



AUSTRALIAN BAUXITE LIMITED

**ALCORE** Limited  
AlF<sub>3</sub> for aluminium smelters, recycling & lithium-ion batteries

ASX: ABX

## ASX ANNOUNCEMENT

18 November 2020

### Alcore Economic Assessment

Australian Bauxite Limited (ASX: ABX) (**ABx**) provides the following economic assessment of its 89% owned subsidiary **ALCORE** Limited (**Alcore**) and in particular work being undertaken to process aluminium fluoride (**AlF<sub>3</sub>**) by Alcore (**AlF<sub>3</sub> Project**).

- AlF<sub>3</sub> is a strategically important mineral because it is an essential ingredient for aluminium smelting. It is also being investigated for advanced lithium-ion batteries
- Australasian aluminium smelters currently rely entirely on imported AlF<sub>3</sub>
- AlF<sub>3</sub> imports by Australasian smelters from China alone in the last 12 months totalled more than 26,000 tonnes averaging US\$1,266 per tonne
- Alcore plans to be the first domestic producer of AlF<sub>3</sub> which will diversify and increase security of supply for Australasian smelters and enable export to other smelters worldwide
- The Alcore process is the world's first production of AlF<sub>3</sub> from the recycling of aluminium smelter waste and from ABx's gibbsite-rich clean bauxite
- Alcore is routinely producing AlF<sub>3</sub> of commercial composition and bulk density in the laboratory
- Alcore uses the aluminium-related parts of the CORE Technology (patent application)

#### Updated economic assessment

According to Roskill, a respected industry analysis company, in 2019:

- The operating cost of most global AlF<sub>3</sub> production was between US\$1,000/t and US\$1,500/t
- 75% of existing commercial AlF<sub>3</sub> production costs are raw materials, mainly fluorspar and aluminium hydroxide.

The Alcore process uses lower cost raw materials, offering a significant reduction in operating cost:

- Fluorine from aluminium smelter waste, instead of from purchased fluorspar
- Aluminium from bauxite or aluminium smelter waste, instead of purchased aluminium hydroxide

**Alcore's costs:** The cost advantage of fluorine from aluminium smelter waste allows Alcore to begin low-risk commercial production, initially from aluminium hydroxide, before expanding to processing bauxite or aluminium-rich smelter waste, which reduces costs but is not essential in early years of production to make the project attractive.

The operating cost range for Alcore's early years of production is estimated to be US\$800-\$950 per tonne of AlF<sub>3</sub>, based on the likely costs of raw materials for a plant in Bell Bay, northern Tasmania. This will place Alcore in the lowest cost quartile of global production.

The cost is based on purchased aluminium hydroxide and recycled aluminium smelter waste as the source of fluorine. Future cost reductions from using bauxite or aluminium-rich smelter waste are upsides.

**Prices:** The median long-term AlF<sub>3</sub> price is US\$1,175/t and market prices are currently near this value (see Figure 1). This provides an attractive operating margin for Alcore.

The Alcore process predominantly uses standard processing equipment, minimising the cost and risk of development.

**Current Alcore activities**

1. Conducting engineering validation, which is likely to include a pilot plant for critical process steps, to:
  - Confirm process and product performance at a larger scale
  - Produce larger samples for evaluation by aluminium smelters
2. Conducting process verification experiments in the laboratory to:
  - Optimise process conditions to ensure that required physical properties of  $\text{AlF}_3$  are consistently achieved
  - Produce  $\text{AlF}_3$  from bauxite and aluminium smelter waste of equivalent quality to that produced from aluminium hydroxide
  - Optimise the recovery of fluorine from aluminium smelter waste, including the separation and recovery of by-products with potential commercial value

**Commercial**

- Market prices for  $\text{AlF}_3$  are mainly determined by the Chinese export price set on the basis of free-on-board in Chinese Ports, which is published daily and monthly by China Customs. The median long term  $\text{AlF}_3$  price is US\$1,175/t (see Figure 1).
- Alcore plans to be the domestic first producer of  $\text{AlF}_3$ , at an industrial site in Bell Bay, northern Tasmania; an industrial precinct that currently has an aluminium smelter, a manganese smelter, an aluminium powder plant, a skilled workforce and experienced engineering firms.
- Alcore plans to commence with a production module of 10,000 tonnes of  $\text{AlF}_3$  per year, and steadily construct up to five production modules of the same size, for a total of up to 50,000 tonnes of  $\text{AlF}_3$  per year. This represents a small percentage of the 1.5 million tonne global market for  $\text{AlF}_3$ .

