Tuesday, 16 May 2023

RESEARCH REPORT

CORPORATE CONNECT

ABx Group Limited

Hiding in plain sight

SHARE PRICE & ESTIMATED FUTURE PRICE

Valuation	$0.33
Price	$0.10
Implied Return	290%

ABx Group: Initiation of coverage

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Richard Close
richardclose@corporateconnect.com.au

We initiate coverage on ABx Group with a valuation of $0.33 per share.

ABx Group is currently progressing three businesses, including discovering and developing an ionic adsorption clay rare earth project in northern Tasmania, establishing a plant to produce hydrogen fluoride and aluminium fluoride from recycled industrial waste to replace imports (ALCORE), and mining and enhancing bauxite resources for the cement, aluminium and fertiliser industries.

Rare Earth Elements – A true Ionic Adsorption Clay deposit

The Deep Leads prospect in Northern Tasmania is rapidly developing into a significant Rare Earths deposit with all early metallurgical testing indicating that it is a true Ionic Adsorption Clay (IAC) deposit – perhaps the only true IAC resource in Australia. The company has made quick work of upgrading the drilling program to delineate further resources, achieving a 500% increase to the maiden resource estimate in under five months. The current Mineral Resource Estimate stands at 21 million tonnes of Inferred & Indicated resource with a grade of 770 ppm Total Rare Earth Oxides.

Initial testing by ANSTO of 70 bulk samples from the Deep Leads deposit gave an average extraction rate of 40% at pH4. This outcome clearly shows the potential of the resource to be a commercial IAC project using simple low acid desorption techniques for the extraction of Mixed Rare Earth Concentrates.

This report models a 1mtpa Rare Earth desorption project based on a resource of 20 million tonnes.

Alcore (83% owned) – Refining technology to make Hydrogen Fluoride and Aluminium Fluoride

Alcore is home to the proprietary chemical engineering process that produces Hydrogen Fluoride from aluminium smelter waste. The company is now in the final stages of developing a pilot plant which will be constructed on the Central Coast of NSW. The operation of the Pilot Plant will give investors their first opportunity to see operating metrics as the company works towards building a 20,000-tonne commercial plant at Bell Bay in Tasmania. We have modelled the initial 20,000tpa AlF_3 plant that has been announced by the company.

Sunrise Bauxite Project – and sunrise with the bauxite price

ABX has 137 million tonnes of measured bauxite resources spread down the coast of Australia. The 37 million tonne Sunrise deposit in Sth East Queensland looks to be the best candidate for metallurgical grade Direct Shipping Ore. We model a 1.5 mtpa operation with export from the Port of Bundaberg. Global bauxite markets are turning positive and the Sunrise Project is ideally placed to take advantage of this.

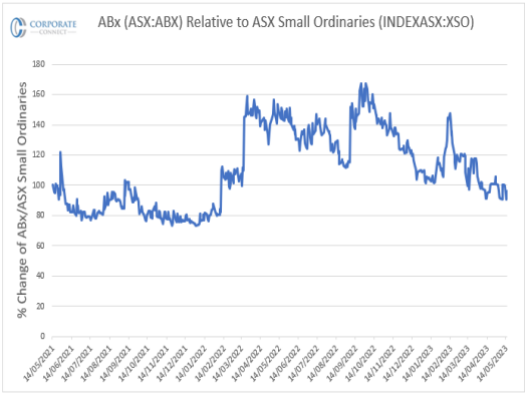
Company Data

ASX code	ABX
ASX price	$0.11
Shares on issue	223.6 mill.
Market capitalisation	$24.6 mill.
Cash on hand	~$4.5mill[1]
12-month price range	$0.10 – $0.17

[1] as at 31/3/2023

Key Personnel

Paul Lennon	Chairman
Dr Mark Cooksey	Managing Director/CEO
Ian Levy	Executive DIrector
Leon Hawker	Chief Operating Officer



Source: FactSet

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Investment Thesis

Hidden in plain sight - Valuation of $0.33 per share

Our analysis of the diversified projects within ABx Group has resulted in a Sum of the Parts valuation of $0.33 per share. We think realisation of that valuation will be driven by the following:

Deep Leads is the real deal – a true Ionic Adsorption Clay Rare Earths deposit.

Lowest cost processing possible: ABx's ANSTO testing of its Deep Leads samples demonstrated that Rare Earth Elements can be extracted under low cost/low acid conditions – paving the way for the consideration of a simple desorption process as seen for the major IAC projects in China.

Mineral Resource is growing quickly with considerable scope for growth: Growth in the Mineral Resource is progressing quickly and consistently with around 80% of the prospect yet to be assessed. In addition, the application for an exploration lease between the Deep Leads and Wind Break deposit opens the possibility of a prospect size of over 13 km in length.

Rare Earths necessary for renewable energy: The outlook for Rare Earth prices is positive, driven by the renewable energy transition and the demand for Permanent Magnets. The Deep Leads project is enriched in the four rare earths that are used in magnet manufacturing – resulting in a basket price which is considerably higher than many of its peers.

Location and Environment: Deep Leads is located in Tasmania, a Tier 1 mining jurisdiction and, importantly, not within an environmentally sensitive area. In fact, most drilling is taking place within timber plantations that are regularly disturbed for lumber harvesting.

Alcore – a technology that uses smelter waste to make valuable Aluminium Fluoride

The chemistry is now proven: Now that the chemistry has been tested and confirmed, investors can now focus on the more process-oriented phase of Alcore's development. The Pilot Plant design and construction phase is underway, so future progress announcements will be more focussed on metrics like volume – and that's easier for investors to understand.

Clearing the way for a path to commercial outcomes: ABx have now announced the long term plan for a 20,000 tonnes/year commercial plant in Tasmania, starting with a smaller Stage One plant which will produce 1300 tonne/year of Aluminium Fluoride, using 200kg/hour of smelter bath. We think the "dotted line" between the success of the Pilot Plant using 20kg/hour of bath and the Stage One Commercial plant using 200kg/hour will help crystallize valuation assessments.

Bauxite – Sunrise Project

Aluminium is a key metal in the energy transition and the global bauxite market is getting tight: ABx's bauxite projects have had to endure a low pricing environment for a decade – that is now changing with increased demand for bauxite from China. Combined with that is the increasingly uncertain outlook for exports from Indonesia and Guinea.

Target production date is in sight: ABx have set a target of late 2025 for bauxite exports to begin at their Sunrise Project. We would expect to see announcements over 2023 and 2024 on how the design and procurement activities are progressing.

Overview

ABx was originally known as Australian Bauxite and changed its name in December 2021 largely to reflect the progression of the company from the developer of Bauxite deposits to a company that now has three separate projects.

ABx Group is not made up of an unrelated group of projects that have been acquired opportunistically. Instead, the genesis of both Alcore and Tasmanian Rare Earths have come about through the group's long-term focus on developing and adding value to bauxite deposits on the east coast of Australia – more than likely driven by the moribund bauxite export market that was prevalent after they had assembled the suite of deposits.

ABx Group has a small corporate footprint and is essentially a holding company so we have divided the report into the three projects being pursued by the company.

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ABx Group – Valuation

Valuation - $0.33 per share

Our valuation of ABx Group is built from the following:

Deep Leads – IAC Rare Earths: We have looked at the project from two valuation directions – a) DCF modelling of a simple desorption operation processing 1 million tonne per year of ore and b) Comparable company analysis based on Mineral Resource Estimates and possible In-Situ Valuations. The Un-risked NPV of the IAC Desorption Operation gave a value of $54 million which we have applied a 33% Probability of Success to for a Risked valuation of $18 million. Interestingly, our Mineral Resource Valuation based on Peer company comparisons gave a similar valuation at $18 million.

Alcore: The Alcore valuation is based on the company's announced plan to build a Stage 2 Commercial plant in Tasmania, producing 20,000 tonnes per annum of Aluminium Fluoride at a capital expenditure of $80 million. We have modelled cash flows for a 20-year project to reach an Un-risked NPV of $65 million for ABx's 83% equity in the project. The risked valuation of $29 million uses a Probability of Success of 45% and represents that Alcore have now proven the chemistry of the process and are now moving to the Pilot Plant Stage. We have not considered financing options in the valuation at this time, and it is possible that the plant may be funded by a partial sale of the project to an industry partner such as an aluminium producer.

Sunrise Bauxite: Sunrise is valued using a 12-year DCF model and is risked at 50%. The Probability of Success is estimated at this level for a number of reasons: the project complexity is low, the signing of the JV with Rawmin reduces financing and marketing risk and from a macro perspective, the outlook for bauxite pricing is as strong as it has been for two decades. The Unrisked valuation for ABx's 51% equity is $29million, or $15million risked.

ABx Group - Valuation		Unrisked			Risked	
Asset	Method	Valuation (A$ mill.)	Valuation (A$/share)	PoS	Valuation (A$ mill.)	Valuation (A$/share)
Deep Leads - IAC Rare Earths	Blended (Project NPV & Resource)	54	0.24	33%	18	0.08
Alcore (83%)	NPV - 20ktpa Commercial Plant	65	0.29	45%	29	0.13
Sunrise Bauxite Project (50.1%)	NPV - 1.5mtpa export	29	0.13	50%	14	0.06
Other Bauxite/Rare Earth Tenements	Ind. Val[n]*, ABx Accounts	15	0.07	100%	15	0.07
Cash		4	0.02		4	0.02
Debt		-	-		-	-
Corporate		(7)	(0.03)		(7)	(0.03)
TOTAL	**(Note: whole numbers may not add up due to rounding)**	**159**	**0.71**		**74**	**0.33**

** Independent Valuation Report by Michael Leu & Eric Kam in March 2021 (Used VALMIN Code 2015 & JORC 2012) valued the Total Bauxite Mineral Resource at $43.1million (base case)*

Table 1: ABx Group Valuation.

Our initial Sum of the Parts valuation of ABx Group's projects sits at an Unrisked value of $159 million or Risked value of $74 million ($0.33/share) – which is at a substantial premium to the current share price of $0.11/share. We note that our valuation of ABx's other bauxite tenements is low compared to the independent valuation in the ABX accounts.

ABx Group – Project Analysis Index

- Deep Leads Tasmanian Ionic Adsorption Clay (IAC) rare earths deposit - page 4.
- Alcore: Technology for producing Hydrogen Fluoride & Aluminium Fluoride - page 19.
- Sunrise Bauxite project - page 27.

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Deep Leads – Ionic Adsorbed Clay (IAC) Rare Earths Project, Tasmania.

Australia's first true IAC resource – potentially the country's lowest cost rare earths project.

Deep Leads - Main Points

- Deep Leads is a clay hosted Rare Earth deposit that appears to have the highest component of Ionic Adsorption Clays (IAC) – the Holy Grail of low cost Rare Earth extraction.
- The resource is located in a favourable jurisdiction for development with current land use predominantly hard/soft wood plantations and significant human disturbance already taking place.
- Significant upside potential - only 18% of the initial target zone has been drilled.
- Extraction rates from 71 representative samples across the prospect are consistent with commercially significant levels of IAC type mineralisation.
- Extraction rates favour Permanent Magnet REE's over Lighter lower value REE's – particularly CeO_2 – a hallmark of IAC deposits.
- Current mineral resource estimate is at a size to consider development options (21 million tonnes).
- With true IAC deposits, capex for development is generally at least an order of magnitude lower than hard rock REE projects.

Introduction

In our view, ABX's Deep Leads/Rubble Mound Ionic Adsorption Clay (IAC) REE discovery in Tasmania has the potential to become Australia's first true IAC Rare Earths project. The resource currently sits at 21 million tonnes with a grade of 770ppm. The Deep Leads exploration team verified that mineralisation contained substantive IAC Rare Earths with ANSTO tested extraction rates which pave the way for low-cost economic recovery. Corporate Connect believes ABx should be close to initiating a scoping study into a low-cost heap desorption/leach operation.

Most of the world's rare earths are typically sourced from hard-rock mines, which require costly processing plants and take a long time to reach production. However, rare earths can also be found in ionic adsorption clay (IAC) deposits, although historically only in southern China. The advantage of IAC deposits is that rare earths can be extracted from the clay through a simple desorption process, allowing for rapid and cost-effective project development. Additionally, IAC deposits tend to have a higher concentration of the more valuable rare earths needed for permanent magnets. Although clay hosted REE deposits are fairly widespread, most of the rare earths in these deposits are contained within minerals, making extraction expensive. True IAC deposits, where a large portion of rare earths can be extracted via desorption, are quite rare.

