



(ASX:ABX)

# Business Plan

26 July 2022



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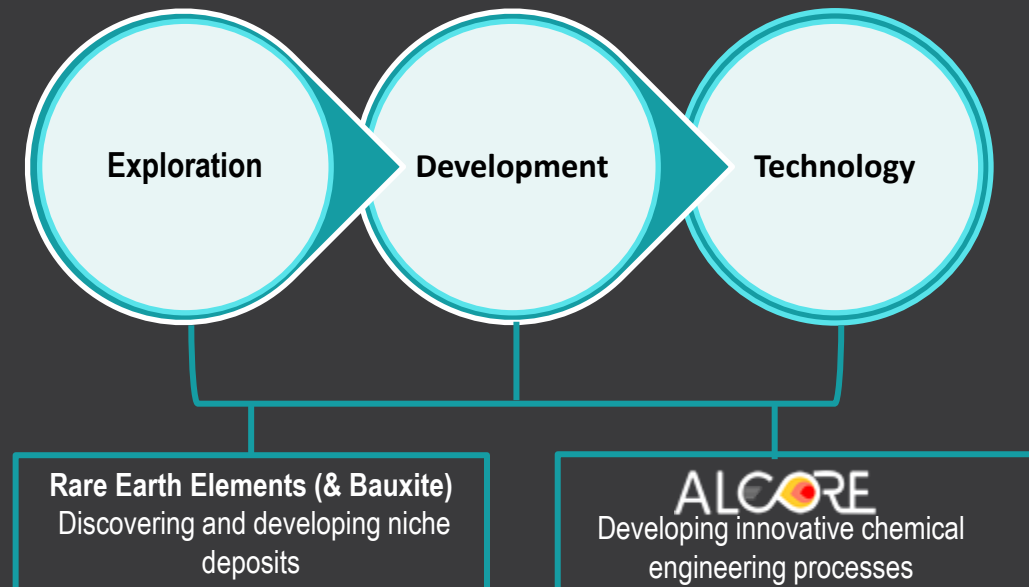
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Prices for aluminium fluoride (AlF<sub>3</sub>) were sourced from Asian Metals, China Customs and verified by comparison with prices from Bloomberg. The price actually achieved will depend upon market conditions at the time of sale.

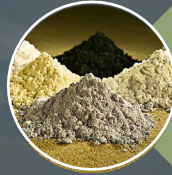
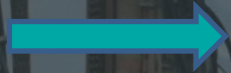
## Creating new sources and technologies for the supply of strategic minerals and chemicals:

1. Multiple discoveries of the ideal type of rare earth deposit in northern Tasmania
2. Production of aluminium fluoride, essential for aluminium smelting, from recycled waste
3. Mining and enhancing the value of bauxite resources for cement, aluminium and fertilisers.





# Segments



Rare earth discoveries in northern Tasmania



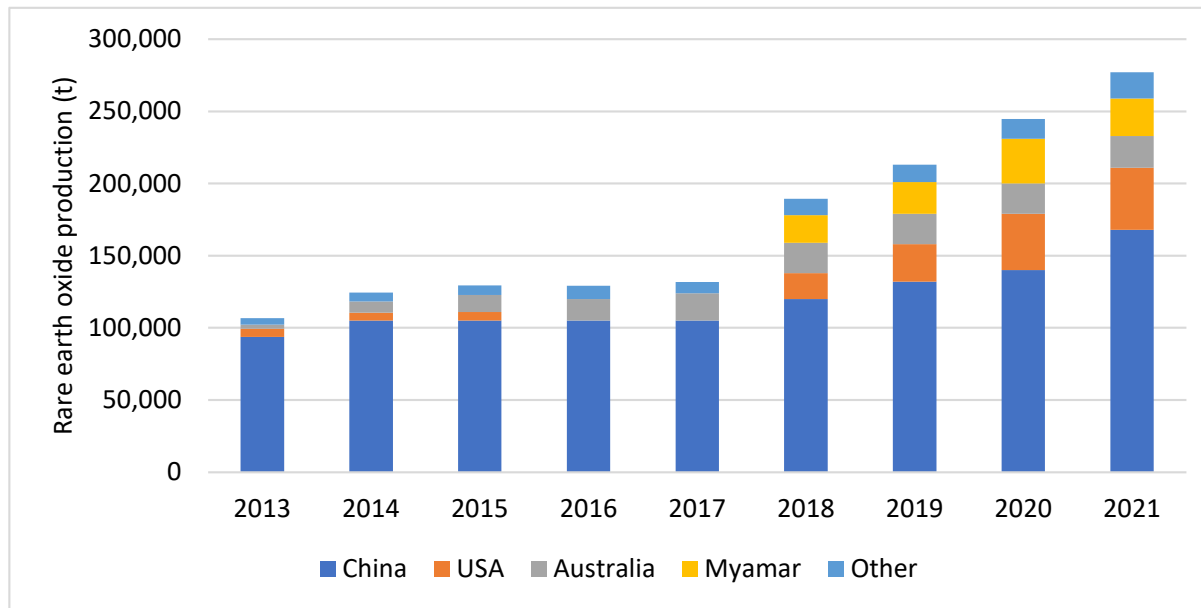
ALCORE Aluminium fluoride production technology



