ABx Group

(ASX:ABX)

# A uniquely positioned Australian company delivering materials for a cleaner future

**INVESTOR PRESENTATION**

23 December 2024

# Disclaimer

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Prices for aluminium fluoride ($AlF_3$) 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.

## Competent Person Statement

The information in this report that relate to Exploration Information and Mineral Resources are based on information compiled by Ian Levy who is a member of The Australasian Institute of Mining and Metallurgy and the Australian Institute of Geoscientists. Mr Levy is a qualified geologist and a director of ABx Group Limited.

Mr Levy has sufficient experience, which is relevant to the style of mineralisation and type of deposit under consideration and to the activity, which he is undertaking to qualify as a Competent Person as defined in the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. Mr Levy has consented in writing to the inclusion in this report of the Exploration Information in the form and context in which it appears.

# Company Overview


| Capital Structure | |
|---|---|
| ASX Code | ABx |
| Shares on Issue | 250.0m |
| Options on Issue | 14.9m |
| Share Price (11 Dec 2024) | $0.038 |
| Market Capitalisation (11 Dec 2024) | $9.3m |
| Cash (30 Sep 2024) | $460k[1] |

[1]Company has access to additional $3.57m as held in trust

| Board and Management | |
|---|---|
| Mark Cooksey | Managing Director |
| Joycelyn Morton | Chair |
| Ian Levy | Non-Executive Director |
| Nathan Towns | National Operations Manager |
| Geoff Atkins | Technical Advisor |

| Major Shareholders | |
|---|---|
| Peter Palan and Clare Palan | 3.8% |
| Aftron Pty Ltd | 3.0% |
| Shareholders Mutual Alliance | 2.8% |
| Justevian Pty Ltd | 2.3% |
| Yarraandoo Pty Ltd | 2.3% |
| HSBC Custody Nominees | 2.3% |
| Top 20 | 29.4% |

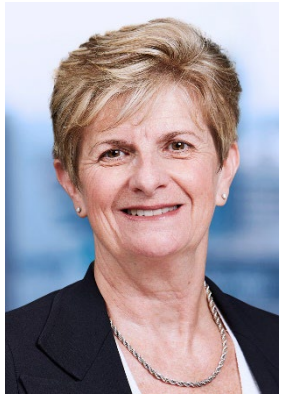
# Experienced Team

## Mark Cooksey
### Managing Director

More than 20 years with Rio Tinto and CSIRO

Significant experience in developing and commercialising new processes in minerals and metals industry

PhD in Chemical & Materials Engineering



## Joycelyn Morton
### Non-Executive Chair

Over 30 years' experience as an executive and director with Australian and international listed companies, including Argo Investments, ASC and Snowy Hydro

Chair of the Audit, Risk and Compliance Committee for multiple boards

Fellow and Life Member of CPA Australia, and former National President

## Ian Levy
### Non-Executive Director

30 years of senior management and geological experience with multiple commodities, including at WMC

Previously CEO of Allegiance Mining and Director of Gloucester Coal

Member of JORC for 11 years (4 years as Vice Chairman) and Federal President, Australian Institute of Geoscientists

## Geoff Atkins
### Technical Advisor

25 years of project and corporate development experience

Four years as Corporate Planning Manager at Lynas Corporation, where he oversaw the development of and implementation of the strategic planning process and the development of the Mt Weld Concentration Plant and Lynas Advance Materials Plant in Malaysia

ABx Group

# Delivering materials for a cleaner future

**Rare earths**: Supplying light and heavy rare earths from Tasmania into Western supply chains

**Fluorine waste recycling**: Producing industrial chemicals from aluminium smelter waste


**Bauxite**: Mining & enhancing bauxite resources for the cement, aluminium & fertiliser industries

# Investment Proposition

Highest proportion of Dy+Tb of any clay-hosted resource in Australia

Simple processing without drill and blast mining, or use of acids

**Team**
Experienced and capable ☑

**Mineralogy and REE Distribution**
No acid required for processing
Balance of light and heavy REE ☑

**Jurisdiction**
Commercial forest plantation in Australia ☑

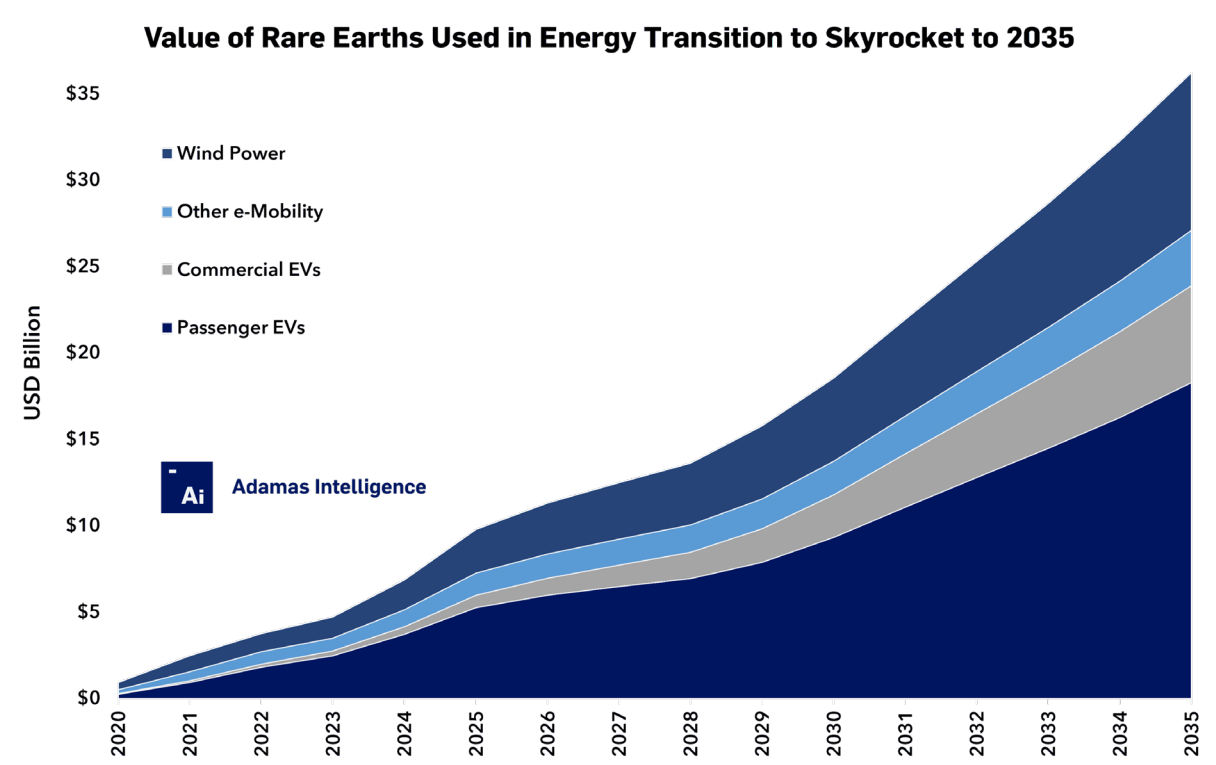
**Supply Shortage**
Massive demand growth for rare earths ☑