History and Timeline

The initial discovery of IAC Rare Earths came in late 2020, when ABx geologists explored the linkage between bauxite and IAC deposits. Initial testing for Rare Earth Elements (REE) was initiated on ABX's existing Bauxite exploration samples from the Queensland Binjour deposit and the Rubble Mound Deposit in Tasmania. The results were announced to the market in early 2021 and demonstrated that the most promising grades were located on the Tasmanian tenements. During 2021, ABX conducted a step-out drilling campaign at their Deep Leads prospect, adjacent to Rubble Mound and discovered further lateral extensions to the deposit with REE grades that were consistent with commercial IAC deposits in China.

February 2021: ASX announcement on rare earth exploration project undertaken at the company's bauxite properties.

August 2021: Significant increase in rare earth prospect size at DL130.

September 2021: The first leach test of a composite bulk sample from DL130 found significant leaching of super magnet REE's with distilled cold water. The precipitate enriched the magnet REE's in the order of 33%.

February 2022: Discovery of another REE prospect at Portrush. Results from Deep Leads indicate thicker and higher-grade mineralisation. Deeper drilling points to thicker REE mineralisation with higher grades. More powerful drilling rig is deployed.

March 2022: Rubble Mound prospect discovery is announced.

May 2022: Confirmation that Deep Leads mineralisation was ionic adsorption clay – extraction rates of 48% to 71% were achieved under low acid, low-cost processing methods. Testing was completed by ANSTO.

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June 2022: Implementation of improved drilling technology leads to the better penetration of the prospect – leading to the delineation of a thick (10m) channel of high grade REE mineralisation.

September 2022: 230% increase in the area of high grade REE mineralisation at Deep Leads – increasing the lateral extent of the prospect by 4.5km. Confirmation of a 6.5km mineralised channel between Deep Leads and Rubble Mound prospects – the channel yields 5 holes with high grade mineralisation.

November 2022: Announce a maiden mineral resource estimate (MRE) of 3.94 million tonnes averaging 918ppm TREO/ 655ppm TREO-CeO_2 at a 200ppm TREO-CeO_2 cut-off.

February 2023: High extraction rates achieved under low-cost conditions (0.5M Ammonium Sulphate solution at pH 4). Extraction rates from 71 samples across the Deep Leads-Rubble Mound resource indicate an average of 50% extraction in Deep Leads (Maximum of 80%) and 24% in Rubble Mound (Maximum of 83%).

March 2023: JORC Resource Estimate increased by 350% to 13.9 million tonnes averaging 707ppm TREO/ 507ppm TREO- CeO_2.

May 2023: JORC Resource Estimate increased by 50% to 21 million tonnes averaging 770ppm TREO/ 585ppm TREO- CeO_2.

Location:

ABx has identified rare earth mineralisation across several of their north Tasmanian bauxite exploration leases shown below – primarily:

- EL9 / 2010 – Deep Leads, Rubble Mound and Wind Break
- EL 18 / 2014 – Portrush

Located approximately 50 km to the west of Launceston, exploration is currently focussed on the Deep Leads-Rubble Mound (DLRM) discoveries.

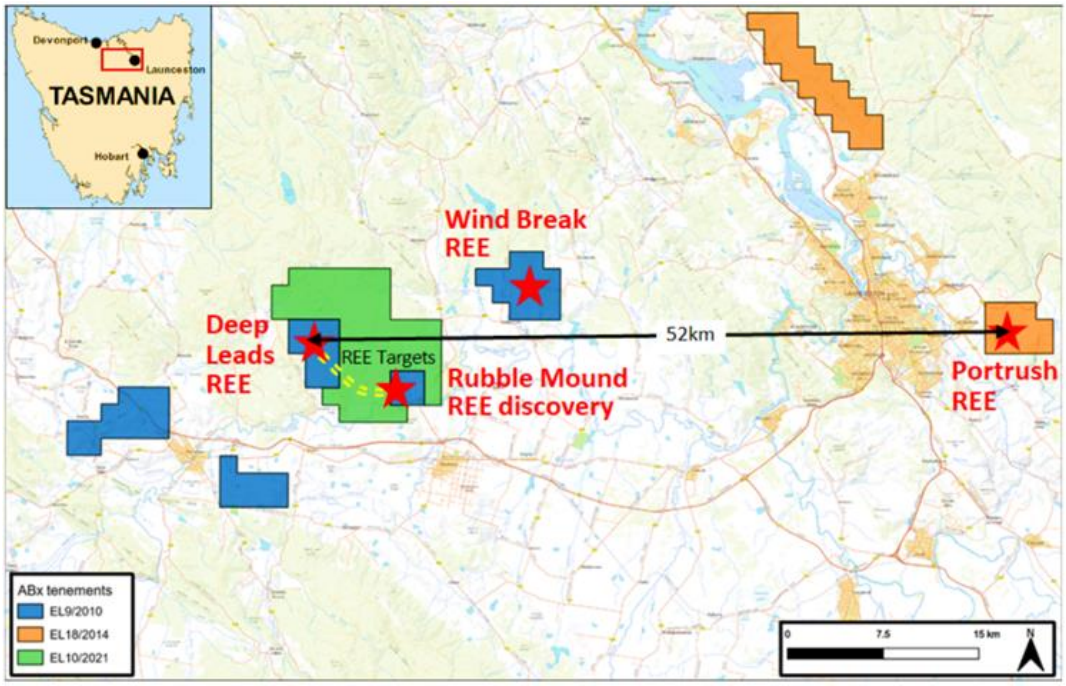

Figure 1: Location of ABx's Northern Tasmania REE prospects

Current Land Use

The prospect is located largely in cleared and uncleared forest plantations (soft and hard wood) and is frequently disturbed for lumber harvesting. The plantations are surrounded by farmland and the Bass Highway runs east to west on the southern end of the prospect. Site access is easy and close to all modern amenities. Drilling access has sometimes been impeded by heavy wet weather.

Land use across the prospect has included plantation felling and clearing and results in significant disturbance of the local environment (Fig. 2 - 4). Mining of IAC REE's would be of a surficial nature and involve low-cost mining methods, i.e., free dig.

Figure 2: Drilling operations at ABx's Deep Leads project.

Figure 3: Drilling operations at ABx's Deep Leads project.

Figure 4: Drilling operations at ABx's Deep Leads project.

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Mineral Resource Estimate – Rapid growth so far and only 18% of the Deep Leads target has been drilled and reported.

The company announced their maiden mineral resource in November 2022, 18 months after the initial discovery of rare earths within the pre-existing bauxite deposit. The ABx exploration team then progressed rapidly (3 months) to a tripling of the maiden resource estimate to nearly 14 million tonnes at a grade of 705ppm TREO (507ppm TREO-Ceo2) and increased the cut-off grade to 250ppm TREO-CeO2 from 200ppm. The latest upgrade, announced on May 8th, 2023, has delivered a resource estimate of 21 million tonnes at 770ppm TREO – an increase of 50% in tonnage and nearly 10% in grade. In addition, the resource thickness increased by 10% to 7.7metres.

								Permanent Magnet REOs			
Resource Category	**Million Tonnes**	From (m)	To (m)	Thick-ness (m)	TREO ppm	TREO-CeO_2 ppm	Perm Mag ppm	Nd_2O_3 ppm	Pr_6O_{11} ppm	Tb_4O_7 ppm	Dy_2O_3 ppm
Inferred	17	5	12	6.7	746	565	192	128	32	4.4	27
Indicated	4	4	17	12.5	880	677	216	142	35	5.5	33
Totals	**21**	**5**	**13**	**7.7**	**770**	**585**	**196**	**130**	**33**	**4.6**	**28**

Other Rare Earth oxides

Resource Category	CeO_2 ppm	Er_2O_3 ppm	Eu_2O_3 ppm	Gd_2O_3 ppm	Ho_2O_3 ppm	La_2O_3 ppm	Lu_2O_3 ppm	Sm_2O_3 ppm	Tm_2O_3 ppm	Yb_2O_3 ppm	Y_2O_3 ppm
Inferred	181	15	7.8	29	5.4	111	2.0	29	2.2	13	159
Indicated	203	19	9.3	35	6.6	128	2.3	33	2.5	15	210
Totals	**185**	**16**	**8.1**	**30**	**5.6**	**114**	**2.1**	**29**	**2.2**	**14**	**168**

Parameters Cut-off grade = 250ppm TREO-CeO_2 Minimum thickness = 2 metres
Maximum extrapolation = 80 metres Density = 1.9 dry tonnes/cubic metre in situ
TREO = total rare earth element as oxides. TREO-CeO2 = TREO minus cerium oxide

Table 2: Mineral Resource Estimate for Deep Leads - Rubble Mound Prospect

The potential for growth in the Mineral Resource Estimate is considerable. As can be seen in Figures 5 to 9, the potential target zone has been expanded rapidly and significantly since the initial discovery. The understanding of the geological model for mineralisation is improving and, with it, a larger and improved drilling target zone. Figures 5 to 7 below show how the target zone has expanded since September 2022.

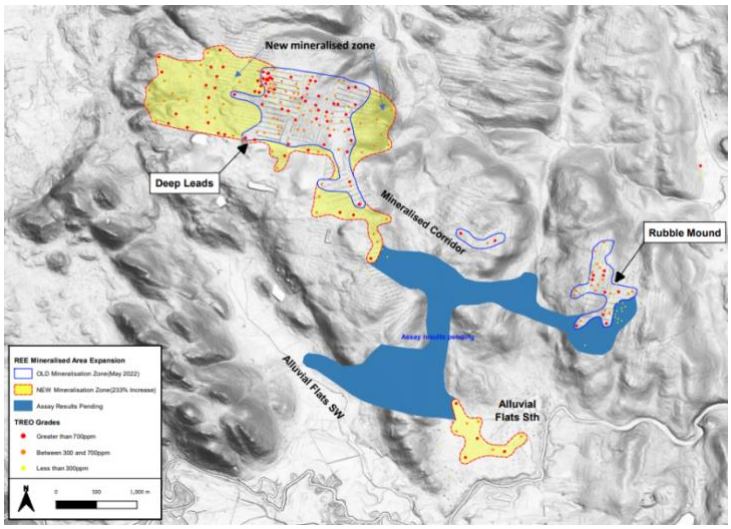

Figure 5 shows the 230% increase in the mineralised area (yellow shading) reported in September 2022. The original mineralised zone from May 2022 is shown with blue outline while the blue heavily shaded area was, at that time, pending assay results.

Figure 5: 6/9/2022 - Mineralisation expansion area by 230% (Source: ASX announcement)

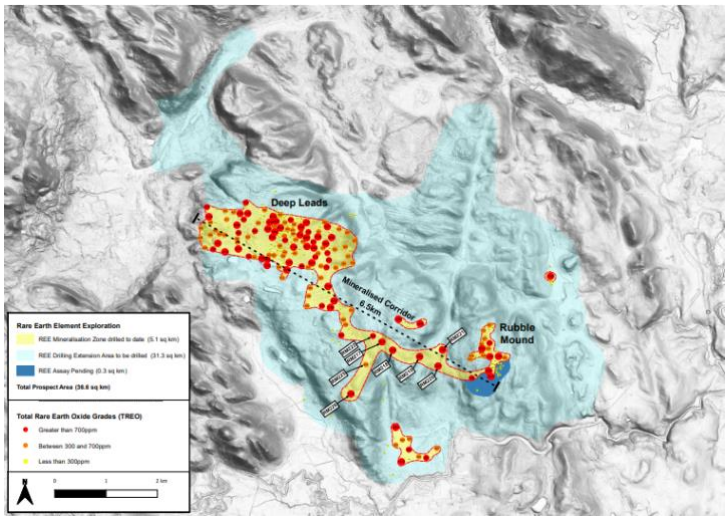

Figure 6 shows the extension to the proposed drilling target (light blue shading) as well as the confirmation of a new mineralised zone in the channel between Deep Leads and Rubble Mound. The channel is approximately 6.5km long and its discovery increased the prospect size by 27% to 5.1 km^2, as well as increasing the prospective area to be drill tested to more than 30km^2.

Note that the current mineralisation zone is approximately 6.5km in length – across the long axis that runs NW to SE.