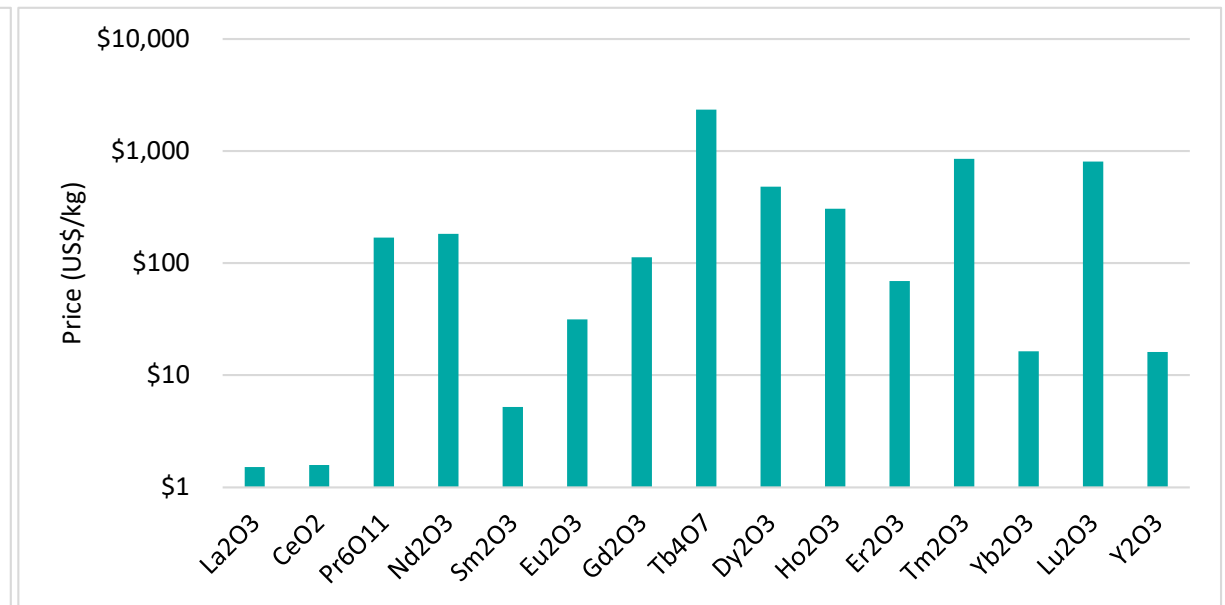
Bauxite operations in Queensland and Tasmania

# ABx's potential rare earth elements

- 15+ rare earth elements (REEs) used in wide variety of applications, with demand growing rapidly
- China dominates rare earths markets
- Prices of different rare earths vary significantly because:
  - Proportions of supply do not match proportions of demand
  - Rare earths difficult to substitute