**Pathway to Production**
Bauxite mining is enabler ☑

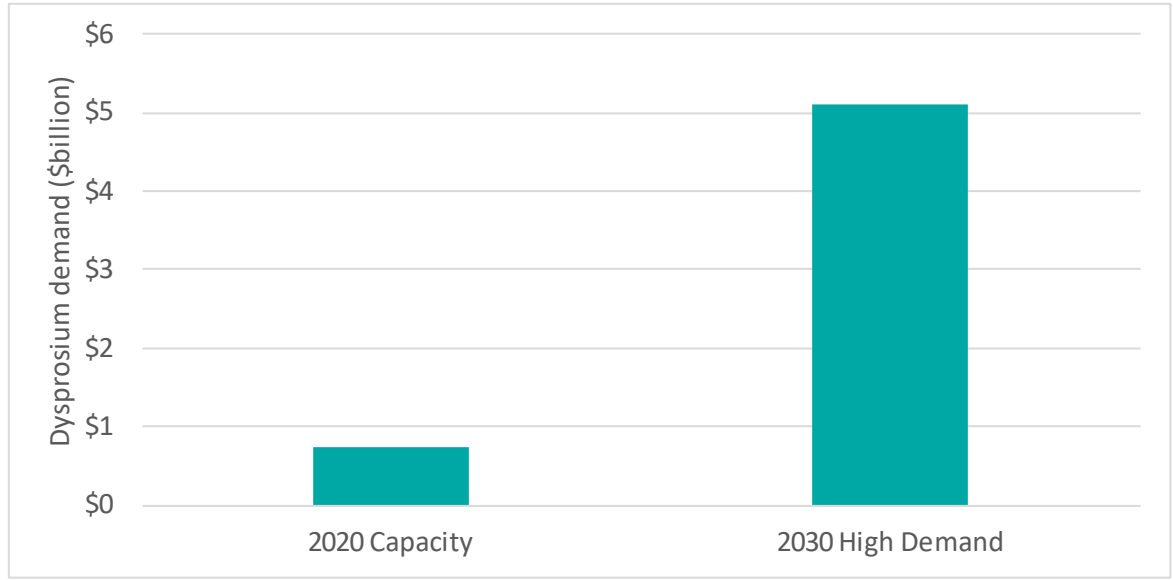
**Infrastructure**
Less than 50 km to industrial centre and enabling infrastructure ☑

# Massive demand growth for rare earths

Electric motors require permanent magnets containing rare earths




Source: Adamas Intelligence




Sources: US DoE, Critical Minerals Assessment, 2023; Ginger International Trade & Investment

- Demand for NdFeB magnets forecast to increase at a CAGR of 8.7% for 2024 to 2040
- Of the rare earths, dysprosium has the most acute supply risk

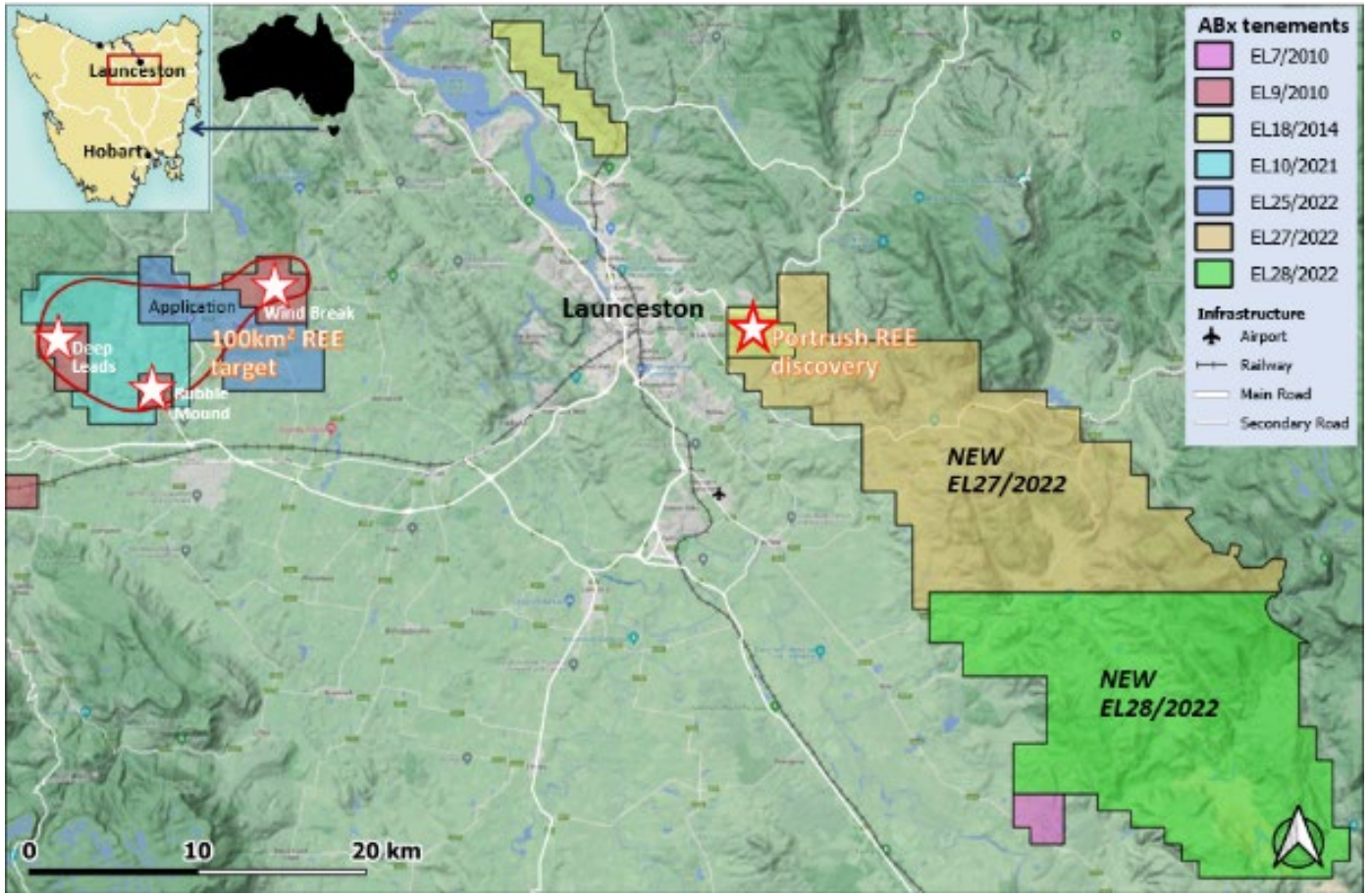
# ABx Deep Leads Rare Earth Project

- Upgrade to 89 Mt announced May 2024[1]
- Over 10-fold increase in 12 months

| Size | Cut-off (ppm TREO-$CeO_2$) | Mean TREO (ppm) | Mean TREO-$CeO_2$ (ppm) | DyTb[3] (%TREO) |
|---|---|---|---|---|
| 89 Mt[2] | 350 | 844 | 652 | 4.3% |

| Holes drilled | Metres drilled (m) | Metres assayed (m) | From (m) | To (m) |
|---|---|---|---|---|
| 1,077 | 9,742 | 3,843 | 4.2 | 12.0 |