Figure 6: 20/09/2022 – 27% increase to mineralised zone and large expansion of drilling target (Source: ASX announcement)

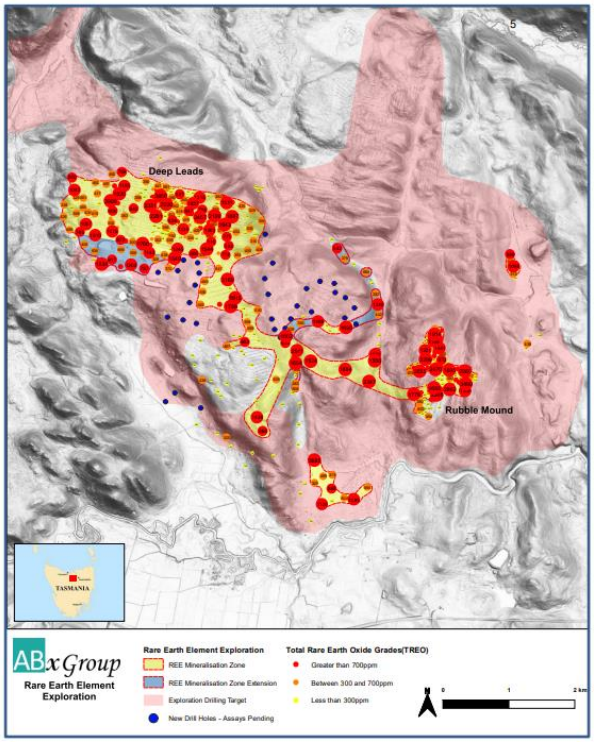

Figure 7: 20/03/2023 - Update to mineralised zone, drilling target zone and location of pending assays (Source: ASX announcement)

Fig.7 was released at the time of the upgrade of the Mineral Resource Estimate to 13.9 million tonnes.

Only 18% of the prospective target area (pink shading) had been drilled and grades reported, and current geologic modelling suggests that mineralisation remains open in most directions.

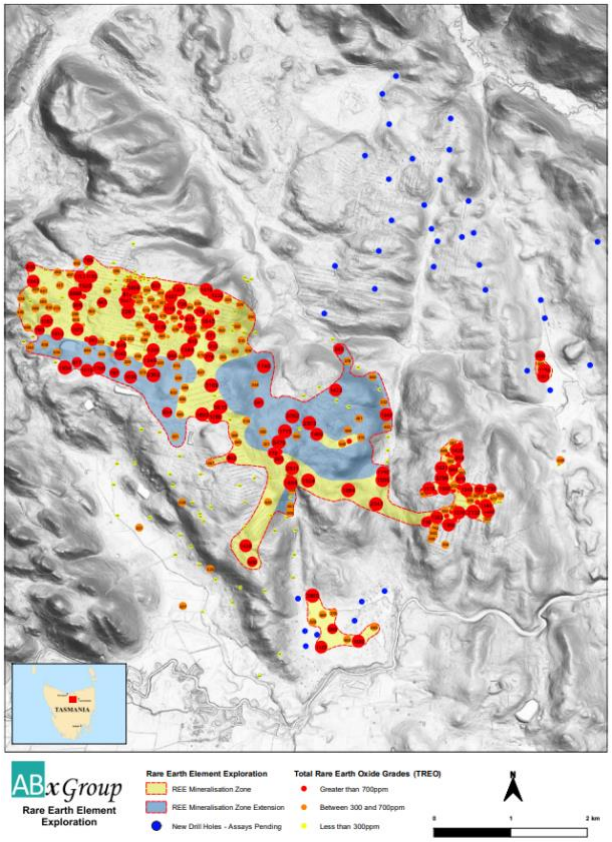

Figure 8 shows the latest MRE data with the areas in blue-grey being the extension to mineralisation from the March upgrade.

The latest upgrade takes ABx over the initial target of 20 million tonnes – the minimum resource size at which development options can be considered.

What should be noted in the diagram is the blue dots to the north of the known mineralisation – these represent drilled holes with assays pending and are a large step out from the existing resource. Any commercially significant grades in this area could have a meaningful impact on total resource size.

Figure 8: 9/05/2023 - Update to mineralised zone, drilling target zone and location of pending assays (Source: ASX announcement)

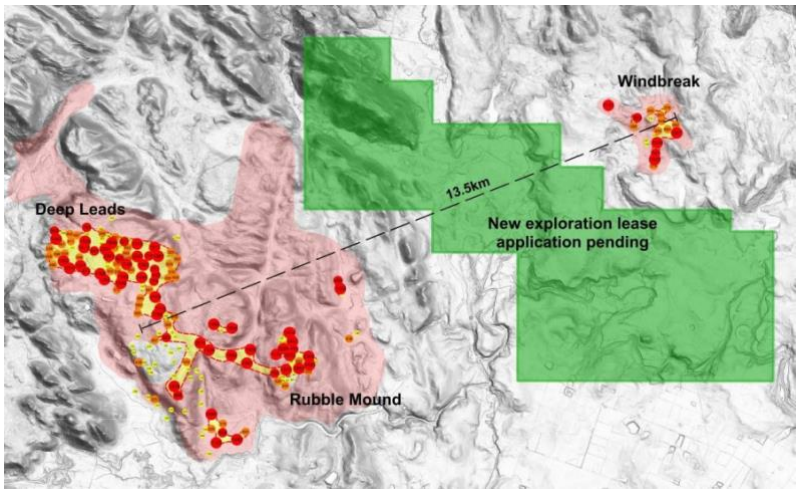

Figure 9 shows the new exploration lease that has been applied for between the existing discoveries at Deep Leads-Rubble Mound and Wind Break.

Existing regional mapping of geology suggests that there is no reason why the new exploration lease will be any less prospective for IAC type mineralisation than the existing exploration leases. This gives rise to the potential for a 13 km long axis along which ABx can explore for IAC Rare Earths.

Figure 9: New EL application location (Source: ASX announcement 9/5/2023)

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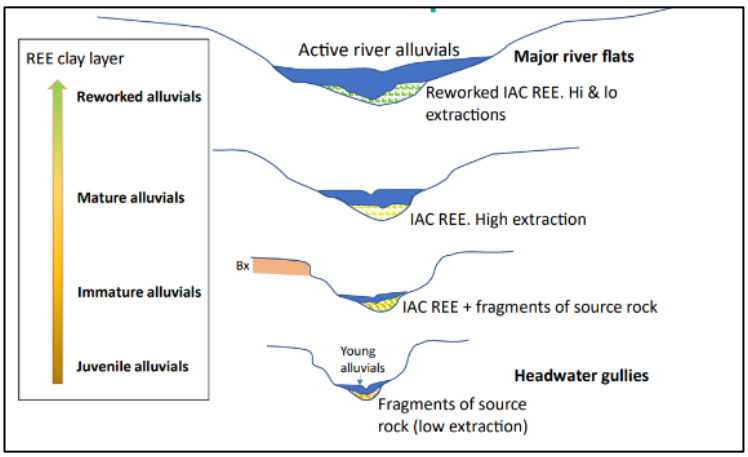


The geological model of the resource is still being developed as the drilling program progresses. The initial Rare Earth drilling program often failed to reach bedrock and it wasn't until a new drill rig (modified to ABx's specifications to better deal with the geological profile) was brought onsite in mid 2022 that deeper holes could be drilled. In addition, holes drilled for the initial bauxite exploration and subsequently tested for REO's were all relatively shallow as the drilling team stopped when they reached the bottom of the bauxite.

Some areas will be re-drilled in 2023 – particularly holes that stopped in higher grade mineralisation.

Figure 10: Geological model scenarios for REE location

The brief geology description from surface down:

1.Shallow clay layer: Bauxite/laterite and clays with bauxite & dolerite grains

2. REE clay layer

3. River gravel layers in some places

4 Weathered Dolerite

5. Bedrock - Fresh dolerite

True IAC mineralisation – Desorption extraction results very positive for project economics

Unlike many other companies exploring for IAC type deposits, ABx took early measures to validate the presence of Ionic Adsorbed Clay Rare Earths in the prospect. This was announced to the market in February 2023 and included the results from 71 samples from across the Deep Leads – Rubble Mound Resource.

Of the 49 samples from Deep Leads, there was a 33% extraction rate of Total REE's and 40% extraction rate of Total REO's – CeO_2. Over 70% of samples recorded greater than 25% extraction rates of 'Total REE's – CeO_2'.

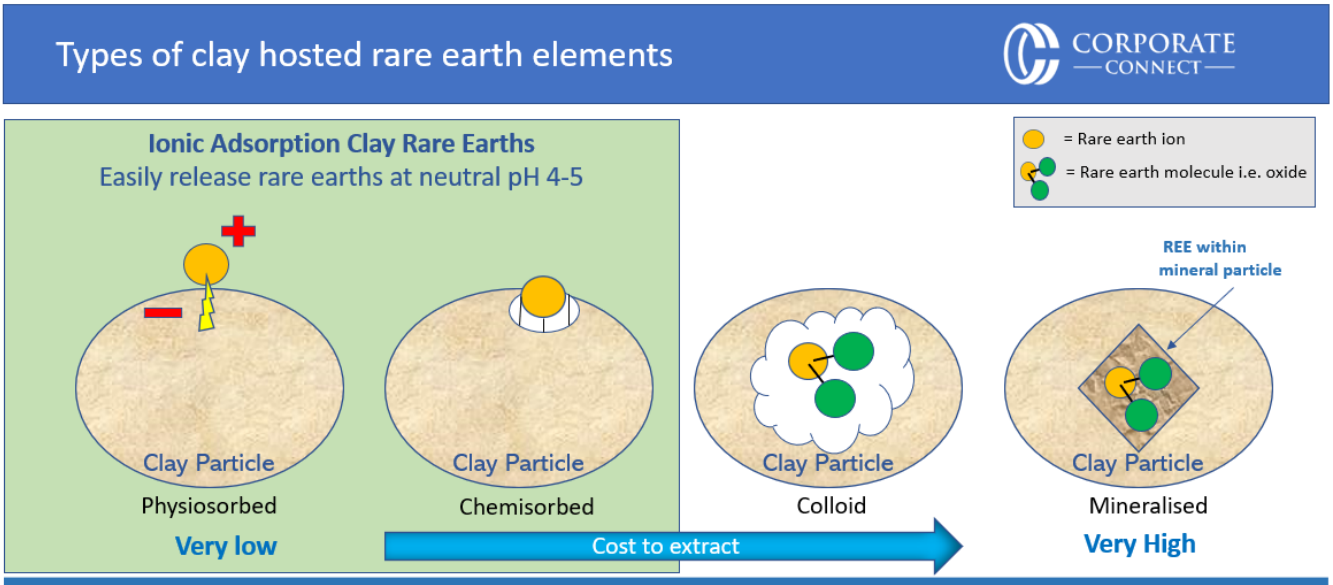
	Drill sample REE Grades			Desorption Extraction Rates (%)		
	TREO ppm	Perm Magnet ppm	TREO – CeO_2 ppm	TREO ppm	Perm Magnet ppm	TREO – CeO_2 ppm
Average of all 49 leach test results	1075	288	833	33%	39%	40%
Maximum test result	3988	1147	3730	68%	80%	79%
IAC REE : Mean of the 36 of 49 samples above 24% extraction rate	1105	287	823	41%	50%	50%

Table 3: Desorption test results conducted at ANSTO (*Source: Company announcement 2/2/2023*)

These initial extraction rates are in line with the extraction rates seen in Chinese IAC REE projects and are significantly higher than the average 28% rates used in Aclara's Penco Module project economic study – which is considered economically viable at this time.

The critical factor in appreciating the significance of these results is that all desorption testing was conducted by ANSTO under the low-acid, low-cost processing conditions that define successful extraction of true ionic adsorption clay REE's. This means desorption conditions of a weak solution of ammonium sulphate at pH4 and ambient temperatures and short desorption times (~20 minutes). The low acid/ambient temperature desorption regime has significant implications for the cost of extracting REE's from mineralisation and hence has major implication for project economics.

Figure 11 shows the differences between different clay hosted REE mineralisation phases and their extraction costs. The diagram shows the relationship of how the cost of leachate used per tonne of ore rises significantly as the proportion of Ionic Adsorption Clay REE's decreases.



Extraction method and acid consumption costs NB: Acid (Sulphuric) costs approximately US$150/kg			
No acid	< 30 kg/tonne acid < US$4.50 tonne of ore	100kg/tonne acid ~US$15.00 per tonne of ore	> 500kg/tonne acid > US$75.00 tonne of ore
Desorbed with simple monovalent salt solution	Desorbed with simple monovalent salt solution & weakly acidic conditions	Acid Leach	Aggressive alkaline bake or acid leach

Figure 11: Types of Clay hosted REE deposits - and the cost of extraction (*Source: Corporate Connect*)

Clay Hosted REE's: What can be extracted – and at what cost?