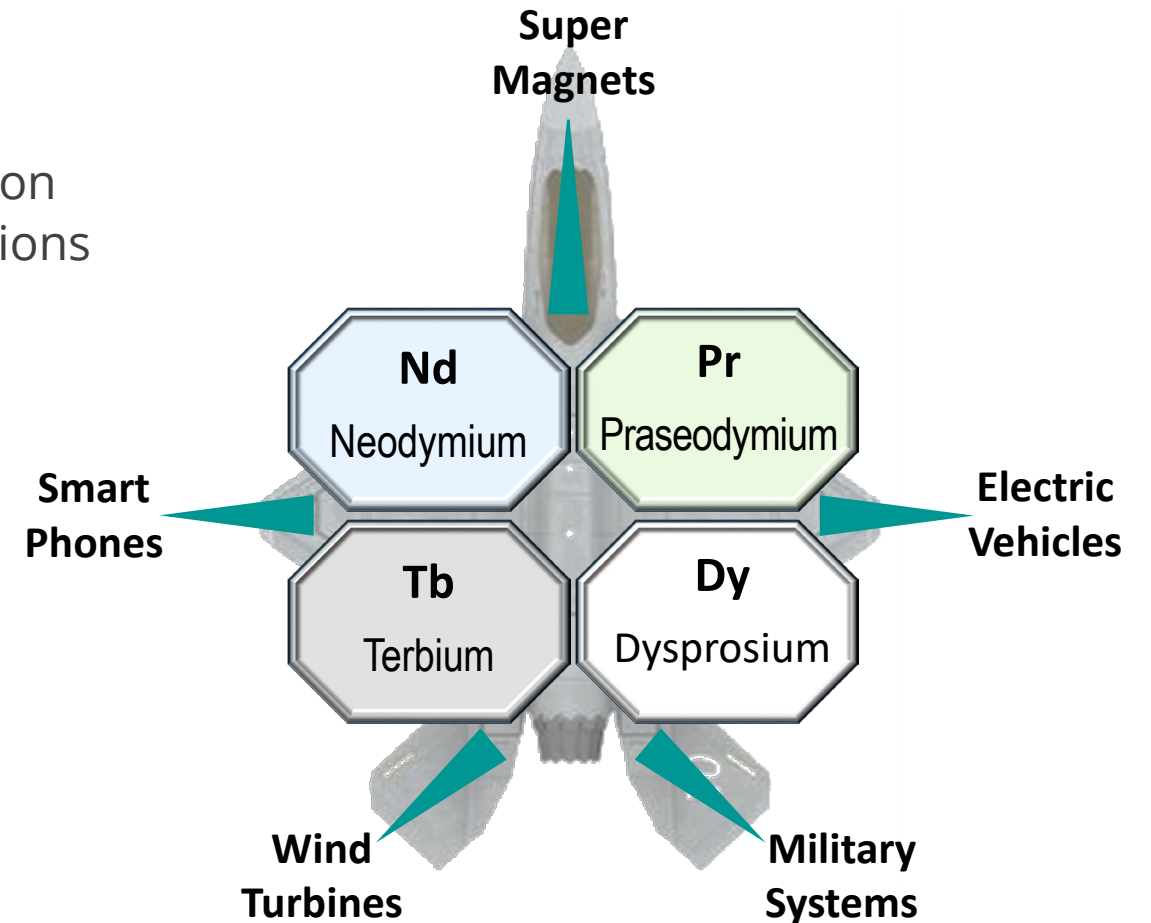
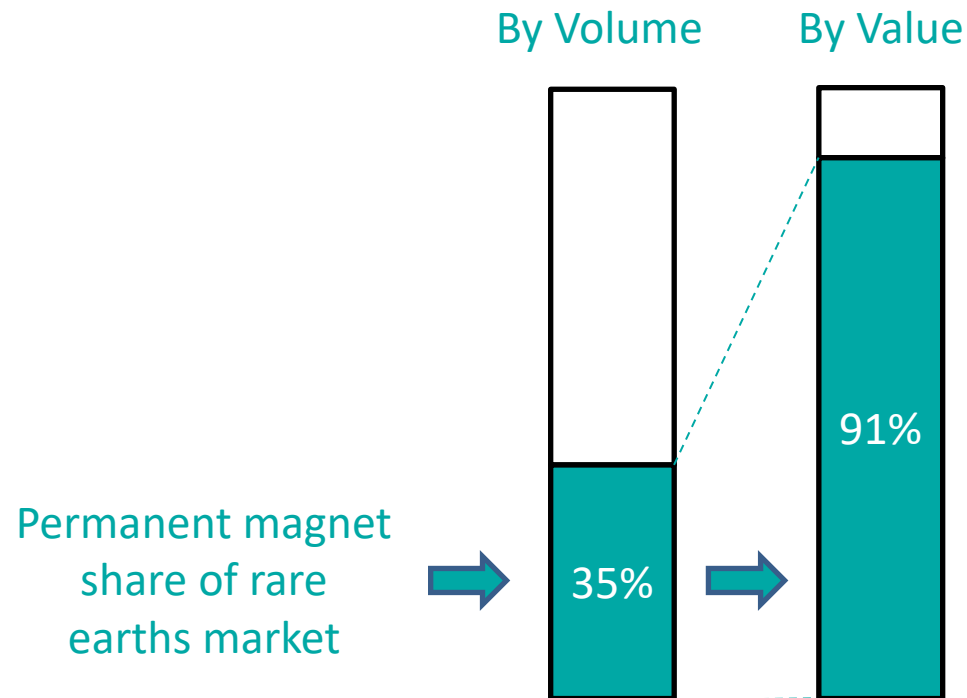
Source: USGS (excludes unregulated production in China)



Note: logarithmic scale

# Permanent magnets

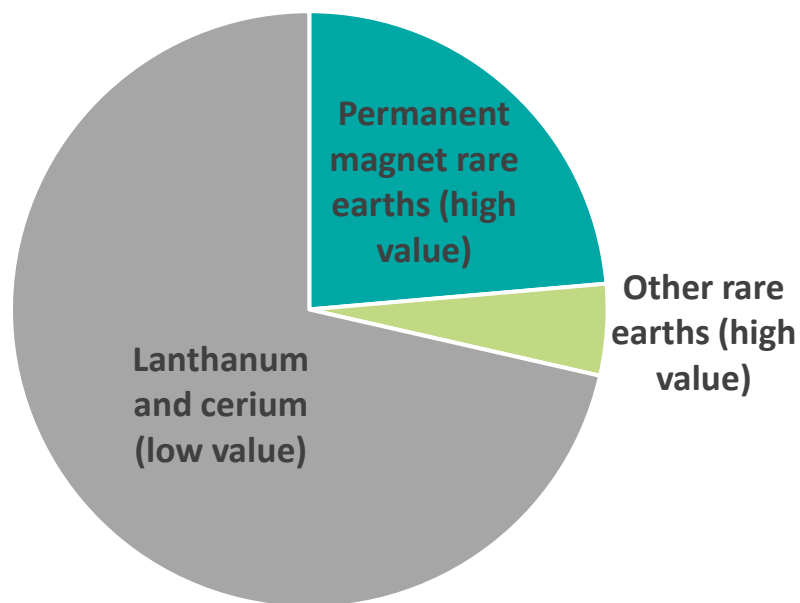
- Essential for electric vehicles and wind turbines
- Represent over 90% of value of rare earths consumption
- Forecast to grow faster than other rare earth applications



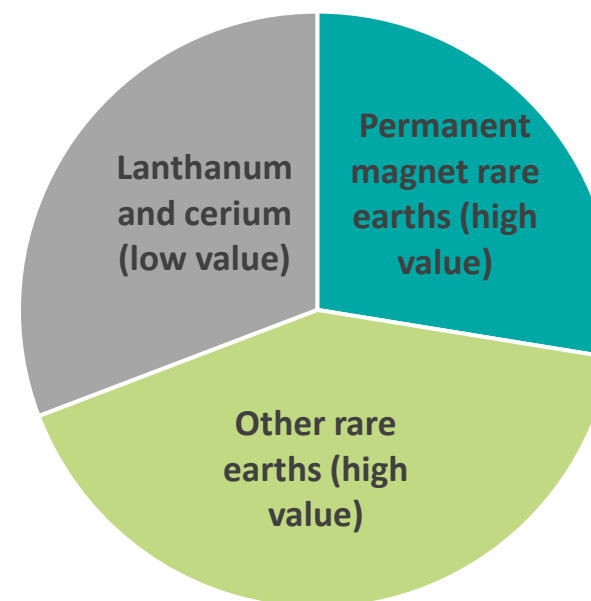
Source: Rare Earth Industry Association (<https://www.global-reia.org/about-rare-earth/>)

