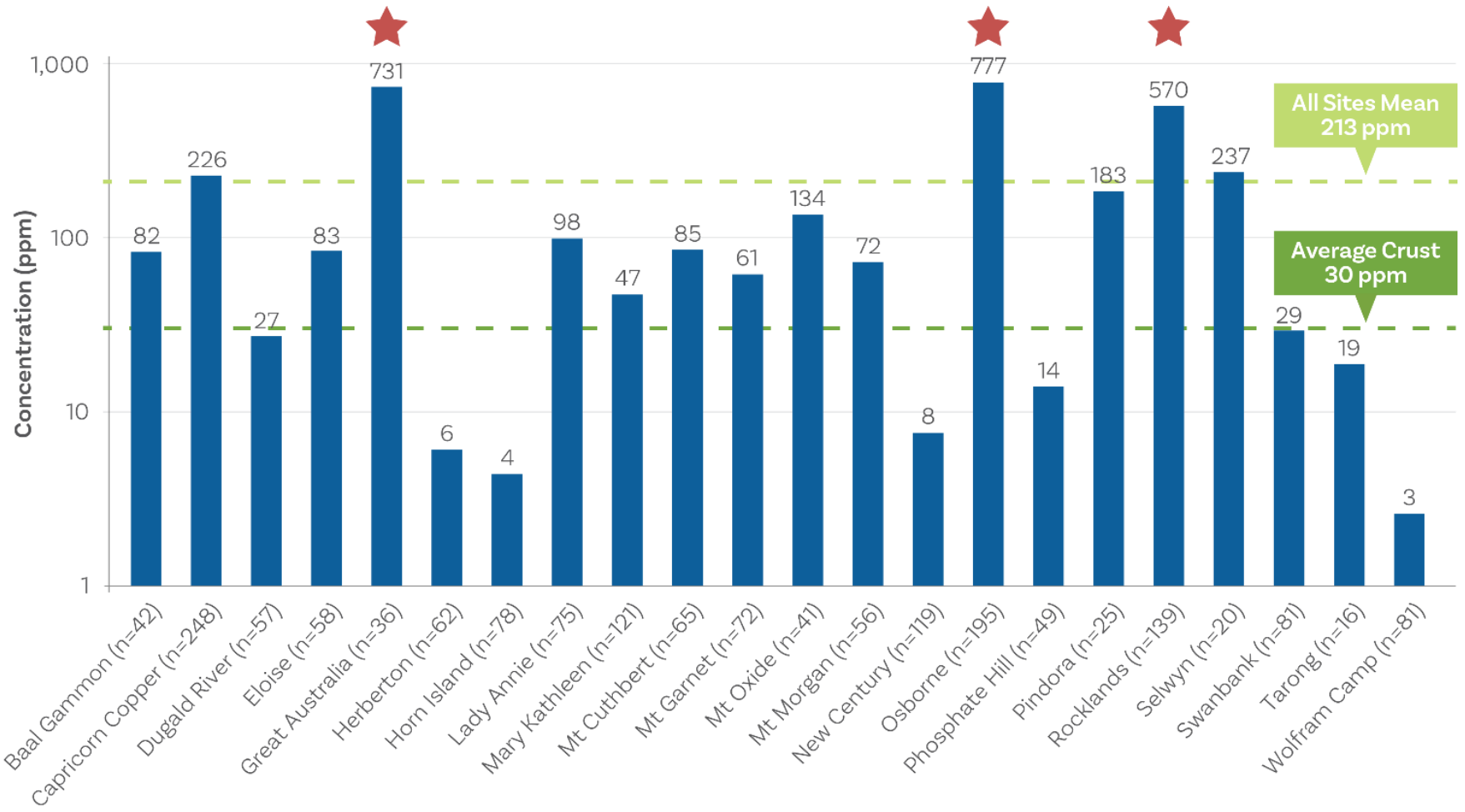
Stream 3

BESPOKE MINERAL PROCESSING METHODOLOGIES

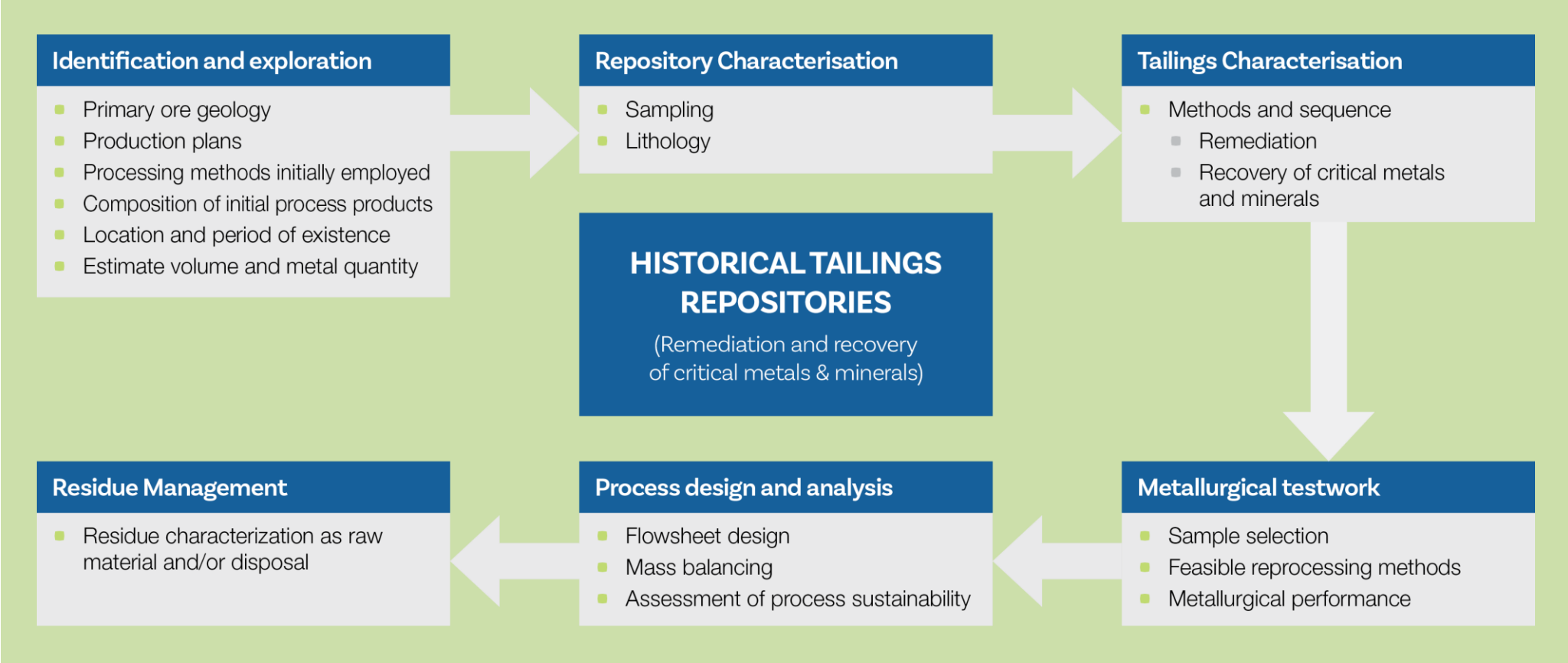
Evaluation of processing methodologies offering the greatest potentially economic recovery of critical minerals from mine waste materials.

Queensland Government ⇄ CobaltBlue ⇄ The University Of Queensland AUSTRALIA

Cobalt assays in Qld mine waste



Realising the Opportunity



Source: Systematic characterization of historical tailings for possible remediation and recovery of critical metals and minerals (Mulenshi et al 2021)

Companies already doing this….