Resource based on only 29% of identified mineralised outline[1]



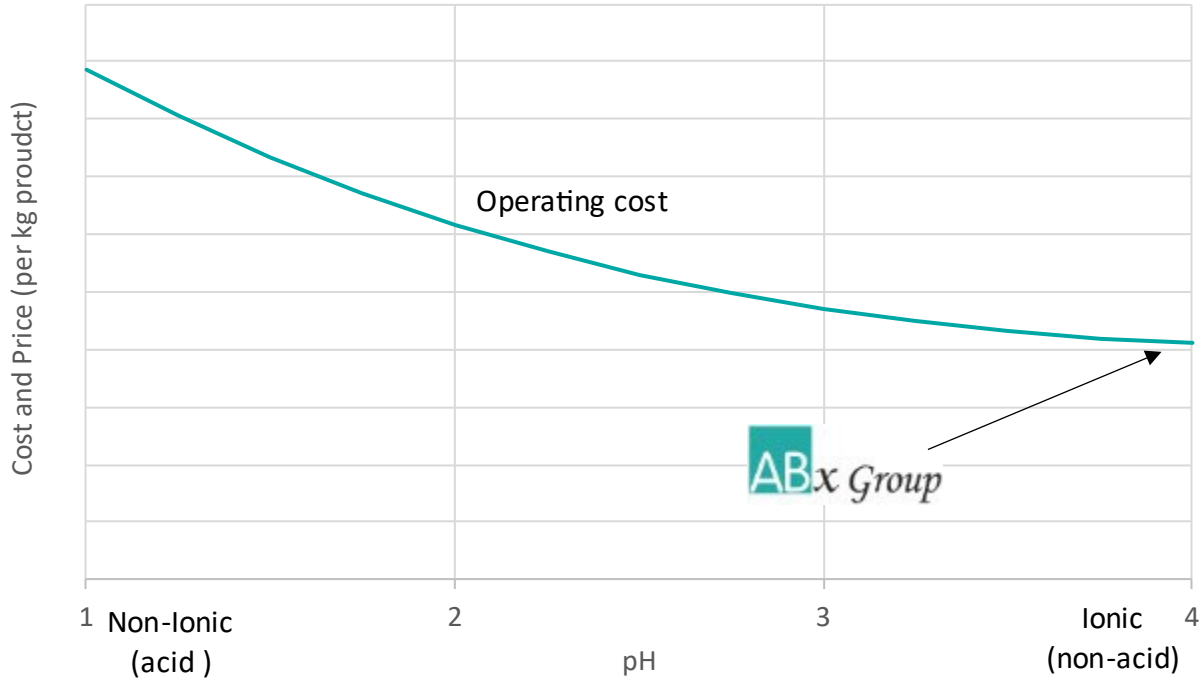

[1]ABX ASX Announcement, 2 May 2024
[2]41 Mt inferred, 42 Mt indicated and 6 Mt measured
[3]DyTb = $Dy_2O_3$ + $Tb_4O_7$

# Deep Leads mineralogy is amenable to low cost processing

**Deep Leads is one of the few ionic adsorption clay resources**

- Rare earths can be extracted from an ionic adsorption clay ore in less than 30 minutes at pH 4 or above. They do not require acid
- Avoidance of acid significantly reduces impurities and hence operating cost
- Most clay-hosted deposits are not ionic

| Company | Project | Country | Proposed Leaching |
|---|---|---|---|
| ABx | Deep Leads | Australia | AMSUL, pH 4 |
| Australian Rare Earths | Koppamuura | Australia | MGSUL, pH 1-2.2 |
| OD6 | Splinter Rock | Australia | HCl, 25 g/L |
| Meteoric Resources | Caldeira | Brazil | AMSUL, pH 4 |
| Ionic Rare Earths | Makuutu | Uganda | AMSUl, pH 2 |




Illustrative cost curve for clay-hosted rare earth resources

Sources: See Appendix 1

# Deep Leads has ideal balance of light and heavy rare earths

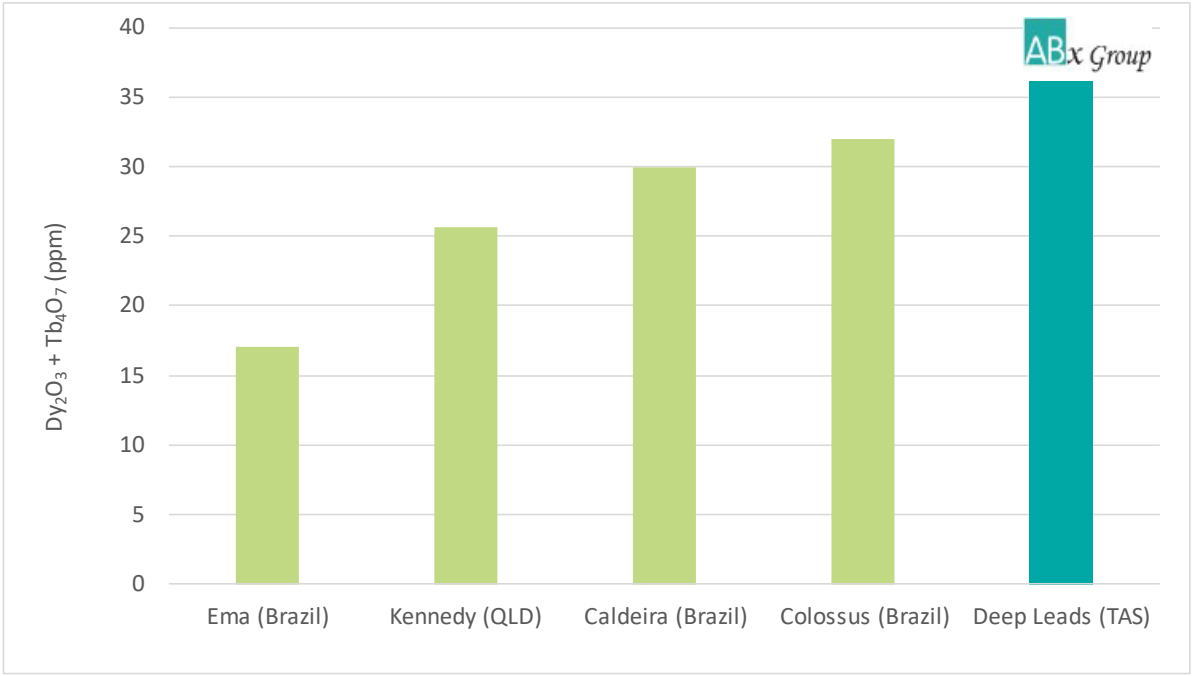
- ABx rare earth product will be attractive to separation plants
- ABx will be resilient to any variation in demand for light and heavy rare earths

| Company | Project | Country | %NdPr | %DyTb |
|---|---|---|---|---|
| ABx | Deep Leads | Australia | 21.8% | 4.3% |
| Lynas | Mt Weld | Australia | 23.3% | 0.4% |
| MP Materials | Mountain Pass | USA | 16.4% | - |
| Northern Minerals | Browns Range | Australia | - | 9.6% |
| Arafura | Nolans Bore | Australia | 26.4% | 0.4% |
| Meteoric Resources | Caldeira | Brazil | 22.9% | 1.1% |