# Ionic absorption clay (IAC) rare earth deposits

- Currently only mined in southern China
- Contain much higher proportion of higher value rare earths, such as those required for permanent magnets (Nd, Pr, Dy, Tb)
- Less complex processing: lower costs and shorter time to production



Mount Weld (Australia)



Ionic clay (southern China)

Source: D.J. Packey and D. Kingsnorth, Resources Policy, 48(2016) 112-116.

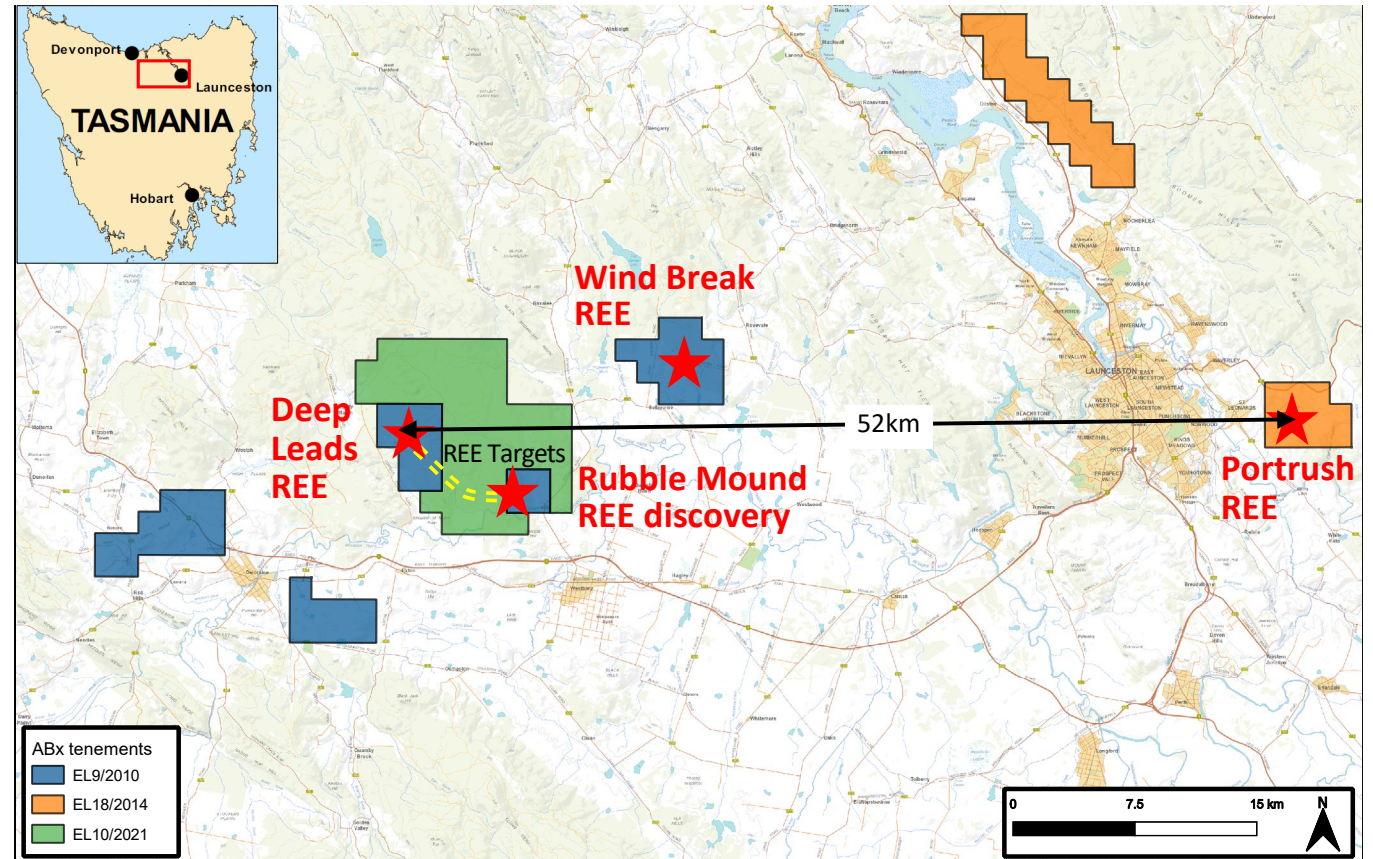


# ABx rare earth discoveries in Tasmania

- ABx is the first company to discover rare earths in Tasmania
- Four discoveries spanning 52 km<sup>1</sup>

## Attractive opportunity<sup>2,3,4</sup>

1. Grade (samples above 1,000 ppm Nd/Pr/Dy/Tb oxides)
2. Multiple channels of mineralisation
3. Recovery (samples up to 70% using ammonium sulfate at pH 4)
4. Shallow depth, typically 6-12 metres
5. Very low levels of radioactive elements (thorium and uranium)