Already there…

- **New Century** – Century and Mt Lyell (Zn)
- **EQ Resources** – Mt Carbine (W)
- **Heritage Minerals** – Mt Morgan (Cu-Au)
- **NQ Minerals** – Hellyer (Pb, Zn, Ag)
- **BIM Metals/Carnaby Resources** – Tick Hill (Au)
- **South 32** – Gemco (Mn)
- **Rio Tinto** – Sorel-Tracy, Canada (Sc)
- **Regeneration Enterprises** - various

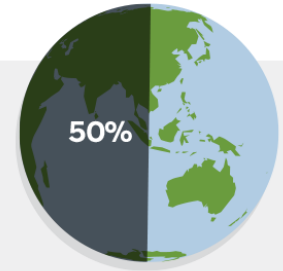
Building an allied supply chain

US Inflation Reduction Act

EU Critical Raw Materials Act

Global Share of Critical Mineral Processing

	IRA Compliant	Major Allies
Nickel	8%	14%
Cobalt	6%	15%



Allied countries +50% of global EV sales by 2030

OPPORTUNITIES

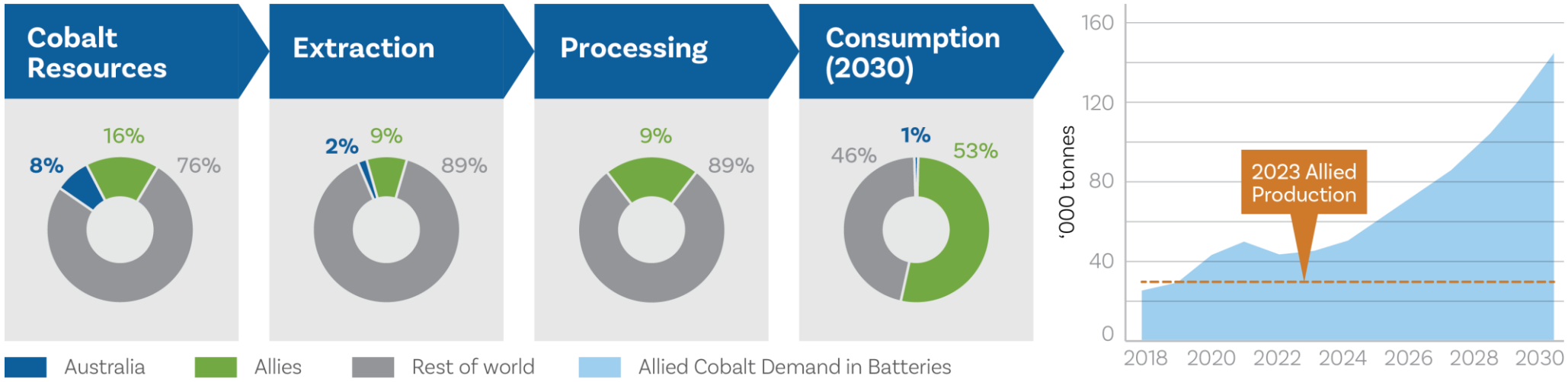
Australia is the only Allied country that produces all four cathode elements (lithium, nickel, cobalt & manganese)

CobaltBlue

Cobalt Blue to become one of the largest Allied suppliers of cobalt sulphate

Source: Cobalt Blue Holdings Limited

Building an allied supply chain



- Australia is the only country globally that mines all four of the cathode elements (lithium, nickel, cobalt and manganese).
- Overcoming the real chokepoint in critical minerals supply chain, **Processing**, cannot be addressed until the US/EU incentivize responsible and sustainable **Extraction**.
- Cobalt Blue is targeting an integrated approach focused on **Extraction** (Broken Hill) and **Processing** (Kwinana). Large scale **Extraction** and **Processing** in Australia will support secure global supply chains.

Source: Cobalt Blue Holdings Limited

Cobalt Blue

www.cobaltblueholdings.com

ASX: COB