Sources: See Appendix 2

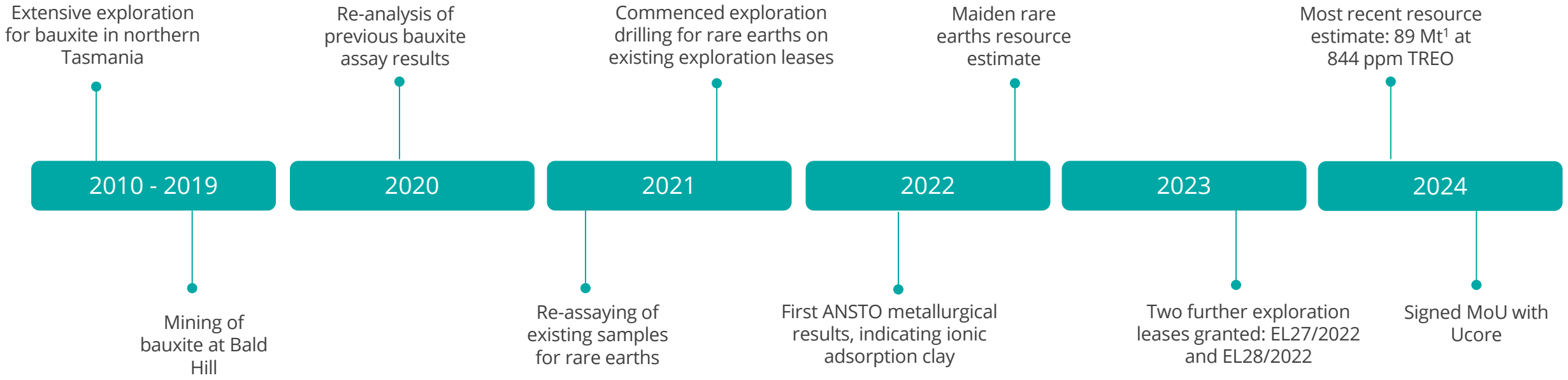
| Rare earth | Type | Feature |
|---|---|---|
| Nd and Pr | Light rare earth | Provide magnetic strength |
| Dy and Tb | Heavy rare earth | Retain magnetic properties at high temperatures |

- ABx has among the highest Dy and Tb grades of any ionic adsorption clay deposit




Sources: See Appendix 3

# Pathway to Production: Rapid project advancement




[1]41 Mt inferred, 42 Mt indicated and 6 Mt measured

# Pathway to Production: Vision for rare earths business

## Project Development

Demonstrate project feasibility

## Production

Construct mine and plant to produce mixed rare earth carbonate

## Expansion

Identify additional ionic adsorption clay rare earth resources

## Value-adding

Construct plant to produce separated rare earth oxides

## Deep Leads Project Enabler: Bauxite Mining

Pre-strip bauxite mining to supply cement and fertiliser plants
Project will expose rare earths and provide funding for rare earths development

# Pathway to Production: Bauxite operations

- ABx mined bauxite northern Tasmania from 2014 to 2020, and sold the product to cement and fertiliser plants. Customer demand is ongoing[1]
- Similar bauxite resource overlays Deep Leads rare earth resource
- Bauxite mining operations will expose rare earth mineralisation and enable rare earths project to be fast tracked
- Bauxite sales will provide cashflow for funding rare earths development
- Bauxite mining licence application submitted. Operations expected to commence in Q1 2025

ABx bauxite mining at Bald Hill Project near Campbell Town, Tasmania in 2020

[1]ABx ASX Announcement, 11 September 2023

# Pathway to Production: Strategic and offtake partnerships

## Offtake Interest

- Executed MOU for offtake and potential investment with Ucore, who is undertaking technology transfer from demonstration scale to commercial scale rare earth oxide separation in North America

## Strategic Investor Interest

- Engaging with deep-pocketed long-term investors with strategic interest in rare earths supply chain

## Government Support

- Engaged with the Australian and Tasmanian governments' critical minerals strategies – potential for the company to receive financial support

Australian Government
Department of Industry, Science and Resources

Tasmanian Government

ABx Group | ucore®

Joint Announcement 4 September 2024

**ABx Group and Ucore Rare Metals Sign MoU for Australia-USA Rare Earths Supply Chain**

**Key Objectives:**

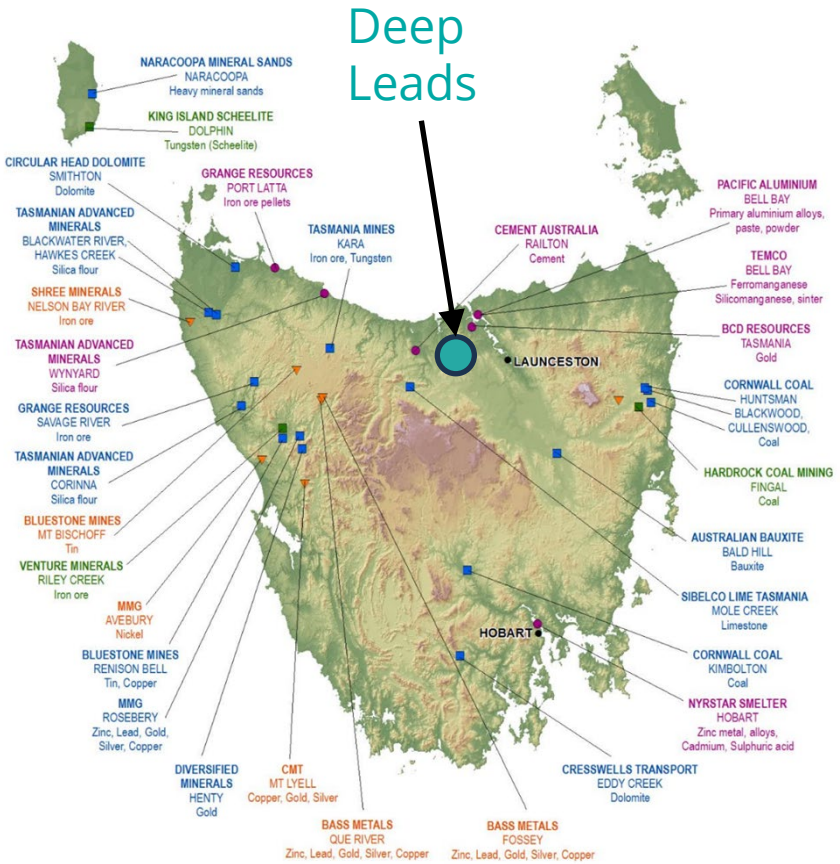
- **Work to establish a binding offtake agreement for the supply of mixed rare earth carbonates from Australia to the USA through enhanced collaboration**
- **Establish an investment pathway for Ucore into ABx**
- **Bolster relationships between the United States and Australia as both countries strive to enhance critical minerals and clean energy projects**