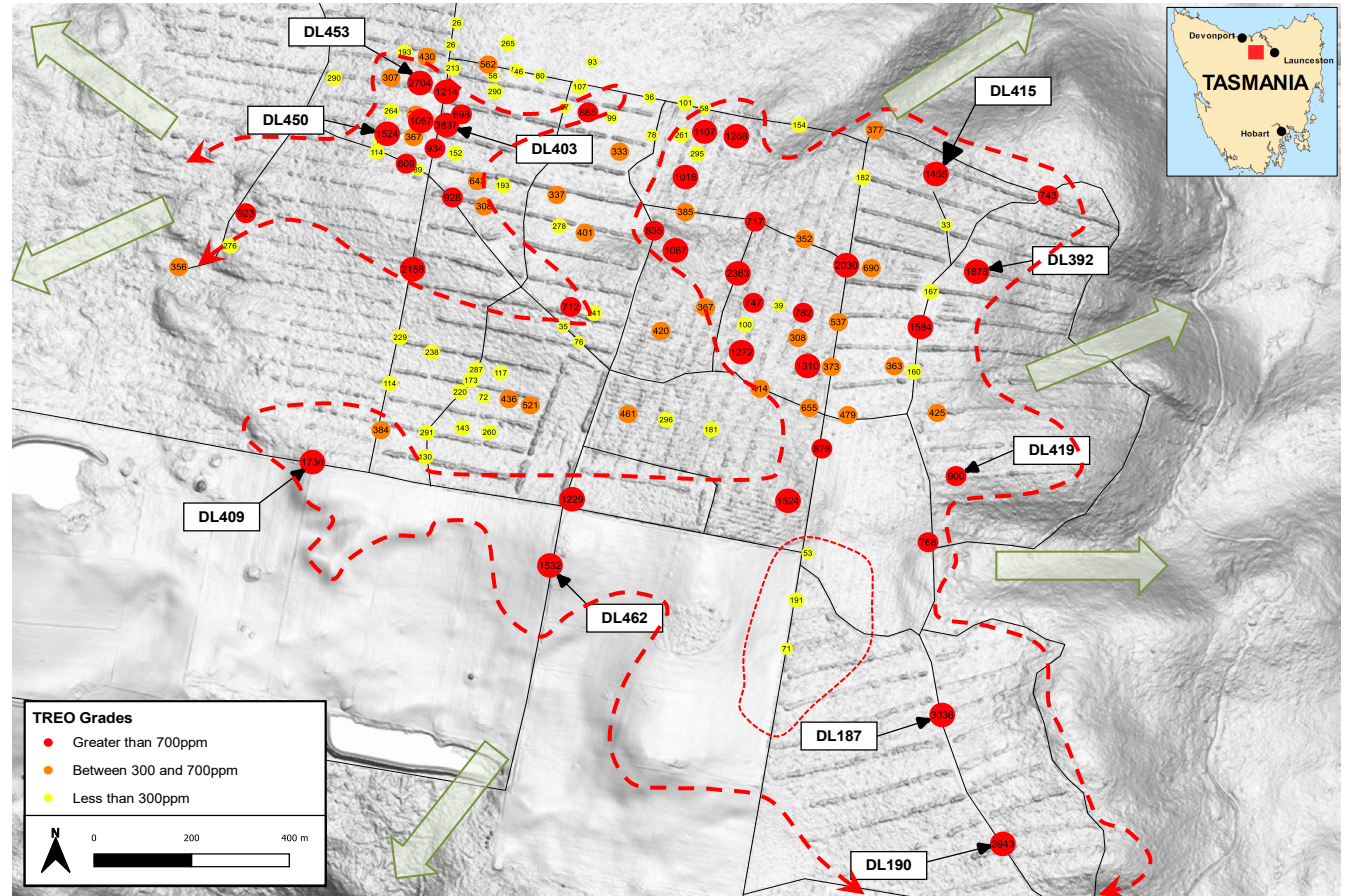
# ABx rare earths strategy

## Strategy

- Rapidly develop low-cost production of rare earth concentrates
- Operate only where welcomed

## 2022 Plan

- Further drilling campaigns in exploration licence EL10/2021<sup>1</sup>
- Further metallurgical testing to determine recovery via desorption
- Enhance ABx's exploration technology to find more rare earths
- Sample characterisation to understand clay mineralogy