**Government & Industry**

Discussions continue with governments, agencies and with major companies in the aluminium industry. Alcore considers  $\text{AlF}_3$  to be a strategically important mineral product.

**Comment:** Alcore CEO, Mark Cooksey commented: “For the process selected for our first 10,000 tonnes/year production module, we have demonstrated all of the key requirements at the laboratory scale. The updated economic assessment confirms that this is a very attractive project. We are accelerating the engineering validation for the first production module.”



**Figure 1:**  
**China  $\text{AlF}_3$  export prices**  
 Source: China Customs

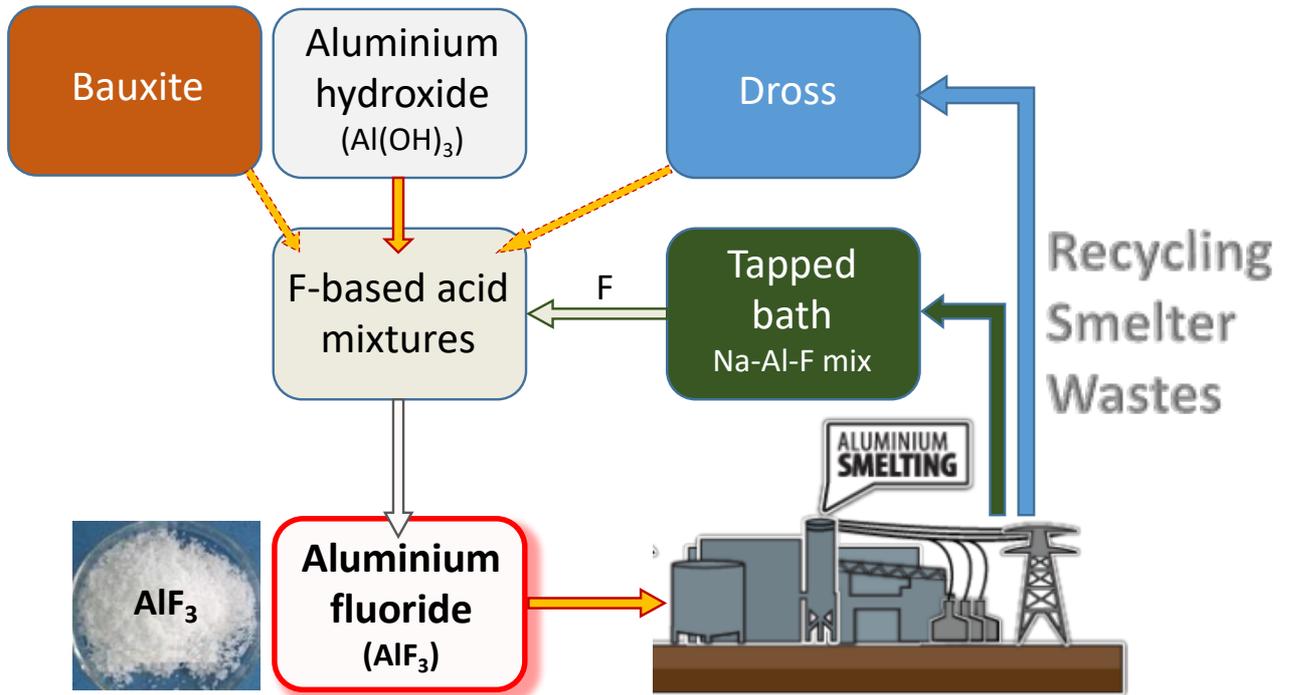


Figure 2: Summary of the Alcore strategy.



Figure 3: The \$2.5 million Alcore laboratory constructed inside the Alcore Research Centre.