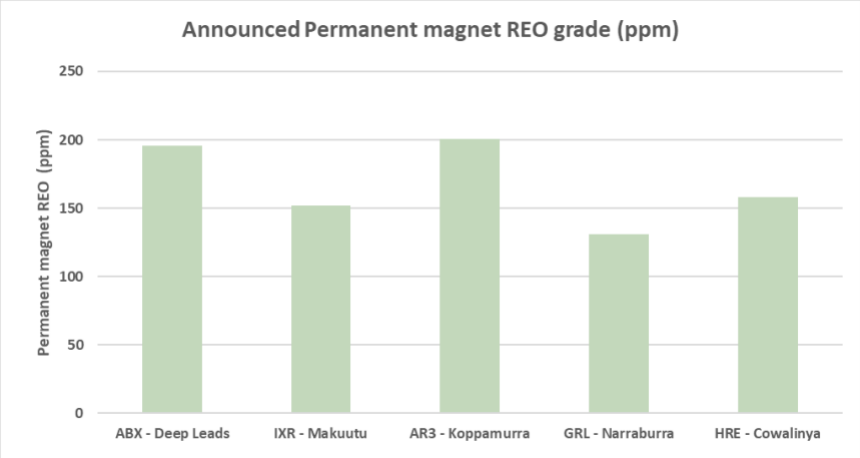


Figure 12: Overall Magnet REO grades of Clay Hosted peers (Source: Company announcements)

Figure 12 shows four peers alongside ABx and the overall announced grade for Permanent Magnet REO's at their respective projects.

However, these grades are not directly comparable because what they do not take into account are the conditions required to extract the REE's from the mineralisation, i.e., at what level of acidity.

As can be seen from Fig.11, this has significant implications for cost and project economics.

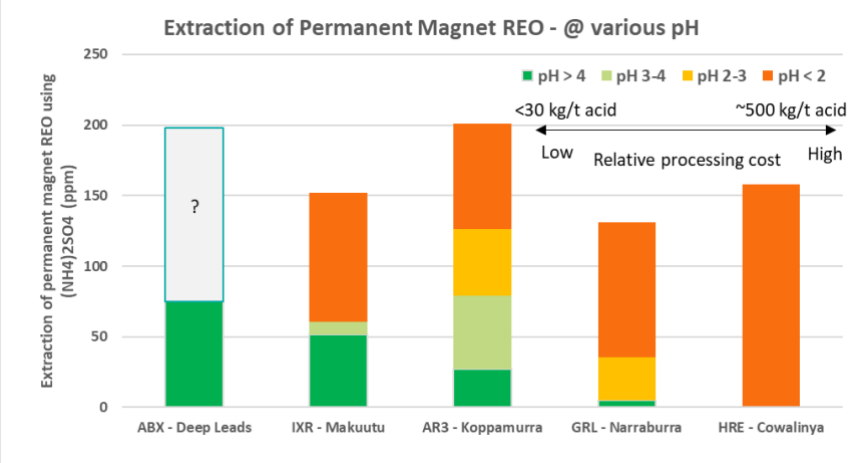


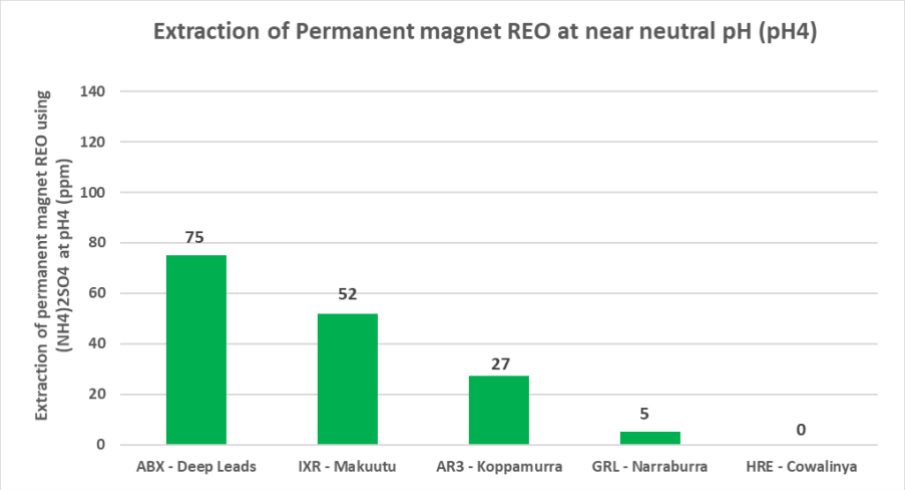
Figure 13: Extraction rates and required pH for extraction (Source: ASX announcements, CC & ABx)

Figure 13 is the same chart as Figure 12 but breaks down how much of the grade is recoverable and under what conditions - an approximation of the levels of Permanent Magnet extraction achieved using Ammonium Sulphate for the five companies – it also shows what level of acidity (pH) is required to achieve that extraction (Note: pH 4 is the acidity level of tomato juice/black tea; pH 3 is the acidity of vinegar; pH 2 is the acidity of lemon juice; pH 1 is the acidity of stomach acid).

The orange bars indicate higher acid and cost conditions. (See Figure 11 for cost/tonne).

What is significant is the level of Permanent Magnet extraction that can be achieved at Deep Leads using very low-cost desorption conditions.

Note that ABx has only tested Deep Leads extraction rates at ANSTO under pH4 conditions (i.e., low-cost extraction) hence there is no data for extraction under higher cost conditions.



Finally, Figure 14 demonstrates the level of Permanent Magnet extraction that is achievable under the lowest cost regime of pH4 and weak Ammonium Sulphide solution.

What is clear is that the Deep Leads mineralisation has the highest level of Permanent Magnet REO extraction under low cost/pH4 conditions.

Figure 14: Extraction of Permanent magnet REO at low-cost conditions (Source: Company announcements, CC and ABx)

The initial study on Deep Leads extraction rates, as well as the geological conditions, suggest that the Deep Leads project lends itself well to Heap and/or In-situ Desorption using Ammonium Sulphate $(NH_4)_2SO_4$ in weak solution.

For the purposes of this report, we have modelled Heap Desorption only as the environmental permitting required for an In-Situ desorption operation would make the option more unlikely for the purpose of this analysis. However, it should be noted that the use of Ammonium Sulphate as a desorbent would be considered a positive given its non-toxic nature and common use as a fertiliser for alkaline soils.

Valuation – Deep Leads Prospect

We have chosen a probabilistic valuation method for the Deep Leads REE deposits using:

- Comparable Company analysis: comparison with other listed Clay hosted REE deposits listed on the Australian and the Toronto Stock Exchanges to calculate an approximate project value based on the In-Situ value of the Mineral Resource Estimate (MRE).
  - We have included and risked three different MRE outcomes – Current (21 million tonnes), 25 million tonnes and 30 million tonnes.
- Discounted Cash Flow (DCF) modelling – based on a 20-year project: a 20 million tonne deposit, treating 1 million tonnes of Run of Mine (ROM) ore per annum in a simple heap desorption operation.

Rare Earth Oxides - Price Deck

The Rare Earth Oxide price deck used for Corporate Connect research is in line with Adamas forecasts as of September 2022.

Rare Earth Oxide	La_2O_3	CeO_2	Pr_6O_{11}	Nd_2O_3	Sm_2O_3	Eu_2O_3	Gd_2O_3	Tb_4O_7	Dy_2O_3	Ho_2O_3	Er_2O_3	Tm_2O_3	Yb_2O_3	Lu_2O_3	Y_2O_3
Price (US$/KG)	1	1	128	134	4	30	69	2046	382	179	54	0	17	810	12

Table 4: REE Price Deck (*Source – Adamsas, Corporate Connect*)

Comparable company analysis

This analysis compares ABx with four companies whose primary assets are early-stage clay hosted Rare Earth projects. ABx Group is the exception in that it also has significant assets/activities in Alcore and Bauxite. For the purposes of this comparison only, we have allocated a value of A$20million to those other assets, a value that we believe is conservative.

Clay Hosted Rare Earth Companies - Comparison metrics

Company Name	Mkt Cap (A$ mill.)	Project name	Total Resource (mill. Tonnes)	Total Resource TREO (ppm)	Heavy REO (ppm)	Perm. Magnet REO (ppm)	Cut off grade	Insitu value per tonne of ore (US$)	In Situ Value (A$ mill)	ROM Basket Price (US$/kg)	Magnet Basket Price (US$/kg)	Extraction at >pH4 (%)
ABX Group	25	Deep Leads	21	770	241	196	250	50	1,532	**65.36**	**54.25**	**38%**
Ionic Rare Earths	107	Makuutu	531	640	127	152	200	19	14,321	48.46	40.69	34%
Australian Rare Earths	34	Koppamurra	102	818	261	201	325	39	5,699	47.13	37.62	14%
Aclara Resources	83	Penco Module	101	2417	482	446	NA	133	5,296	54.98	46.05	28%
Meteoric Resources	265	Caldeira	409	2626	303	631	1000	108	63,889	41.04	36.80	60%

NB: The extraction rate for Caldeira (MEI-ASX) has not been tested by ANSTO.

Table 5: Clay hosted REE companies - comparison metrics (*Source – Corporate Connect*)

Comparison of some of the main risks

Given the large number of variables at play in determining the value of a clay hosted REE project, we have chosen to look first at the broader metric of current market capitalisation as a proportion of the total In-situ value of mineral resources. The metric is general in nature and it would be expected to increase as project risk decreases.

Clay Hosted Rare Earth Companies - Comparison metrics

Company Name	Code	JORC compliant resource	Proven lowest cost extraction (ie, ANSTO tested @ pH 4)	Detailed Economic study
ABX Group	ABX- ASX	●	●	◆
Ionic Rare Earths	IXR-ASX	●	▲	▲
Australian Rare Earths	AR3-ASX	●	▲	◆
Aclara Resources	ARA-CA	●	●	●
Meteoric Resources	MEI-ASX	●	▲	◆
Heavy Rare Earths	HRE-ASX	●	◆	◆

Table 6: Project status - Clay hosted REE Projects

Resource status:

All the companies have announced JORC compliant resources.

The prospect for growth in the mineral resource estimates is probably greatest with the companies that are in the earlier phases of their exploration journey – namely MEI-ASX, HRE-ASX, ABX-ASX and AR3-ASX.

Project Study status:

Of the companies, only Aclara's (ARA-CA) Penco project has completed a detailed 412 page Preliminary Economic assessment while Ionic Rare Earths (IXR-ASX) have recently presented a 50 page Definitive Feasibility Study. All other companies are currently

actively drilling to build out their Mineral Resource Estimates. Given the very low cost nature of ABx's current resource, the company could progress a Scoping Study on a 20 million tonne Mineral Resource Estimate.

Presence of substantial low extraction cost IAC Rare Earths:

As outlined previously, true IAC's will release the contained Rare Earth Elements when leached with ammonium sulphate solutions of around pH 4 under ambient temperature and pressure conditions. This allows for Rare Earth extraction at the lowest cost and decreases the level of variability or uncertainty around operating margins. At this stage only ABX-ASX, IXR-ASX, ARA-CA & MEI-ASX have returned commercially positive test results under those conditions.

Comparison of in-situ value per tonne and Basket Price

Using the price deck in Table 4 we have calculated the basket price for six companies with clay hosted REE deposits and the notional in-situ value per tonne of ore.

Basket Price is used to estimate the value of what a kilogram of separated mixed rare earth oxides would be for a particular deposit and we have used it here only to demonstrate that a hypothetical kilogram of REO's from the Deep Leads mineral resource is considerably higher than other listed projects - indicating a higher proportion of the more valuable REO's used in Permanent Magnet. The Situ Value per tonne of ore is essentially the amount of REO contained per tonne of mineralisation multiplied by the Basket Price. Note that the chart is not adjusted for extraction rates – which could vary widely in magnitude and cost (See figures 12-14).

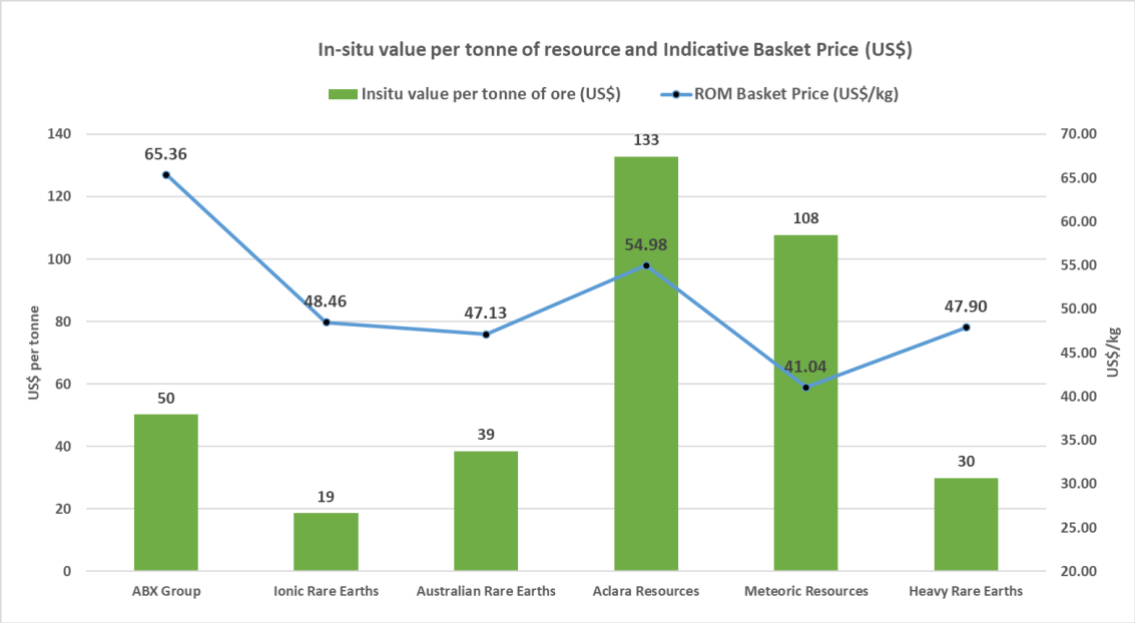


Figure 15: Company comparisons: In-situ value of ore (US$/tonne) & Basket Price

Valuation – Market Capitalisation as a % on In-situ value.