# Segments



Rare earth discoveries in northern Tasmania



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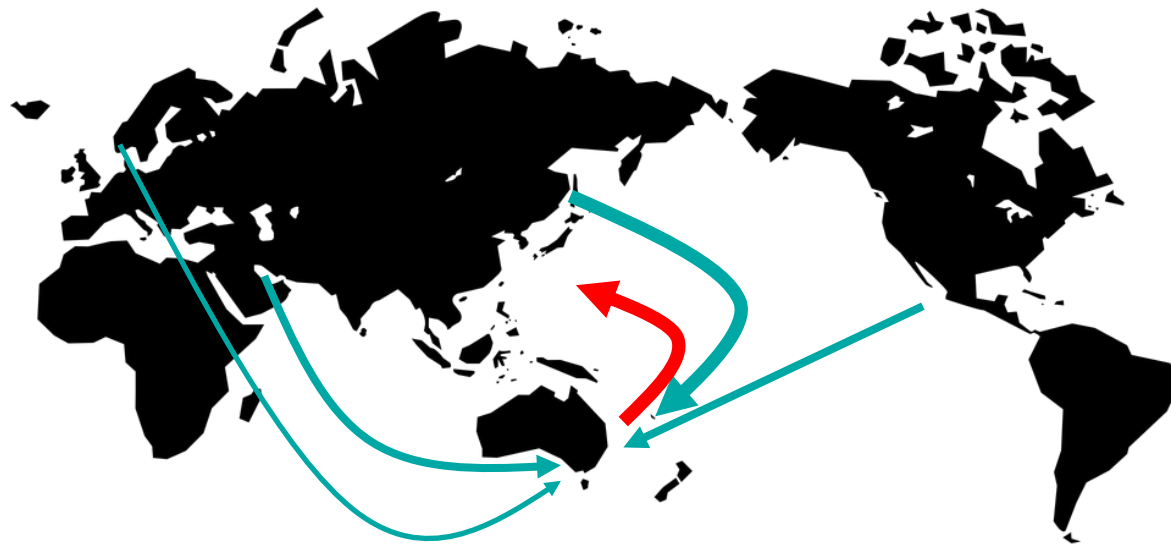
Bauxite operations in Queensland and Tasmania

# Aluminium fluoride from aluminium smelter waste

Aluminium fluoride ( $\text{AlF}_3$ ): essential for aluminium smelting

- 1.2 million tonnes produced globally per year worth US\$1.5 billion (US\$1,000-1,800 per tonne)
- 50% produced in China, mainly for Chinese smelters
- Australia imports 100% of requirements, mostly from China

- Traditionally produced from high-cost aluminium hydroxide and fluorspar
- Achievable specification – product purity risk is low
- Mature market – dozens of customers globally



→ Aluminium fluoride      → Tapped bath

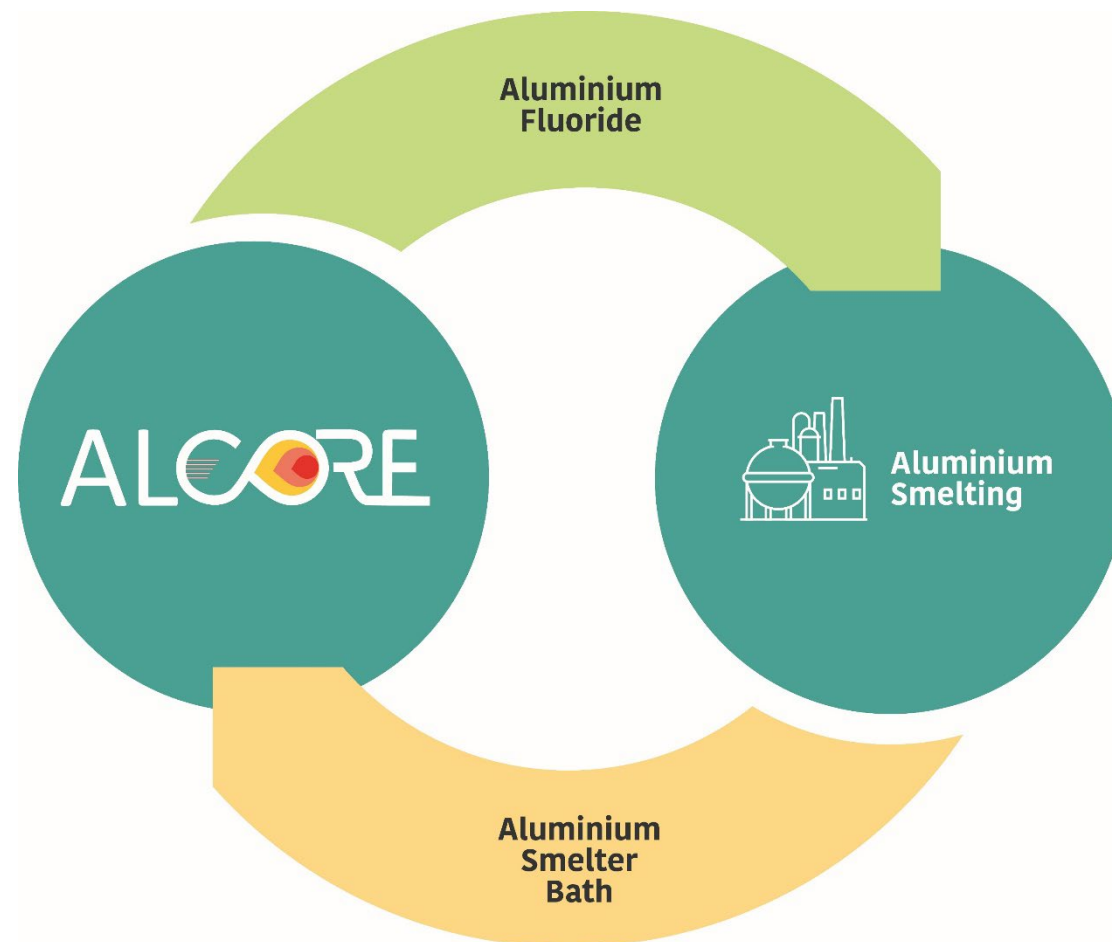
Current imports/exports



# ALCORE Process to produce aluminium fluoride

- Exemplary illustration of circular economy

- ABx's 83%-owned refining technology subsidiary
- Developing processes to produce aluminium fluoride using:
  - Fluorine from tapped bath (an aluminium smelter waste)
  - Aluminium from dross (an aluminium smelter waste) or bauxite