**South Melbourne, Victoria and Halifax, Nova Scotia – (September 4, 2024)** – ABx Group (ASX: ABX) ("**ABx**") and Ucore Rare Metals Inc. (TSXV: UCU) (OTCQX: URAF) ("**Ucore**") are pleased to announce the September 3, 2024, execution of a Memorandum of Understanding ("**MOU**") that describes the collaborative pathway ABx and Ucore will embark on to advance to:


Ucore Rapid$^{SX}$ demonstration plant in Kingston, Canada

# Deep Leads is in outstanding jurisdiction and location

## Commercial plantation forest area in Tasmania, Australia

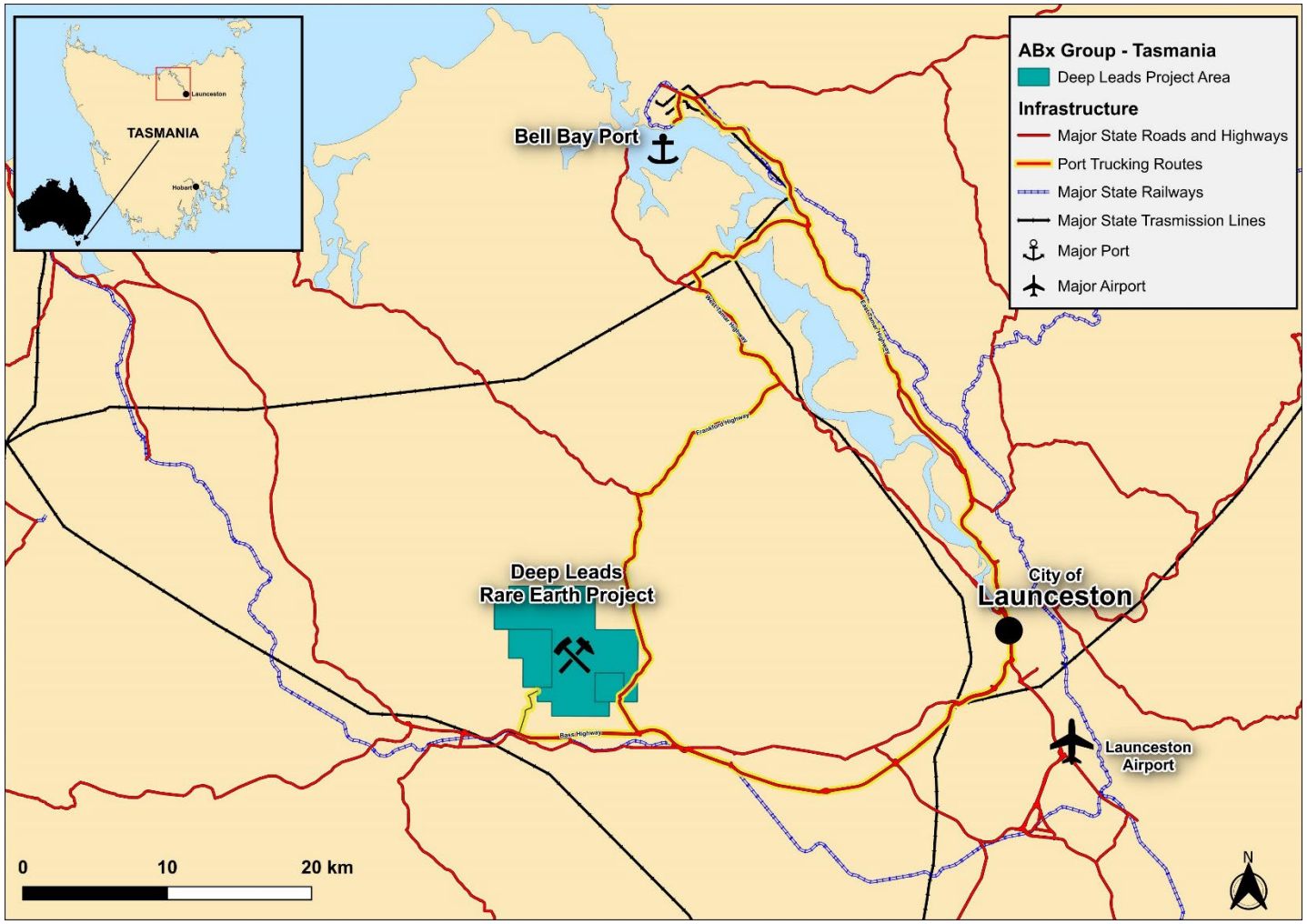



- Deep Leads located in recently harvested commercial hardwood plantation, close to town of Launceston and Bell Bay port
- Australian supply highly attractive to global customers
- ABx has operated in region for over 10 years

# Significant infrastructure locally available

| Infrastructure | |
|---|---|
| Transport | Less than 20 km to major highway<br>Less than 100 km to deepwater Bell Bay port |
| Labour | Less than 50 km to Launceston (pop 65,000) |
| Water | High availability in Tasmania |
| Energy | Close to major transmission lines<br>Greater than 90% of Tasmania energy demand generated by renewables[1] |

[1]2018-23, Open Electricity



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# Delivering materials for a cleaner future

**Rare earths**: Supplying light and heavy rare earths from Tasmania into Western supply chains

**Fluorine waste recycling**: Producing industrial chemicals from aluminium smelter waste

ALCORE

**Bauxite**: Mining & enhancing bauxite resources for the cement, aluminium & fertiliser industries

# Investment Proposition

Low cost hydrogen fluoride production using aluminium smelter bath waste

Will enable hydrogen fluoride production in Australia, to reduce 100% reliance on imports

**Team**
Experienced and capable ☑

**Supply shortage**
No hydrogen fluoride produced in Australia
Limited global supplies of fluorspar ☑

**Process is low risk**
Adaptation of existing commercial process ☑

**Strongly increasing demand for fluorine**
Batteries ☑

**New fluorine source available at low cost**
Aluminium smelter bath waste ☑

**Pathway to production**
First mover, at pilot plant stage ☑

# Strongly increasing demand for fluorine

## Significant traditional markets

| Fluorine chemical | Applications |
|---|---|
| Aluminium fluoride | Aluminium smelting |
| HCFC | Refrigerants |
| Hydrogen fluoride | Metal treatment |
| PTFE | Wire insulation, bearings |