Figure 16 shows the market capitalisation of ABx's Peers as a percentage of in-situ value of Total Rare Earth Oxides.

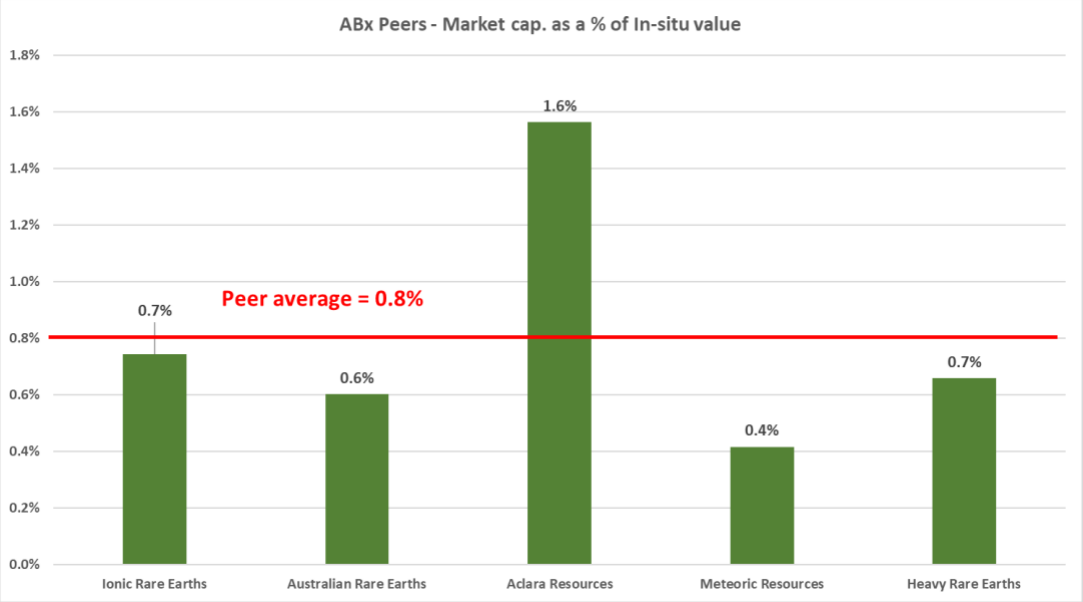


Figure 16: Market capitalisation as a % of In-Situ value.

The average Market capitalisation/In-situ value for the companies in the group, excluding ABX, is approximately 1%. As a point of reference to this number, Heavy Rare Earths Ltd successfully listed on the ASX in August 2022 with a market capitalisation of $13.6 million – which was 1.13% of its total In-situ value.

Applying this multiple to ABX's current MRE of 21 million tonnes implies a value of A$15 million. However, Corporate Connect believes that an upgrade to the current MRE is highly probable within the next 12 months given the current drilling and assay program.

We have used probabilistic weighting to derive an implied value of A$19 million. Please note that we have assumed that the Total Resource grade stays the same at 770ppm.

Deep Leads - Resource Valuation : Probabilistic									
Method		Resource (mill. Tonnes)	Resource TREO (ppm)	TREO value per tonne (A$/t)	Total In-situ Value (A$ million)	Implied Valuation ($A mill.)	Weighting	Risked Value (A$ mill.)	Risked Value (A$/share)
% of In-Situ Value (1%)	Current MRE	21	770	72.5	1523	15	20%	3	
% of In-Situ Value (1%)	Future MRE (<12 months)	25	770	72.5	1813	18	45%	8	
% of In-Situ Value (1%)	Future MRE (<12 months)	30	770	72.5	2175	22	35%	8	
Deep Leads - Resource Valuation							100%	**19**	**0.08**

Table 7: Deep Leads: Probabilistic valuation - using peer derived 1% of In-Situ value

DCF Analysis - 1 mtpa Heap Leach operation.

As yet there are no project scoping studies or data for the Deep Leads Project, so our DCF analysis is based on a simple heap leach operation of 1mtpa ROM. We have assumed mining is a simple Dig, Load & Truck method and there is no significant pre-strip required. Mined areas would be backfilled and remediated on a progressive basis – and would be in line with ABx's stated objective to leave landforms at least the same (or preferably improved) as before mining commenced.

Heap leaching is the method of treatment considered here but it could progress, with time, to Vat/Tank leaching – particularly if the geological model is refined and better grade control is achieved. Pregnant leach solution would be treated with Sodium Carbonate to precipitate a mixed rare earth carbonate product (MREC) product.

Total Capex is estimated to be A$19 million including rehabilitation/remediation at the end of the project.

Operating assumptions:

Strip Ratio	0.41	**Desorption cost:**	A$6.60/tonne (Ammonium Sulphate cost @ US$250/tonne)
Extraction rate:	40%	**MREC precipitation cost:**	A$0.14c per tonne of ore (Sodium Carbonate @ US$280/tonne)
Average TREO grade:	0.0770%	**Discount rate:**	10%
Net Smelter Return	70%		

Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17	Y18	Y19	Y20	Y21	Y22	Y23
Waste (Mtpa)	0.22	0.33	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.33	0.00	0.00
Ore leached (Mtpa)	0.0	0.5	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.8	0.0
Leach extraction rate		40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	0%
Tonnes REO in concentrate		154	231	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308	231	0
Gross concentrate value $mill		15	22	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	22	0
Net Smelter Return rate		70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%
Net revenue A$millions	0	10	15	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	15	0
Capital Costs (A$mill.)	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
Operating Costs (A$mill.)	1	5	9	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	8	2
Free Cash Flow (A$mill.)	-5.1	4.1	5.3	8.1	7.3	7.3	7.3	7.1	7.3	7.3	7.3	7.3	7.1	7.3	7.3	7.3	7.3	7.1	7.3	7.3	8.1	7.0	-2.3

Table 8: DCF model of Deep Leads 1mtpa Heap Leach operation

We derive an unrisked pre-tax $NPV_{10\%}$ of $54 million dollars at a project level

ABx Group Limited

Hiding in plain sight

Alcore

Proprietary process to produce low-cost Hydrogen Fluoride and Aluminium Fluoride – an essential raw material in Aluminium smelting.

Alcore - Main Points

- Alcore is developing a unique refining technology to extract hydrogen fluoride from aluminium smelter waste (excess bath). This hydrogen fluoride can then be reacted with aluminium hydroxide to produce aluminium fluoride. Aluminium Fluoride (AlF_3) is an essential raw material input (electrolyte ingredient) in the Aluminium smelting process – you can't make aluminium without it.
- Australia (and elsewhere…) rely heavily on Chinese exports of AlF_3 – that's problematic for security of supply.
- AlF_3 is traditionally produced using aluminium hydroxide and fluorspar – fluorspar is becoming increasingly expensive and is considered a critical mineral in most western countries.
- The Alcore refining process is very low cost, sitting inside the lowest 5% of production of the global cost curve.
- The Alcore process conforms with the principles of the Circular Economy - it could be built alongside any Aluminium smelter globally, processing its high fluorine waste – a waste which is becoming increasingly difficult for smelters to deal with.
- Alcore has proven that the chemistry works and is now designing and constructing a Pilot Plant on the NSW Central Coast.
- Alcore has received the first $3.3 million instalment of a $7.5 million grant under the Federal Government's Modern Manufacturing Initiative.
- ABx owns 83% percent of Alcore and is responsible for its management.
- Corporate Connect has modelled a 20-year AlF_3 commercial production facility in Bell Bay, Tasmania and has calculated an unrisked NPV for 100% of the project at A$78 million – or A$65 million for ABx's 83% equity.

Timeline:

- 2017: Heads of Agreement signed with technology provider Refined Ore Industries Ltd (ROIL) to acquire the global rights for Alcore technology.
- 2018: Alocore Laboratory in Berkley Vale, Central Coast NSW is completed to lock-up stage.
- 2019: Alcore test work commenced. Refining bauxite into a clear solution containing AlF_3 was obtained, with silicon and iron oxides removed.
- 2020
  - Dr Mark Cooksey appointed General Manager of Alcore.
  - Announces that it is conducting advanced laboratory production of AlF_3 from the by-product waste material from Aluminium smelters.
  - Produces commercial grade AlF_3 made from 30% dross waste and 70% gibbsite (low grade bauxite).
- 2021
  - Achieves single step production of AlF_3, with grades comparable to commercial specifications, from 100% dross waste from a smelter.
- 2022
  - Two reactors commissioned to produce Oleum and a third reactor commissioned to test the recovery of fluorine from smelter bath and investigate a larger range of process conditions.
  - Selected the initial operating conditions for the Pilot Plant Reactor.
  - Received a $7.5 million grant from the Federal Government to assist development of the Stage 1 Commercial Plant at Bells Bay, Tasmania.

ABx Group Limited

Hiding in plain sight

Overview

Alcore is working on a novel approach to generate hydrogen fluoride from tapped bath, a waste product generated by aluminium smelting. The laboratory has successfully met all the critical objectives and optimization of the process is ongoing. The company is now gearing up to build a pilot plant, followed by the first commercial Hydrogen Fluoride (HF) production facility, scheduled to be established in Bell Bay, Tasmania. Most of the hydrogen fluoride is expected to be transformed into aluminium fluoride, providing a local, cost-effective source of aluminium fluoride for Australian aluminium smelters.

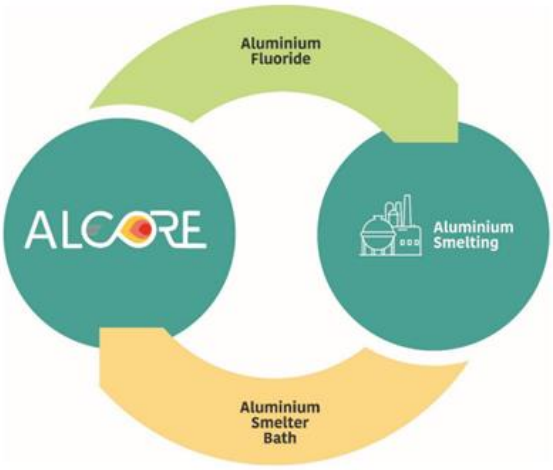


Figure 17: Alcore and the CIrcular Economy

In addition, Alcore is also exploring an alternative process to manufacture aluminium fluoride from cost-effective sources of aluminium, including bauxite and dross, which is another waste product from aluminium smelting. Although laboratory research has been conducted, further development is needed as this process has higher technical risk, even though it offers better financial returns and added environmental benefits than simply producing hydrogen fluoride from tapped bath. This is a secondary priority for the company, and there are no plans to use this approach at the first Alcore production facility.

Currently, Australia and New Zealand aluminium smelters import 100% of their aluminium fluoride needs, predominantly from China. The Alcore process would give Australasian smelters independence from the global AlF_3 market, ensuring reliability of supply. It would also remove the linkage to rising fluorspar prices – a key input in the traditional production of HF/AlF_3.

There are significant export opportunities with potentially any aluminium smelter in the Western World using its excess bath as a source of one of its primary inputs - aluminium fluoride. With the rising importance of industrial processes that assist a circular economy – Alcore could be a key technology for the Aluminium smelting industry.

Alcore – the process, inputs and outputs

In a nutshell, Alcore's unique refining technology takes excess smelter bath from aluminium smelters and combines it with Sulfuric acid to produce Hydrogen fluoride (Fig. 18) which is then used to make Aluminium Fluoride. The process to convert Hydrogen fluoride to Aluminium fluoride is not proprietary technology and is a well-known commercial process.