# ALCORE Process economics

- Based on long term aluminium fluoride prices and exchange rates, and estimated costs
- For 20,000 t/y aluminium fluoride
- Attractive margins under all scenarios

Aluminium source	Scenario	AlF <sub>3</sub> price (US\$/t)	FX rate USD:AUD	AlF <sub>3</sub> price (A\$/t)	Operating cost (A\$/t AlF <sub>3</sub> )	Operating margin (A\$/t AlF <sub>3</sub> )	EBITDA (A\$m)
Aluminium hydroxide	Baseline	\$1,220	0.75	\$1,630	\$1,250	\$1,130	\$23m
Dross	Baseline	\$1,220	0.75	\$1,630	\$1,050	\$1,330	\$27m
Aluminium hydroxide	Optimistic	\$1,400	0.70	\$2,000	\$930	\$1,880	\$38m
Dross	Optimistic	\$1,400	0.70	\$2,000	\$770	\$2,040	\$41m

# ALCORE Technical progress

- Critical processing steps have been demonstrated in laboratory
- Commenced pilot plant program



Rotary kiln for recovery  
of fluorine from  
aluminium smelter bath

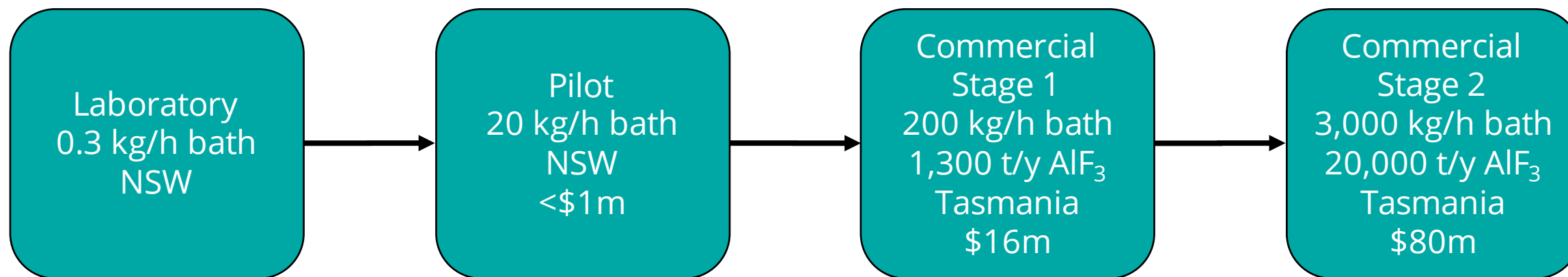
Oleum production plant





# ALCORE Process scale-up

- Rigorous scale-up to reduce technical risk
- First aluminium fluoride plant planned for Bell Bay, Tasmania, near existing hydro-powered aluminium smelter. Planned production 20,000 t/y
- High potential for plants in other major aluminium smelting regions
- Potential expansion into other markets, including fluorine chemicals



Received \$7.5m grant<sup>5</sup>

# ALCORE Progress and schedule

## PHASE 1 2018-19

### ESTABLISHMENT

Create Alcore. ✓  
Construct high technology laboratory ✓

## PHASE 2 2019-21

### PROOF OF CONCEPT

Demonstrate novel chemistry for transforming industrial waste into valuable chemicals. ✓

## PHASE 3 2021-22

### PILOTING

Establish pilot plant facility.  
Finalise commercial plant design.

## PHASE 4 2022-24

### COMMERCIAL

Construct commercial plant.  
Commence production.

## PHASE 5 2025

### GROWTH

Increase production.  
Commence exports.  
Utilise additional industrial wastes in process.



Pilot

Commercial



# Segments



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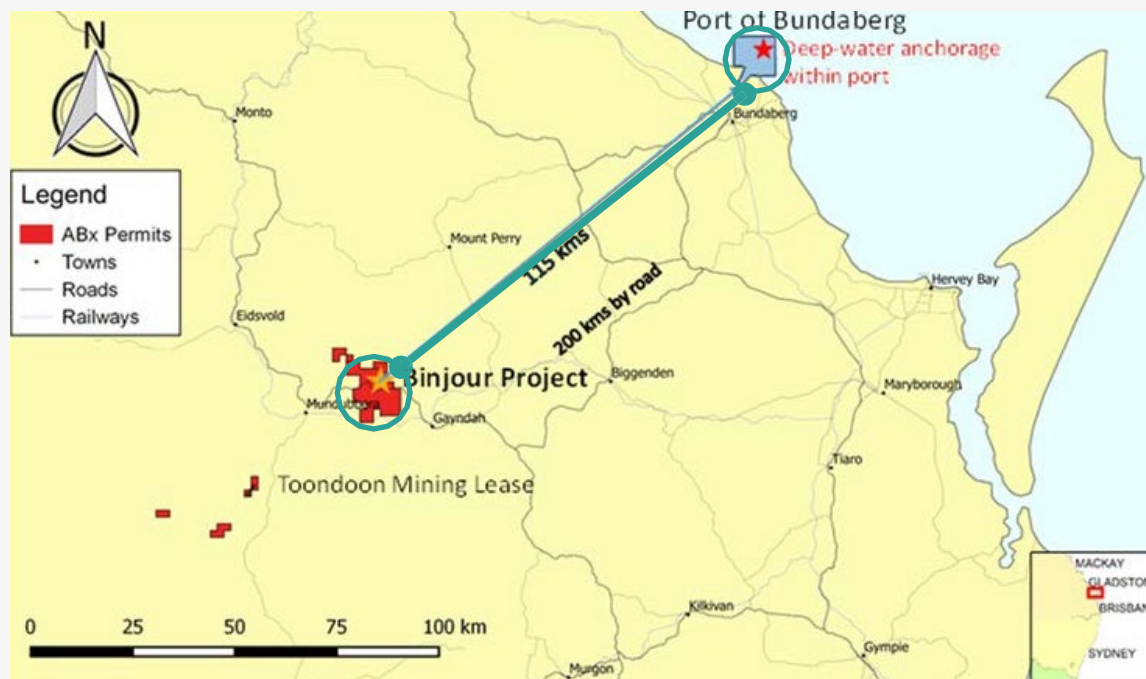
Bauxite operations in Queensland and Tasmania