## Rapidly growing demand for renewable energy

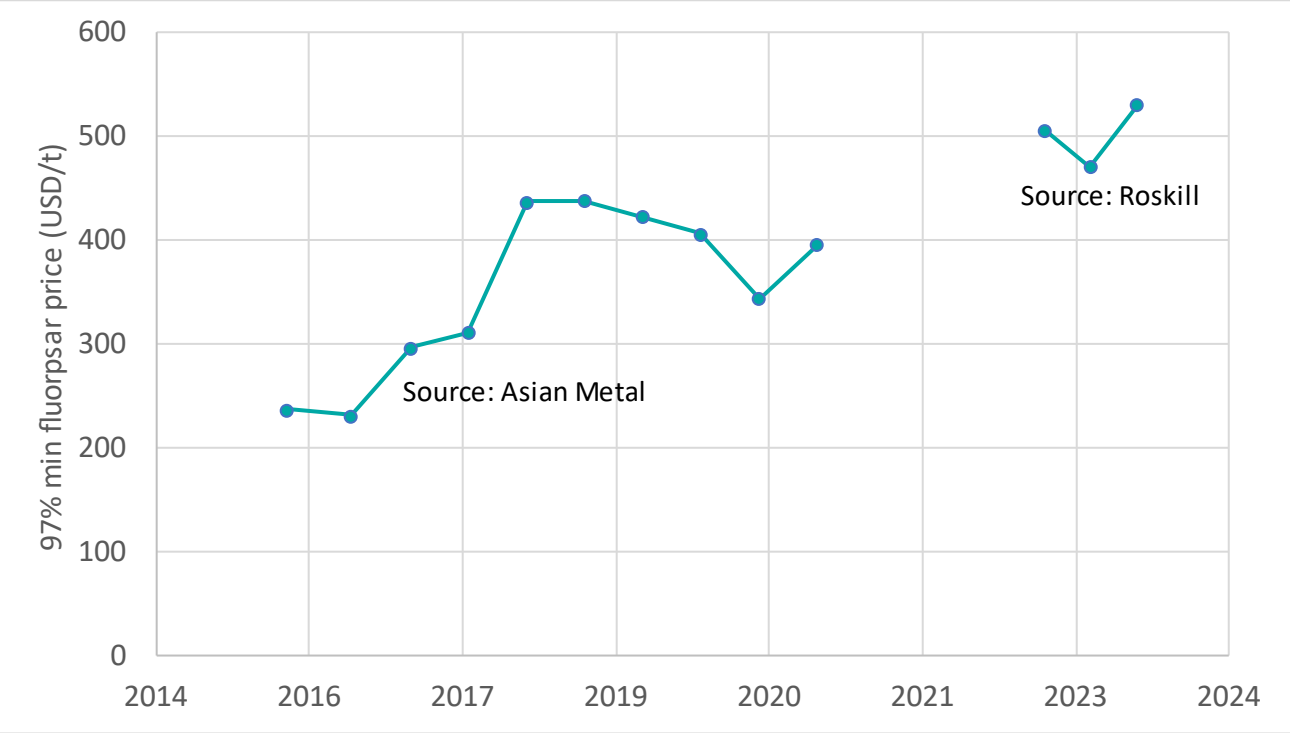
| Fluorine chemical | Applications |
|---|---|
| Lithium hexafluorophosphate | Li-ion batteries (electrolytes) |
| PVDF | Li-ion batteries (separators and electrodes) |
| Hydrogen fluoride | Graphite purifcation |

*"From 2025 to 2035, fluorine demand for energy applications will increase from 5% to 22% of total fluorine demand"*

US DOE Critical Minerals Assessment, 2023

# Supply shortage: limited supplies of fluorspar

## Increasing fluorspar prices




## Government recognition

| Critical Minerals Lists | |
|---|---|
| Fluorspar | USA<br>Europe<br>Japan<br>Canada |
| Fluorine | Australia |

*"In 2035, fluorspar demand will exceed current supply by 40-70%"*

US DOE Critical Minerals Assessment, 2023

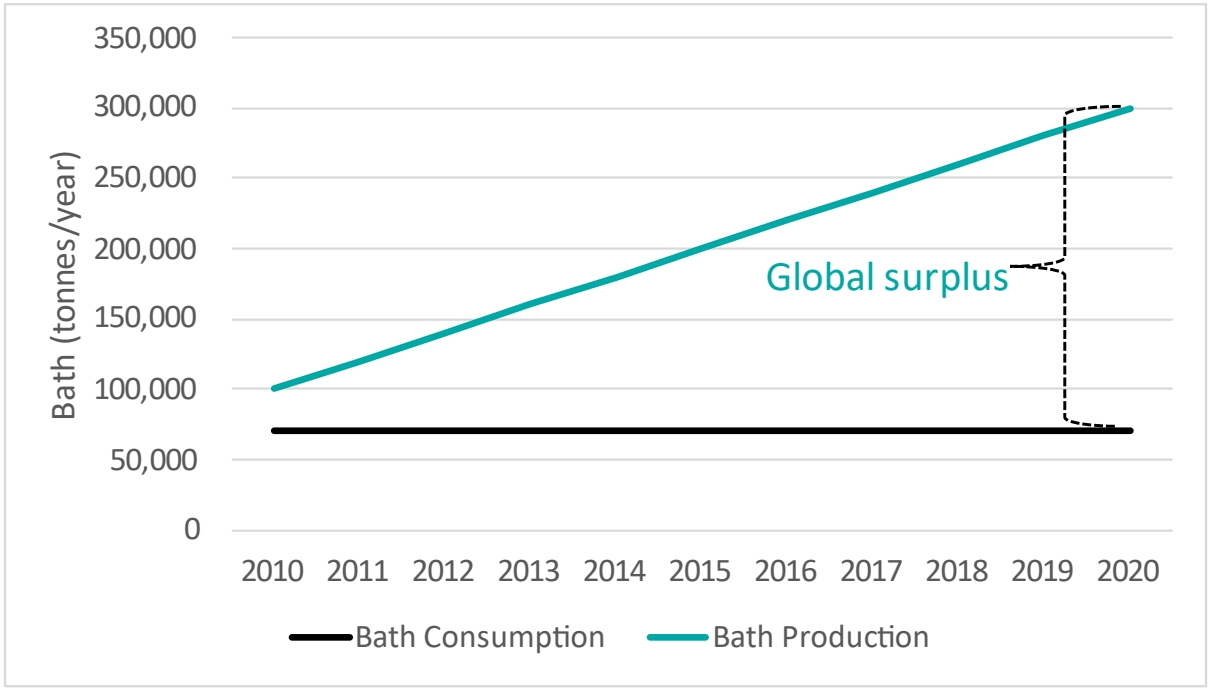
# New fluorine source available: aluminium smelter bath waste

Aluminium fluoride ($AlF_3$)

- Essential chemical for aluminium smelting
- 1.2 million tonnes produced globally per year worth US$1.5 billion (US$1,000-1,800 per tonne)
- Australia is the largest aluminium producer without local aluminium fluoride production, and imports mostly from China
- Results in production of aluminium smelter bath – controlled waste containing 50% fluorine