Alcore have chosen to produce Aluminium Fluoride over Hydrogen Fluoride for commercial reasons - the Aluminium Fluoride market in Australia is much larger (circa 30,000 tonnes/year) than the Hydrogen Fluoride market (<1000 tonnes/year). In addition, Aluminium Fluoride is much less costly to transport than Hydrogen Fluoride and is considerably easier to transport.

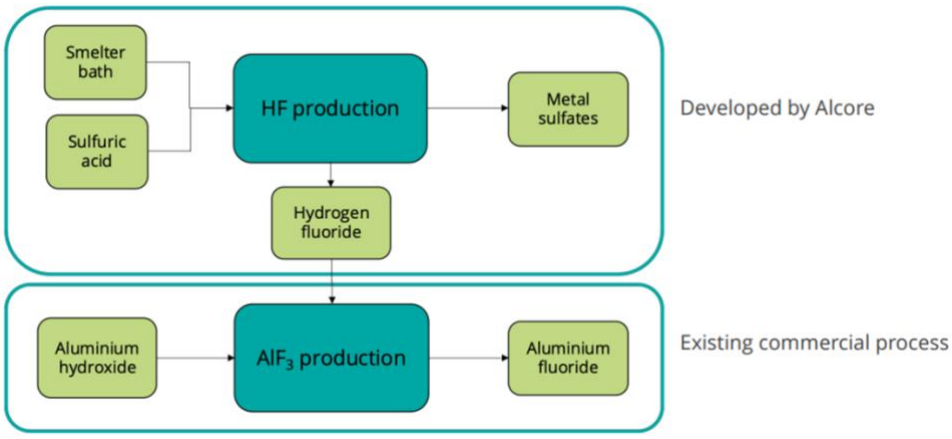


Figure 18: Alcore Simplified Flow sheet (Source: ABx)

Alcore Process inputs: Smelter Bath is the source of Fluorine

Alcore intends to use the Fluorine from excess smelter bath (sometimes referred to as “tapped bath”) to produce Hydrogen Fluoride which will then be used as an input to produce Aluminium Fluoride – a two stage process.

What is Smelter Bath?

Very simply, the smelting of primary aluminium is an electrolytic process that takes place in a cell (or pot) – modern smelters typically have long lines of these cells. Each cell has an anode and cathode which are in contact with the electrolyte (a molten bath of cryolite and alumina). A high electric current is passed through pots via the anode and the current flows continuously from the anode (positive) through the alumina/cryolite mix to the lining of the pot (negative) and then onto the next pot. Electricity maintains the temperature of the process at about 950°C and enables the alumina to split into aluminium and oxygen. The molten aluminium is tapped from the pots regularly while the bath stays in the cell.

Aluminium Fluoride is an essential ingredient in smelter bath because it lowers the melting point of the electrolyte thereby reducing the amount of energy that is required in the smelting process.

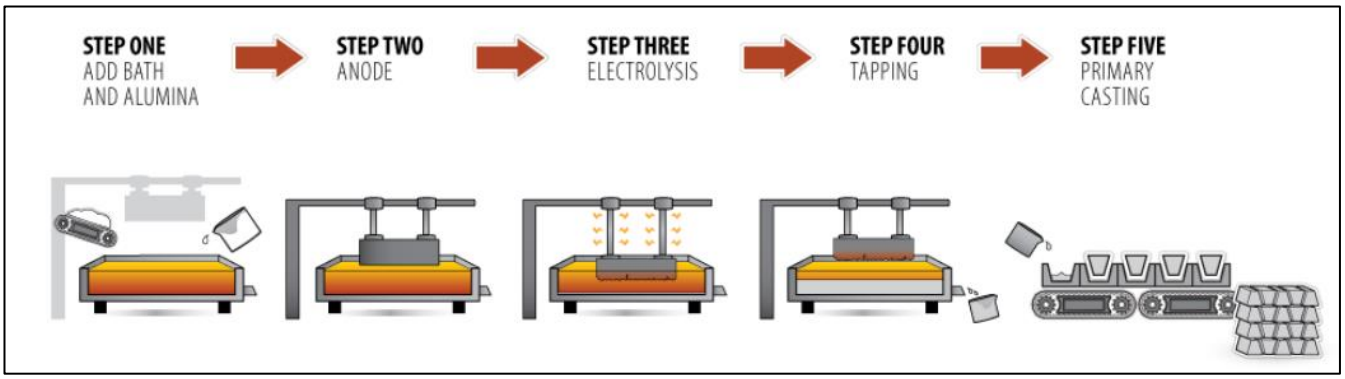


Figure 19: Aluminium smelting (Source: Australian Aluminium Council)

Figure 20: Modern Aluminium smelter (Source: Aluminium Institute)

Most modern aluminium smelters produce excess smelter bath and the only real markets for the excess bath are new smelters which require it to commence production. But Aluminium Industry forecasts suggest that the global bath market will be in surplus as fewer new smelters are constructed.

Modern pollution standards have meant that less fluorine is lost through emissions and incorporation into refractory materials.

The alternative for excess bath is landfill or storage – both are undesirable outcomes given the toxicity of the material. Alcore believes that all smelters in Australasia are net bath producers and potential suppliers to the Alcore process.

Traditional Aluminium Fluoride production - Fluorspar is going up in price.

The main cost driver of traditional AlF3 production is Hydrogen Fluoride and, in turn, the main cost driver of Hydrogen Fluoride is Fluorspar. Roskill Consultants estimate that the raw material costs of Fluorspar made up 41% of the cost of Aluminium Fluoride.

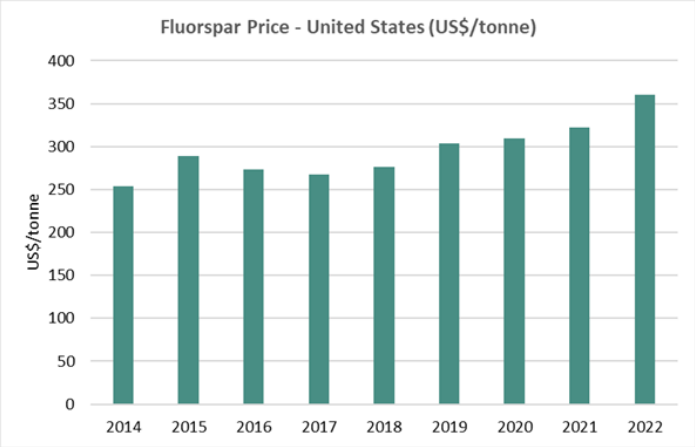


Figure 21: Average Fluorspar price in the US (Source: Statista)

Fluorspar – price continues to increase:

Corporate Connect believes that Fluorspar pricing will continue to grow, as it has for the last two decades, as demand for Aluminium and Hydrogen Fluoride increases. In turn, this will put upward pressure on Aluminium Fluoride prices.

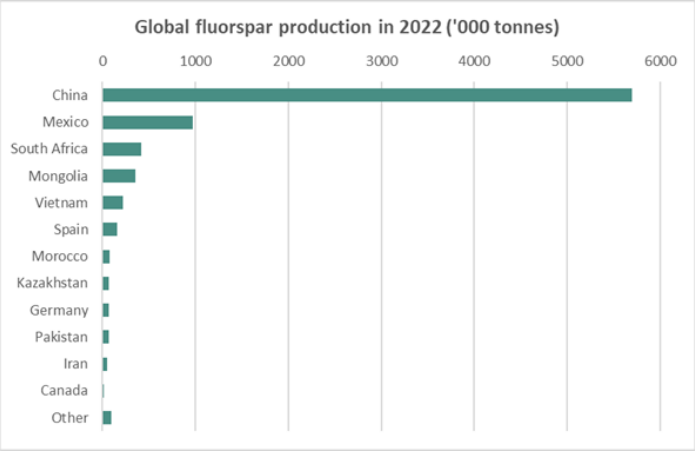


Figure 22: Fluorspar production by country (Source: Statista)

Fluorspar is designated a critical mineral:

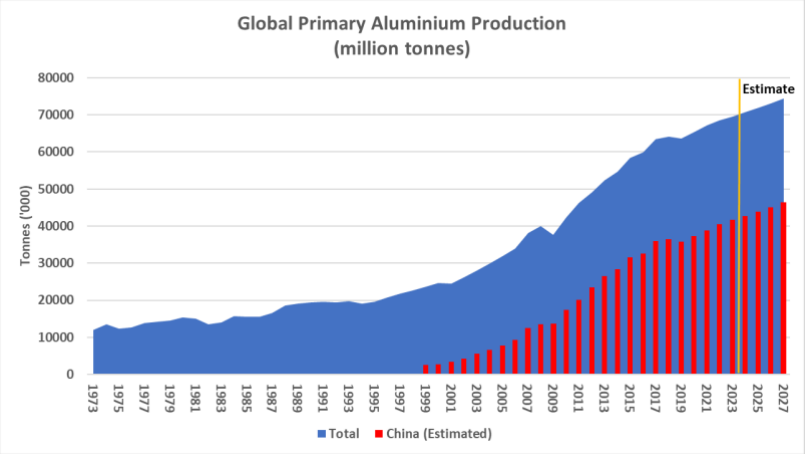
In the US, Europe, Japan and Canada – due to its importance in Aluminium smelting, Hydrogen Fluoride production and steelmaking. In addition, it is a material that is difficult to recycle – Fluorspar has only a 1% end-of-cycle recycling rate across Europe.

Security of supply:

With China supplying well over half of the worlds Fluorspar needs, there is also a security of supply issue that both Aluminium smelters and Western Governments are keenly aware of.

NB: The Alcore process uses Excess Bath as its source of Fluorine so it isn't directly exposed to rising Fluorspar costs.

Aluminium Fluoride market dynamics – strong.



The aluminium fluoride market globally is driven by primary aluminium production, given its crucial role in aluminium smelting.

We consider the market dynamics for AlF_3 very strong given forecasts for the growth in aluminium demand. Aluminium is regarded as an essential metal in the Energy transition where it plays a key role, particularly in transport (EV's) and electricity transmission.

There is considerable macro analysis of the aluminium market from industry bodies, investment banks and research houses – all of which is extremely bullish on the demand for Aluminium over the next decade with some forecasts predicting more than 6% CAGR growth in production.

Figure 23: Global Aluminium primary production forecast

Around 1.2 million tonnes of Aluminium Fluoride is produced globally with around 50% of that total produced in China. There is no AlF_3 production in Australia and New Zealand, so aluminium smelters in both countries import 100% of their requirements – around 30,000 tonnes/year.

Significantly, Australia is the largest producer of primary aluminium metal without its own domestic supply of AlF_3. The proportion of AlF_3 imported from China is normally more than 80% of the country's requirements.

Figure 23 shows global trade prices for AlF_3 with Australian trade averaging a touch over US$1400/tonne FOB – pricing is clearly dependent on volume and Australia is already paying one of the lowest prices ex-China.

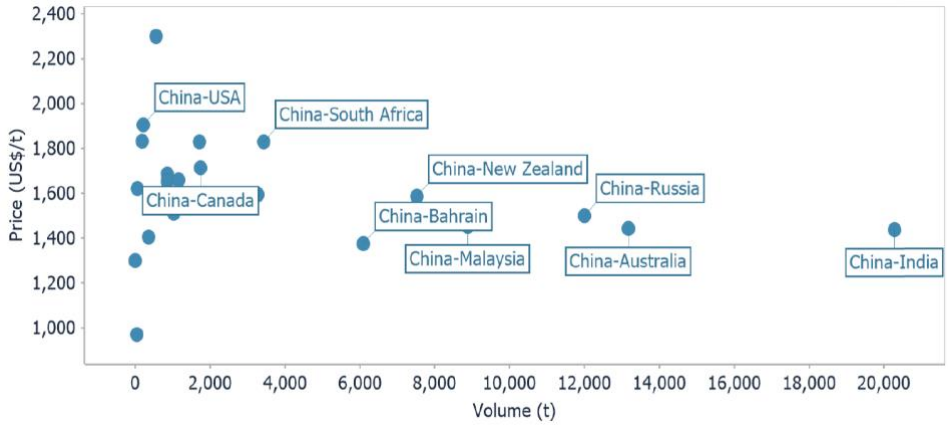


Figure 24: AlF_3 Trade Prices. 2019 average export values from China - US$/tonne FOB. (Source: Roskill)

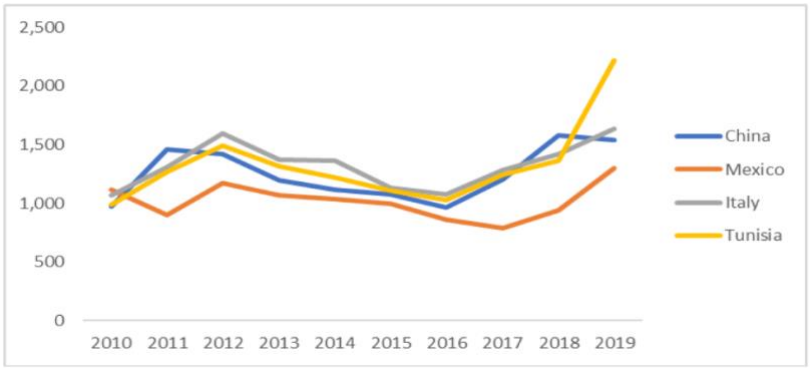


Figure 25: AlF_3 Trade Prices: Selected major exporters US$/tonne FOB (Source: Roskill)

Alcore: The process promises low cost production

Figure 26 below is the Global AlF_3 Production cost curve. It is a relatively flat curve and demonstrates why the price of Aluminium Fluoride moves within a relatively narrow band. Alcore's proposed operating cost sits well within the lowest decile of global costs and well below most Chinese production – the main source of Australia's AlF_3 imports.