# ABx bauxite operations

## Sunrise Bauxite project

Queensland



- 50:50 joint venture with Alumin Pty Ltd, an Australian special purpose vehicle company associated with our strategic marketing partner, Rawmin India<sup>6</sup>
- Mining lease application is on the large Binjour deposit, 115km west of Bundaberg Port.
- Alumin will contribute up to \$18m (for 49.9% equity), which is anticipated to fund mine and port development

# ABx bauxite operations

## Sunrise Bauxite project

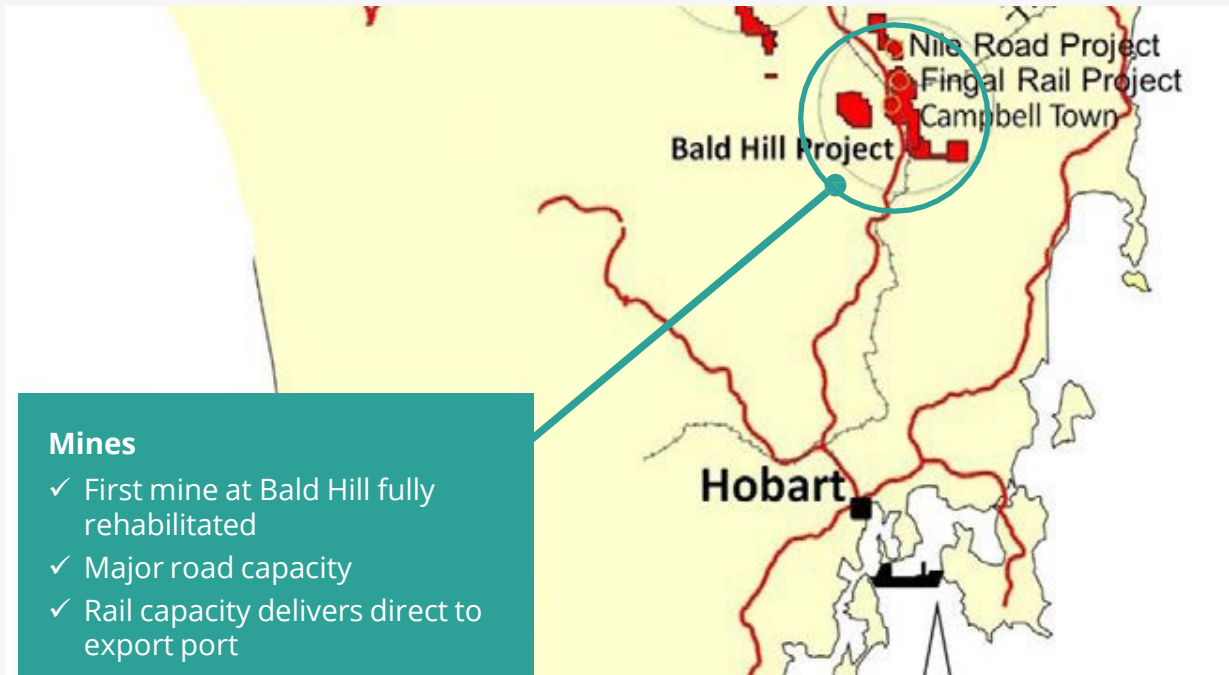
Project schedule

Project	Stage	2022			2023				2024			
		Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Binjour Mine	Approvals											
	Operations											
Bundaberg Port	Approvals											
	Operations											

Subject to change

# ABx bauxite operations

## Northern Tasmania



- Several Tasmanian bauxite deposits that can supply cement and fertiliser grade bauxite for many years.
- Bauxite production at DL130 project may accelerate development of the Deep Leads REE discovery





**ABx Group Limited**

L5 52 Phillip Street  
Sydney 2000  
Australia

Phone: +61 2 9251 7177

E: [corporate@abxgroup.com.au](mailto:corporate@abxgroup.com.au)

**Julie Young**

Marketing & Investor Relations Manager

E: [jyoung@abxgroup.com.au](mailto:jyoung@abxgroup.com.au)



# Reference Information



# References

<sup>1</sup>ASX release 16 March 2022

<sup>2</sup>ASX release 23 November 2021

<sup>3</sup>ASX release 10&14 February 2022

<sup>4</sup>ASX release 29 June 2022

<sup>5</sup>ASX release 29 April 2022

<sup>6</sup>ASX release 28 February 2022