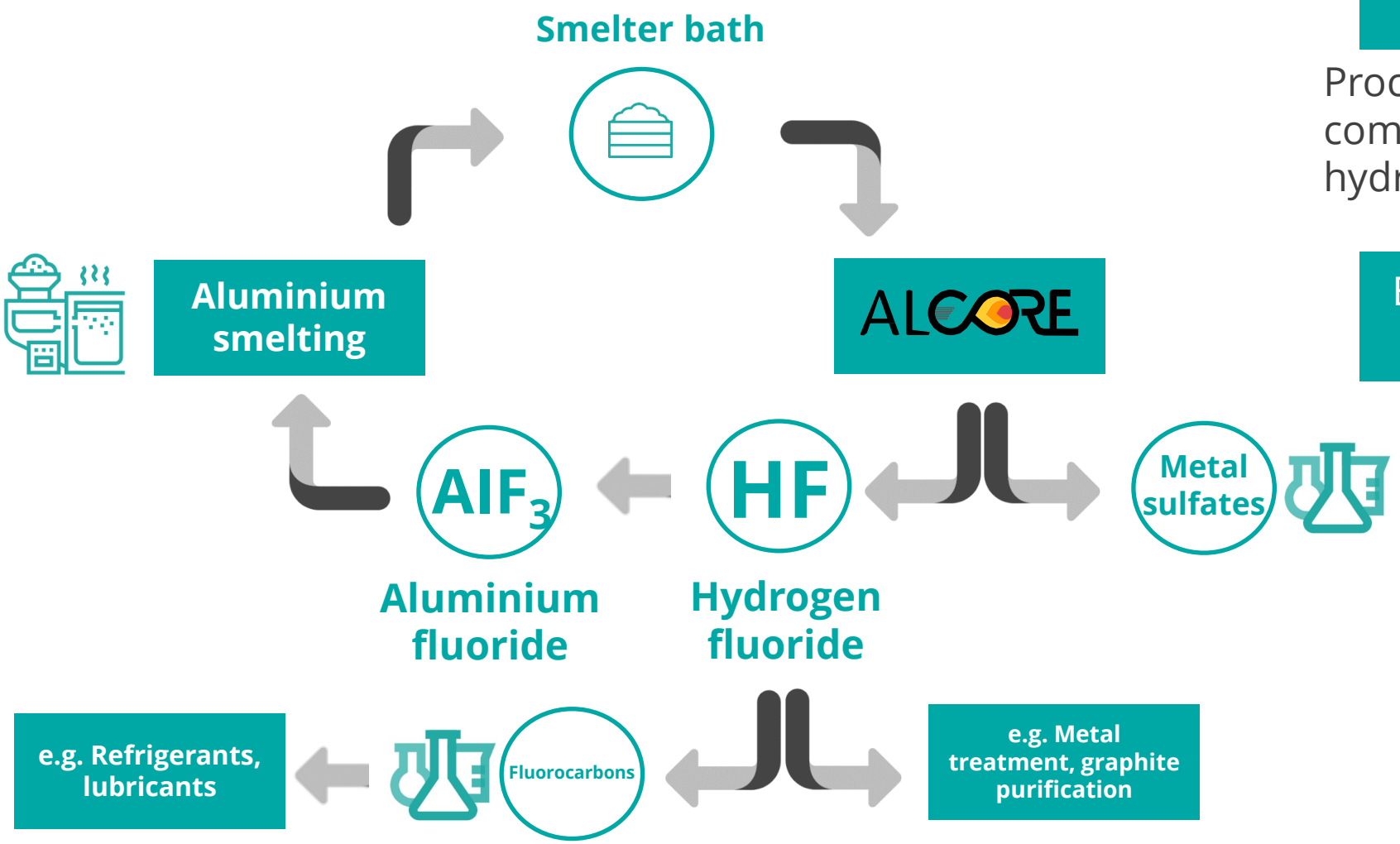

Major fluorine flows in aluminium smelters

## Increasing surplus of aluminium smelter bath




Source: S.J. Lindsay, Bath generation and management, 10th Australasian Aluminium Smelting Technology Conference, 2011

# Process is low risk




**Low technical risk**

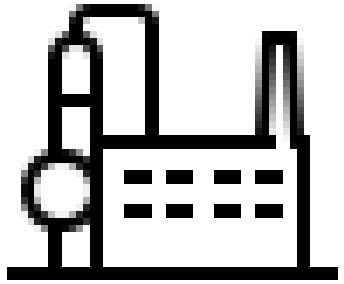
Process is adaptation of existing commercial process to produce hydrogen fluoride from fluorspar

**Exemplary demonstration of circular economy**

# Pathway to production: Vision for fluorine recycling business

**Demonstration**

Demonstrate chemical process for recycling aluminum smelter waste

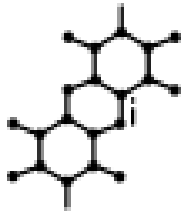


**Production**

Construct plant to produce hydrogen fluoride and aluminium fluoride from aluminium smelter waste

**Expansion**

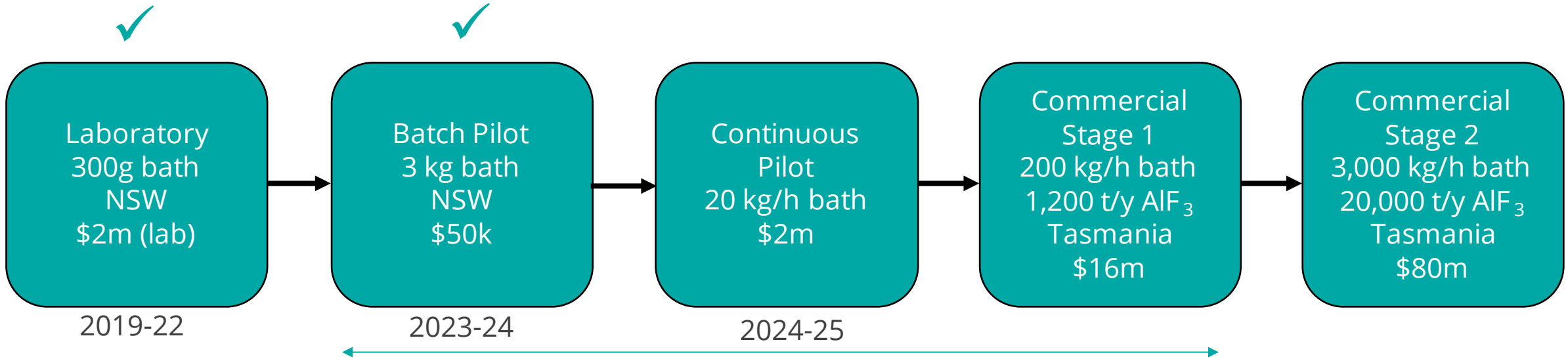
Recycle smelter waste from the global aluminium industry



**Diversification**

Enable Australian fluorochemical industry

# Pathway to production: Project development




$7.5m federal government grant awarded[1] and $5.7m instalments received[2]