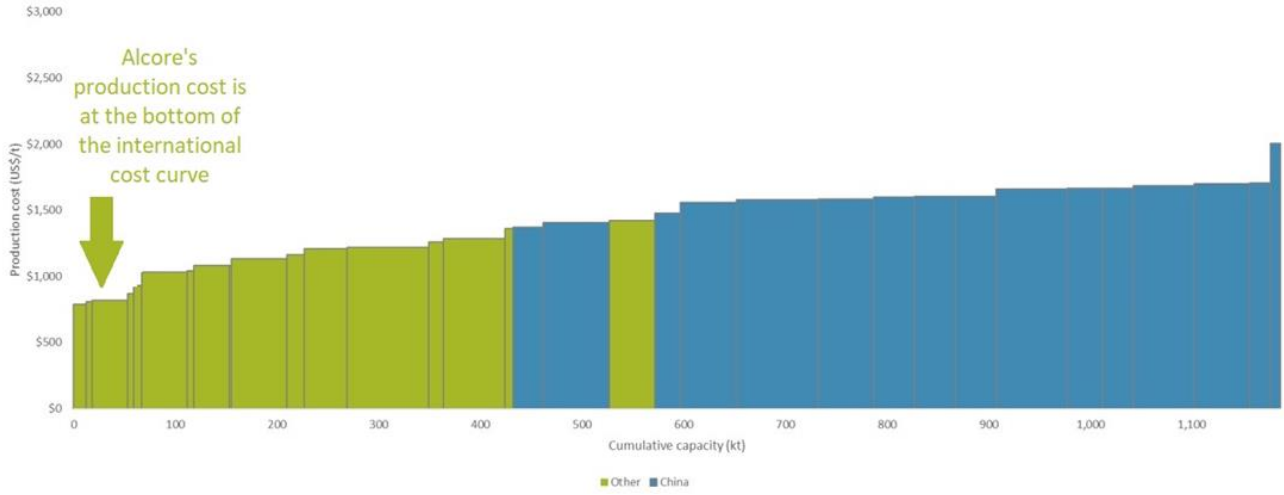


Figure 26: Aluminium Fluoride Global Cost Curve (Source: Roskill, 2019)

Alcore: Path to Commercialisation

Ongoing laboratory testing of the Alcore process has been in train since mid-2019 and has now progressed to the design and construction of a 20kg/hour Pilot Plant at the Alcore Research Centre on the Central Coast of NSW. Three reactors were commissioned throughout 2022 – two to produce Oleum and the third to conduct fluorine recovery tests from smelter bath. In October 2022, Alcore was able to select the initial operating conditions for the Pilot Plant.

Construction of the Pilot Plant is estimated to be finished by the end of CY2023 with commissioning in the first half of 2024. The plant will inform Alcore's engineers on how to develop Stage 1 of the Commercial Hydrogen Fluoride and Aluminium Fluoride plants at Bell Bay, Tasmania. As yet, no timing on the Commercial Plants have been announced to the market and we would envisage that further announcements on timing will be made as test results from the Pilot Plant are accumulated.

As can be seen from the Path diagram (Figure 26) – Alcore intend to move to a 20,000 tonnes/year AlF_3 plant which would supply over 80% of Australia's AIF3 needs.

The Australian Government awarded Alcore a $7.5million grant under its Modern Manufacturing Initiative in April 2022 which will be matched by Alcore to develop the Stage 1 Commercial Plant.

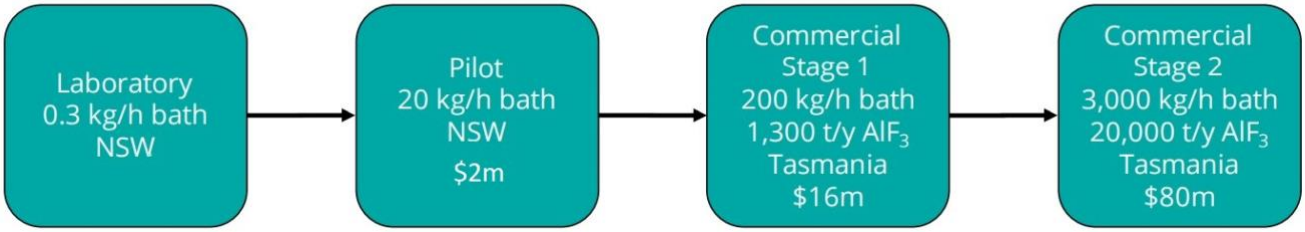


Figure 27: Alcore - Path to commercialisation (Source: ABx)

Alcore - Valuation

Our valuation of the Alcore business is based on NPV modelling of the proposed 20ktpa Stage 2 Commercial Plant which we have assumed will have an upfront capital cost of A$80million, as per company guidance.

For revenues in our analysis, we have used a long term AlF_3 price of A$1750/tonne (US$1208/tonne) this is in line with observed pricing. The AlF_3 price (FOB China) has only dropped below that level twice in the last 15 years.

As a by-product of the Alcore process, the Commercial Plant will also produce Aluminium Sulphate at the rate of 1.75x the rate of Aluminium Fluoride production. Aluminium Sulphate is a readily saleable product with prices varying between US$150 to $250/tonne. Our DCF has assumed an Aluminium Sulphate price of US$170/tonne.

ABx announcements have indicated an estimated operating cost per tonne, including sustaining capex, to be in the order of US$800/tonne. We have inflated that estimate by 8% to US$862/tonne or A$1250/tonne. We consider the estimate to be relatively conservative given we have assumed a relatively high level of cost for the supply of smelter bath.

Sustaining capex is included in Direct costs.

Alcore: Stage 2 Commercial Plant - DCF Analysis (100%)											
Year	1	2	3	4	5	6	7	8	9	10	20
A$ Million (unless indicated)											
AlF3 Production (ktpa)	10	20	20	20	20	20	20	20	20	20	20
Revenue (AlF_3)	17.5	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Revenue ($AlSO_4$)	4.3	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6
Total Revenue	21.8	43.6	43.6	43.6	43.6	43.6	43.6	43.6	43.6	43.6	43.6
Direct Costs	(12.0)	(24.0)	(24.0)	(24.0)	(24.0)	(24.0)	(24.0)	(24.0)	(24.0)	(24.0)	(24.0)
ROIL Royalty @ 1.5%	(0.3)	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)
Operating Margin	9.5	19.1	19.1	19.1	19.1	19.1	19.1	19.1	19.1	19.1	19.1
Other Overheads	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)
EBITDA	9.3	18.8	18.8	18.8	18.8	18.8	18.8	18.8	18.8	18.8	18.8
Capital Expenditure	(80.0)										
Net Cash Flow	(70.7)	18.8	18.8	18.8	18.8	18.8	18.8	18.8	18.8	18.8	18.8

Table 9: DCF Analysis - Alcore Stage 2 Commercial Plant

Valuation Sensitivity- Alcore Commercial plant - Bells Bay, Tasmania						
NPV (A$ million) - 100%						
		AlF_3 Price (US$/tonne)				
		1070	1139	1208	1277	1346
		AlF_3 Price (A$/tonne)				
		1550	1650	1750	1850	1950
AlF_3 Cost of production (A$/tonne)	1450	8	25	43	60	78
	1350	25	43	60	78	95
	1250	43	61	**78**	96	113
	1150	61	78	96	113	131
Unrisked NPV valuation - $ per share (ABx 83% equity adjusted)						
		AlF_3 Price (A$/tonne)				
		1550	1650	1750	1850	1950
AlF_3 Cost of production (A$/tonne)	1450	0.03	0.09	0.16	0.22	0.29
	1350	0.09	0.16	0.22	0.29	0.35
	1250	0.16	0.23	**0.29**	0.35	0.42
	1150	0.23	0.29	0.36	0.42	0.49

Table 10: Alcore Commercial Plant - NPV sensitivity analysis

We calculate an $NPV_{10\%}$ $78 million for 100% or $65 million for ABx's 83% equity position. Assuming that the project is commissioned in 3-4 years' time we have discounted it back for an unrisked estimate of $58 million.

The sensitivity analysis in Table 10 clearly shows that the Alcore Stage 2 Project is profitable under a wide range of input costs and AlF_3 prices.

Note: We believe the appointment of Dr Cooksey to run Alcore and then ABx Group is significant. Dr Cooksey is a very experienced chemical engineer with direct experience in aluminium smelting and research experience across the smelting industry. His agreement to take on the role at Alcore/ABx is significant as he clearly believes in the technology and its commerciality.

ABx Group Limited

Hiding in plain sight

Australian Bauxite

Sunrise Bauxite Project and a 130 million tonne resource

Australian Bauxite - Overview

ABx began life as a bauxite exploration and development company. It has a number of bauxite tenements on the east coast of Australia (Table 12) including the Sunrise Deposit at Binjour, SE Queensland, the Inverell deposit, NSW and various tenements in Tasmania – inclusive of those that hold the IAC Rare Earths prospects. In total, ABx has a total Mineral Resource Estimate (MRE) of 130 million tonnes of Bauxite across the east coast of Australia and Tasmania.

This report focuses primarily on the Sunrise Bauxite Project as we see this as having value should the project go into production. We have only taken into account the 14.2 million tonnes of Inferred Resource primarily for metallurgical reasons given its higher AL_2O_3 content (40.7%) and yield in the laboratory (circa 80%), The deposit is high in Gibbsite which is preferred for use in the production of Alumina.

Region	Resource Category	Million Tonnes	Thickness (m)	Al_2O_3 %	SiO_2 %	Fe_2O_3 %	TiO_2 %	LOI %	Al_2O_3 Avl	Rx SiO_2	% Lab Yield	O'Burden (m)
CAMPBELL TOWN AREA TASMANIA	Inferred	0.9	3.0	42.6	3.5	25.4	3.5	25	36.7	3.0	50	2.1
	Indicated	0.8	3.2	42.5	3.2	26.4	3.0	24	36.2	2.8	55	1.8
	Total	1.7	3.1	42.5	3.3	25.9	3.3	25	36.5	2.9	52	2.0
Fingal Rail Cement-Grade	Inferred	2.4	3.3	30.9	19.5	35.4	3.9	17	–	–	–	1.9
	Indicated	3.9	3.8	31.1	19.0	35.2	4.0	17	–	–	–	1.7
	Total	6.3	3.6	31.0	19.2	35.3	4.0	17	–	–	–	1.8
DL-130 AREA TAS	Inferred	5.7	3.8	44.1	4.3	22.8	3.1	25	37.6	3.2	55	1.5
	Total Tas	13.7	3.6	37.9	11.0	28.9	3.5	21	n.a.	n.a.	54	1.7
BINJOUR QLD [2] DSO, Screen & Cement	Inferred	14.2	4.3	40.7	7.3	24.7	4.3	22	32.3	6.7	80	8.5
	Indicated	22.8	4.0	33.5	19.2	24.9	4.2	17	15.8	17.4	63	6.6
	Total	37.0	4.1	36.2	14.6	24.9	4.2	19	22.1	13.3	69	7.3
TOONDOON QLD [3]	Inferred	3.5	4.9	40.2	7.2	25.3	4.9	22	32.8	5.2	67	1.5
TARALGA [4]	Inferred	9.9	3.1	40.4	5.7	24.6	4.1	22	35.2	1.9	54	0.1
	Indicated	10.2	3.7	41.3	5.3	25.9	4.0	23	36.1	1.9	55	0.7
	Total	20.1	5.6	40.8	5.5	25.3	4.0	23	35.7	1.9	55	0.5
PDM-DSO*	Inferred	7.6	2.5	37.0	6.0	38.4	3.5	13	22.1*	1.3	72	0.2
	Indicated	10.3	3.1	37.6	3.9	40.4	3.7	14	22.4*	1.1	71	0.7
	Total	17.8	5.8	37.3	4.8	39.6	3.6	14	22.3*	1.2	72	0.5
	Total Taralga	37.9	5.7	39.2	5.2	32.0	3.8	18	35.4	1.6	63	0.5
INVERELL [5]	Inferred	17.5	4.7	39.8	4.8	27.7	4.3	22	31.0	4.2	61	2.3
	Indicated	20.5	4.8	40.6	4.7	26.9	4.1	23	32.0	4.0	60	2.4
	Total	38.0	4.8	40.2	4.7	27.3	4.2	22	31.6	4.1	61	2.4
GRAND TOTAL		130.1										

* PDM is Al_2O_3 spinel. Al_2O_3 Avl at 225°C is >35%

For the remaining bauxite resource, we have been guided by other resource multiples and have adjusted appropriately using a relatively high risk discount.