The Alcore Lab is a climate-controlled laboratory constructed inside the Alcore Research Centre to produce test samples of AlF<sub>3</sub> and co-products. It will become a research centre for testing the technology on many ores.



**Figure 4: Alcore test lab, fume cabinets with hi-tech scrubbers, showers, microscopes & Drager air monitor (wall).**

This announcement has been approved for release by the Board of Australian Bauxite Limited.

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**Disclaimer Regarding Forward Looking Statements**

This ASX announcement (Announcement) contains various forward-looking statements. All statements other than statements of historical fact are forward-looking statements. Forward-looking statements are inherently subject to uncertainties in that they may be affected by a variety of known and unknown risks, variables and factors which could cause actual values or results, performance or achievements to differ materially from the expectations described in such forward-looking statements.

ABx does not give any assurance that the anticipated results, performance or achievements expressed or implied in those forward-looking statements will be achieved.

**About Australian Bauxite Limited**

**ASX Code ABX    Web: [www.australianbauxite.com.au](http://www.australianbauxite.com.au)**

Australian Bauxite Limited (ABx) has its first bauxite mine in Tasmania & controls the Eastern Australian Bauxite Province. ABx's 11 bauxite tenements in Queensland, New South Wales & Tasmania totalling 662 km<sup>2</sup> are all 100% owned, unencumbered & free of third-party royalties. ABx's bauxite is gibbsite trihydrate (THA) bauxite that can be processed into alumina at low temperature.

ABx has committed a large proportion of its expenditure into Research and Development to find ways to capitalise on the main strengths of its bauxite type which is very clean, free of all deleterious elements and partitioned into layers, nodules, particles and grains of different qualities that can be separated into different product streams using physical, chemical and geophysical methods.

ABx has declared large Mineral Resources in northern NSW, southern NSW, Binjour in central QLD & in northern Tasmania. ABx's first mine commenced at Bald Hill near Campbell Town, Tasmania in December 2014 – the first new Australian bauxite mine for more than 35 years.

ABx aspires to identify large bauxite resources in the Eastern Australian Bauxite Province and has created significant bauxite development projects in 3 states, Queensland, New South Wales and Tasmania. Its bauxite deposits are favourably located for direct shipping of bauxite to both local and export customers.

**ABx endorses best practices on agricultural land, strives to leave land and environment better than we find it.**

**We only operate where welcomed.**

**About ALCORE Limited:**



Australian Bauxite Limited (ABx)'s 89%-owned technology subsidiary ALCORE Limited was created to fund and manage the AlF<sub>3</sub> Project, involving the construction of a production plant to produce aluminium fluoride (AlF<sub>3</sub>) and valuable co-products using new Australian technology. Alcore intends to convert aluminium smelter waste (and low grade bauxite) worth less than \$50 per tonne into a suite of valuable products worth more than \$800 per tonne. Alcore's testwork commenced on 1 July 2019 at its high-technology Research Centre in Berkeley Vale, Central Coast NSW and is currently focussed on producing AlF<sub>3</sub> test samples for pre-qualified aluminium smelter customers. Its processes can also produce Corethane, which is pure hydrocarbon powder to provide thermal and electrical power with low CO<sub>2</sub> emissions when used as a gas-substitute or as a diesel substitute for fuel security purposes and is ideally suited for use as a sulphur-free bunker fuel. Corethane is also useable as a chemical reductant instead of imported coke and coals.

AlF<sub>3</sub> is an essential ingredient in aluminium smelters and is currently 100% imported. Alcore will be the first Australian producer of this strategically important mineral product and will provide security of supply to the large aluminium smelting industry in Australia. Alcore will produce AlF<sub>3</sub> from smelter waste materials and thereby maximise the recycling by Australian aluminium smelters.

**Directors of ABx**

Paul Lennon	Chairman
Ian Levy	CEO & MD
Ken Boundy	Director
Henry Kinstlinger	Company Secretary

**Officers**

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Jacob Rebek	Chief Geologist
Paul Glover	Marketing, Exploration & Relationships
Nathan Towns	Operations Manager
Dr Mark Cooksey	CEO Alcore Limited