Critical process steps demonstrated [3]

Achieved target fluorine recovery[4]

Basic engineering design package being finalised

Produce saleable hydrogen fluoride for evaluation by customers

Determine design and operating parameters for commercial plant

First plant planned for Bell Bay, Tasmania

[1]ABX ASX Announcement, 29 April 2022
[2]ABX ASX Announcement, 28 June 2023
[3]ABX ASX Announcement, 24 October 2022
[4]ABX ASX Announcement, 4 June 2024

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# Appendix 1

| Company | Project | Country | Stage | Study Level | Resource | | | | | | | Proposed leaching conditions | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Mt | Type | Grade (TREO) (ppm) | Cut-off grade (TREO-$CeO_2$) (ppm) | Reference | | | Conditions | Reference | |
| ABx | Deep Leads | Australia | Exploration | - | 89 | Meas + Ind + Inf | 844 | 350 | ABX ASX Announcement | Table 1 | 2 May 2024 | AMSUL pH 4 | ABX ASX Announcement | 31 May 2022 |
| Australian Rare Earths | Koppamurra | Australia | Exploration | - | 236 | Meas + Ind + Inf | 748 | 325 | AR3 ASX Announcement | Table 1 | 30 Sep 2024 | MGSUL pH 1-2.2 | AR3 ASX Announcement AR3 ASX Announcement | 16 May 2023 8 July 2024 |
| OD6 | Splinter Rock | Australia | Exploration | - | 682 | Ind + Inf | 1,338 | 1,000[2] | OD6 ASX Announcement | Table 1 | 29 May 2024 | HCl, 25g/L | OD6 ASX Announcement | 16 Oct 2024 |
| Meteoric Resources | Caldeira | Brazil | Exploration | Scoping | 409 | Inferred | 2,626 | 1,000[2] | MEI ASX Announcement | Table 2 | 1 May 2023 | AMSUL pH 4 | MEI ASX Announcement | 8 July 2024 |
| Ionic Rare Earths | Makuutu | Uganda | Exploration | DFS | 532 | Ind + Inf | 640 | 200 | IXR ASX Announcement | Table 3 | 20 Mar 2023 | AMSUL pH 2 | IXR ASX Announcement | 20 Mar 2023 |

[1]Meas = Measured, Ind = Indicated, Inf = Inferred
[2]Cut-off grade is TREO (ppm)

The resource figures provided are the most recent reported by each company, and at the desired reported cut-off grade provided by each company's headline numbers. Each resource model contains its own economic and geological assumptions not represented in this table. Resource sizes and grades vary depending on the cut-off used by the specific company.

The leaching conditions provided are the most representative provided by each company. In the case of a DFS, PFS or scoping study, they are the conditions used as the base case in that study. In other cases, they are those reported as 'optimum' by the company

# Appendix 2

| Company | Project | Country | Stage | Study Level | Resource (Mt) | | Grade (TREO) (ppm) | Cut-off grade (TREO) (ppm) | %Pr[2] | %Nd[2] | %Tb[2] | %Dy[2] | Reference | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Mt | Type[1] | | | | | | | | | |
| ABx | Deep Leads | Australia | Exploration | - | 89 | Meas + Ind + Inf | 844 | 350[3] | 4.4% | 17.4% | 0.62% | 3.7% | ABX ASX Announcement | Table 1 | 2 May 2024 |
| Lynas | Mt Weld | Australia | Production | - | 106.6 | Meas + Ind + Inf | 41,000 | 25,000 | 5.1%[4] | 18.3%[4] | 0.16%[4] | 0.6%[4] | LYC ASX Announcement | Table 1 Table 7 | 5 Aug 2024 |
| MP Materials | Mountain Pass | USA | Production | - | 9.09[5] | Ind + Inf | 50,500 | 21,800 | 4.2% | 12.1% | 0.0% | 0.0% | MP Materials Form 10-K for 31 Dec 2023 | Page 22 | 22 Feb 2024 |
| Northern Minerals | Browns Range | Australia | Exploration | DFS | 10.81 | Meas + Ind + Inf | 7,600 | 1,500 | 0.0% | 0.0% | 1.18% | 8.4% | NTU ASX Announcement | Table 2 | 10 Oct 2022 |
| Arafura | Nolans Bore | Australia | Exploration | DFS | 56 | Meas + Ind + Inf | 26,000 | 10,000 | 5.9% | 20.5% | 0.08% | 0.3% | ARU ASX Announcement | Table 1 Table 12 | 7 Feb 2019 |
| Meteoric Resources | Caldeira | Brazil | Exploration | Scoping | 409 | Inferred | 2,626 | 1,000 | 5.9% | 17.0% | 0.19% | 1.0% | MEI ASX Announcement | Table 2 | 1 May 2023 |

[1]Meas = Measured, Ind = Indicated, Inf = Inferred
[2]%Pr = $Pr_6O_{11}$ / TREO, %Nd = $Nd_2O_3$ / TREO, %Tb = $Tb_4O_7$ / TREO, %Dy = $Dy_2O_3$ / TREO,
[3]Cut-off grade is TREO-$CeO_2$ (ppm)
[4]For 32.0 Mt reserve, not 106.6 Mt resource
[5]Short tons

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# Appendix 3

| Company | Project | Country | Stage | Study Level | Resource (Mt) | | Grade (TREO) (ppm) | Cut-off grade (TREO-$CeO_2$) (ppm) | $Tb_4O_7$ (ppm) | $Dy_2O_3$ (ppm) | Reference | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Mt | Type[1] | | | | | | | |
| Brazilian Critical Minerals | Ema | Brazil | Exploration | - | 1,017 | Inferred | 793 | 500 | 4 | 13 | BCM ASX Announcement | Table 1 | 22 Apr 2024 |
| Devex Resources | Kennedy | Australia | Exploration | - | 150 | Inferred | 1,000 | 325 | 3.7 | 22 | DEV ASX Announcement | Table 2 | 4 Jul 2024 |
| Meteoric Resources | Caldeira | Brazil | Exploration | Scoping | 409 | Inferred | 2,626 | 1,000[2] | 5 | 25 | MEI ASX Announcement | Table 2 | 1 May 2023 |
| Viridis Mining and Minerals | Colossus | Brazil | Exploration | Scoping | 201 | Indicated + Inferred | 2,590 | 1,000[2] | 5 | 27 | VMM ASX Announcement | Page 4 | 4 June 2024 |
| ABx | Deep Leads | Australia | Exploration | - | 89 | Meas + Ind + Inf | 844 | 350 | 5.2 | 31 | ABX ASX Announcement | Table 1 | 2 May 2024 |

[1]Meas = Measured, Ind = Indicated, Inf = Inferred
[2]Cut-off grade is TREO (ppm)

The figures provided are the most recent reported by each company, and at the desired reported cut-off grade provided by each company's headline numbers. Each resource model contains its own economic and geological assumptions not represented in this table. Resource sizes and grades vary depending on the cut-off used by the specific company.