The MRE has been at 130million tonnes since 2018 and there has been limited progress on development options. Looking forward we have no clear line of sight for how the remaining Bauxite deposits in the MRE will be commercialised. While all of the resources are of sufficient grade to be used commercially (metallurgical and cement grade), we would need to see a more robust bauxite market to have comfort that some of the projects could be monetised.

Tasmanian bauxite: Included in the "Other Bauxite Resources" valuation is a nominal value of $10million for small scale cement grade bauxite sales. The company has indicated bauxite mining from the DL130 project, Tasmania will go ahead in Q3 2023. We have assumed sales of 30,000 tonnes per annum at a margin of A$35.00/tonne for these operations.

Table 11: ABx Bauxite Resource estimates

Sunrise Project, Binjour, Queensland – Proposed 1.5mtpa metallurgical Bauxite for export.

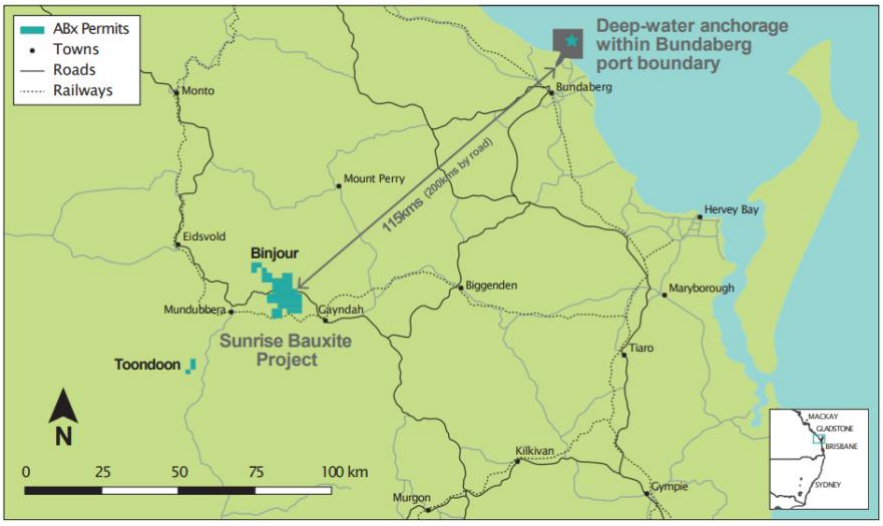
Located near the town of Mundubbera, Qld, the project has an estimated resource of 37 million tonnes of bauxite and is being developed initially as a direct shipping ore (DSO) operation. The Sunrise deposit is high quality, metallurgical grade bauxite with a proportion of Gibbsite and no monohydrates with lower moisture content than is seen in bauxite mined further north on Cape York. It would also be the only Australian bauxite that would be transported at distance from the Great Barrier Reef.

ABx Group Limited

Hiding in plain sight

In early 2022, ABx signed a Joint Venture Agreement with Alumin Pty Ltd to further advance the Sunrise Project. Alumin is a special purpose vehicle owned by Rawmin - an Indian Bauxite miner, marketer and trader who have extensive experience funding long term bauxite projects around the world.

Under the terms of the agreement, Rawmin will contribute up to A$18million to the development of the Sunrise Project. Each A$3.65 million will earn Rawmin 10% equity in the project up to a maximum of 49.9%. ABx has announced that $18million will fund all of the operations associated with mine and port development. It is envisaged that that the mine will operate for a minimum of 20 years.



The bauxite would be extracted using low-cost simple surface mining with drill & blast operations not required. Following overburden removal, a free dig and loader operation would direct load to B-double trucks. The ore would then be transported approximately 200km to the Port of Bundaberg where it would be stored awaiting shipping.

A transhipping operation is planned where barges would be loaded at port before being transferred to larger Capesize/Panamax vessels for export to India and China.

Figure 28: Sunrise Bauxite Project - Location

Sunrise Project: Valuation

Rawmin's signing of the JV agreement underpins the valuation of the Sunrise Project through the $18 million they have indicated they are willing to pay for 49.9% of the project – implying a base case value of circa $35 million. Corporate Connect has chosen to construct a 12-year DCF model (4 years ramp up + 8 years operation) using the following assumptions:

Operating Assumptions		@500 ktpa	@1000 ktpa	@1500 ktpa
Bauxite Price CIF China (US$/DMT)	60.00			
Shipping (A$/WMT)	26.00			
Bauxite Price FOB (A$/WMT)	54.00			
Transhipping (A$/WMT)		11.00	9.90	9.35
Mining & Beneficiation (A$/WMT)		11.00	9.90	9.35
Operating Cost FOB @ 1500 ktpa (A$/WMT)	43.67			
Operating Margin @ 1500 ktpa (A$/WMT)	**10.33**			
Total Capex ($ million)	23			

WMT = Wet Metric Tonnes

DMT = Dry Metric Tonnes

Table 12: Sunrise Bauxite Project - Operating assumptions

Our assumptions represent a conservative view of operating costs. In addition, we have modelled that the operation export 1.5mtpa of Bauxite although ABx has indicated their intention to export up to 2mtpa. That extra volume would have an added benefit to unit costs.

Table 13 and Figure 29 illustrate our production and revenue projections.

Sunrise Bauxite Project (100%) Year	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Production ('000 tonnes)	0	250	500	1,000	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
Revenue (A$ '000)	-	13,500	27,000	54,000	81,000	81,000	81,000	81,000	81,000	81,000	81,000	81,000	81,000
Direct Costs (A$ '000)	-	(12,417)	(24,835)	(45,670)	(65,504)	(65,504)	(65,504)	(65,504)	(65,504)	(65,504)	(65,504)	(65,504)	(65,504)
EBITDA (A$'000)	-	1,083	2,165	8,330	15,496	15,496	15,496	15,496	15,496	15,496	15,496	15,496	15,496
Capex	(10,000)	(4,000)	(2,000)	(1,000)		(2,000)		(2,000)		(2,000)			
Operating Cash Flow	(10,000)	(2,917)	165	7,330	15,496	13,496	15,496	13,496	15,496	13,496	15,496	15,496	15,496

Discount Rate	10%
Pre tax NPV ($ million)	$57
Pre tax NPV of ABx 50.1% Equity ($ million)	$29

Table 13: Sunrise Bauxite Project - 12 year DCF model and NPV

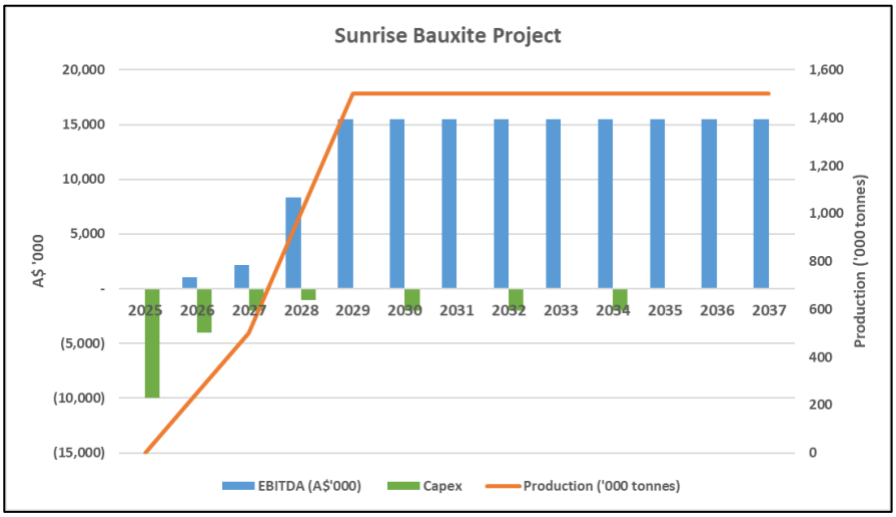


Figure 29: Sunrise Bauxite Project - DCF Projections

Bauxite Market – Reasons to be cheerful!

Over the second half of last decade, Bauxite prices were under pressure as new supply came online from Guinea backed by Chinese capital that wanted to diversify away from Australia's grip on the market. That supply hurt the aspirations of many new participants to the market, including ABX's Australian Bauxite.

Going forward there are reasons to be very positive on bauxite export prices with Chinese imports expected to grow significantly at a time when two of the three big exporters experience supply constraints. Chinese demand is expected to grow from circa 140 mtpa in 2022 to nearly 230mtpa within a decade. This is due to a combination of alumina refining capacity and declining domestic production.

Currently, Guinea, Indonesia, and Australia are the major bauxite exporters to China, with Guinea being the largest at 85Mt, followed by Australia at 30Mt and Indonesia at 15Mt. However, supply risks are increasing for Guinea and Indonesia, which leaves Australia in an advantageous position to benefit from Chinese demand.

In January 2023, Indonesia's Investment Minister, Bahlil Lahadalia, confirmed that bauxite exports would stop in June this year as the country pivots to a government mandated policy to build out downstream processing capabilities rather than maintaining a reliance on raw materials export. In Guinea the situation is somewhat more cloudy with the current government expressing similar wishes to the Indonesia but with no plan to get there – the overall political situation in Guinea has substantially increased the risks around investment in growth projects.

ABx Group
Company Details.

Company Board & Management

Chairman - Paul Lennon

Mr Lennon served as the 42nd Premier of Tasmania for 4 years (2004 - 2008) and Treasurer (2004-2006). He was the Minister for Infrastructure, Energy and Resources (1998-2002), and later Minister for Economic Development, Energy and Resources (2002-2004) while Mr Lennon was the Deputy Premier of Tasmania from (1998-2004).

Managing Director and CEO – Dr Mark Cooksey

Dr Cooksey brings to Alcore an impressive history in research, development and commercialisation of new processes in the minerals and metals industry. He commenced his career as a Research Engineer in aluminium smelting with Comalco (now Rio Tinto Alcan) in 1997 and became a Senior Research Engineer in 2000. Mark joined CSIRO in 2004 as a Senior Research Engineer and became a Senior Principal Research Leader in 2016. Dr Cooksey holds a PhD (Chemical & Materials Engineering), Bachelor of Engineering (Materials – First Class Honours) and Bachelor of Science (Information Technology and Applied Mathematics). He has worked closely with aluminium and other metal industries.

Ian Levy – Executive Director

Mr Levy is a geologist with more than forty years' experience developing mines from discovery through to production. Mr Levy has worked for a number of major resources companies, including WMC Limited, Pancontinental Mining, Gympie Gold and also served as CEO of Allegiance Mining. He has overseen the development of a number of gold, bauxite, base metals, nickel and industrial minerals projects. Ian was a member of the Joint Ore Reserves Committee (JORC) for 11 years including 4 years as Vice Chairman and Federal President, Australian Institute of Geoscientists.

Ken Boundy – Non Executive Director

Ken Boundy is a highly qualified corporate leader with a broad experience across many sectors of the economy in both executive and non-executive roles. For approximately 20 years, Ken has led a number of companies across the wine, food, building materials and tourism industries. During this period, he has had responsibility for corporate development for two ASX100 companies, which included extensive M&A activity. As an executive, Ken was CEO of Tourism Australia and Goodman Fielder Asia as well as having divisional leadership roles in other private sector organisations. Since 2004, Ken has been an independent Non-Executive Director and Chairman on 21 private and public boards. Ken is a Fellow of the Australian Institute of Company Directors and holds a Master of Business Administration from Deakin University.

Note: All Directors have significant shareholdings in ABx Group.

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For more information contact Corporate Connect

www.corporateconnect.com.au

Sydney
Level 7
7 Macquarie Place
Sydney NSW 2000

Phone: +61 400 897 559
Email: enquiries@corporateconnect.com.au
https://www.corporateconnect.com.au/

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