



AB*x Group*

ASX:ABX

ALC**ORE**

**Clean fluorine chemical production:
producing industrial chemicals from
aluminium smelter by-product**

FLUORINE FORUM 2025

Hotel Grand Dino, Baveno, Italy

23 October 2025



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**Delivering materials
for a cleaner future**



Heavy Rare Earths

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



ALCORE

Clean fluorine chemical production

Producing industrial chemicals from aluminium smelter by-product



Near-term bauxite production

Mining bauxite resources for the aluminium, cement and fertiliser industries

INVESTMENT PROPOSITION

- ❑ **Low-cost hydrogen fluoride production using aluminium smelter bath by-product**
- ❑ **Will enable hydrogen fluoride production in Australia, to reduce 100% reliance on imports**



Team

Experienced and capable



Strongly increasing demand for fluorine

Batteries



Supply shortage

No hydrogen fluoride produced in Australia. Limited global fluorspar resources



New fluorine source available at low cost

Aluminium smelter bath waste



Chemical process is low risk

Adaptation of existing commercial process



Pathway to production

First mover globally: at pilot plant stage

HIGHLY EXPERIENCED TEAM



DR 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

XIAO LIANG

Principal Engineer

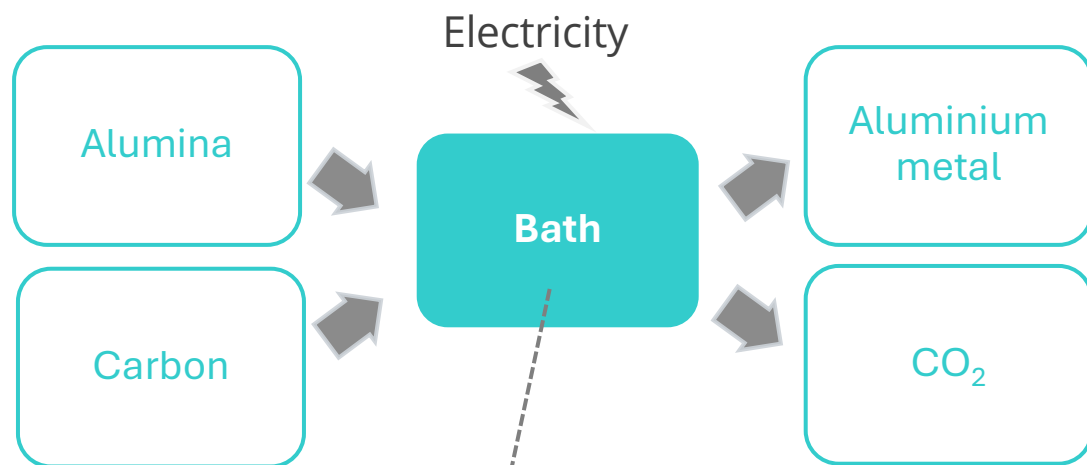
- Over 15 years of expertise in chemical process innovation and intensification, including conceptual design, fundamental research, and process scale-up.
- With extensive leadership experience, he drives cutting-edge technology development and oversees successful planning and implementation of new technologies at ALCORE



ALUMINIUM SMELTER BATH

- ❑ Used as electrolyte in aluminium smelting, because it dissolves alumina (Al_2O_3) and is electrically conductive

Aluminium smelting



Main reaction: $2\text{Al}_2\text{O}_3 + 3\text{C} \rightarrow 4\text{Al} + 3\text{CO}_2$
Side reactions: $3\text{Na}_2\text{O} + 2\text{AlF}_3 \rightarrow 6\text{NaF} + \text{Al}_2\text{O}_3$
 $3\text{NaF} + \text{AlF}_3 \rightarrow \text{Na}_3\text{AlF}_6$

Typical bath composition

Compound	Chemical Formula	Content (%)
Cryolite	Na_3AlF_6 ($3\text{NaF} \cdot \text{AlF}_3$)	88-94
Calcium Fluoride	CaF_2	4-6
Alumina	Al_2O_3	2-6
Iron Oxide	Fe_2O_3	<0.08
Silica	SiO_2	<0.08
Carbon	C	<0.4

Mechanism of surplus bath formation

Alumina contains sodium oxide (Na_2O) impurity

→ Na_2O reacts with aluminium fluoride (AlF_3) in the bath to produce sodium fluoride (NaF) and alumina (Al_2O_3)

→ AlF_3 additions required to maintain AlF_3 content

→ Production of NaF and addition of AlF_3 means that bath (Na_3AlF_6) is produced

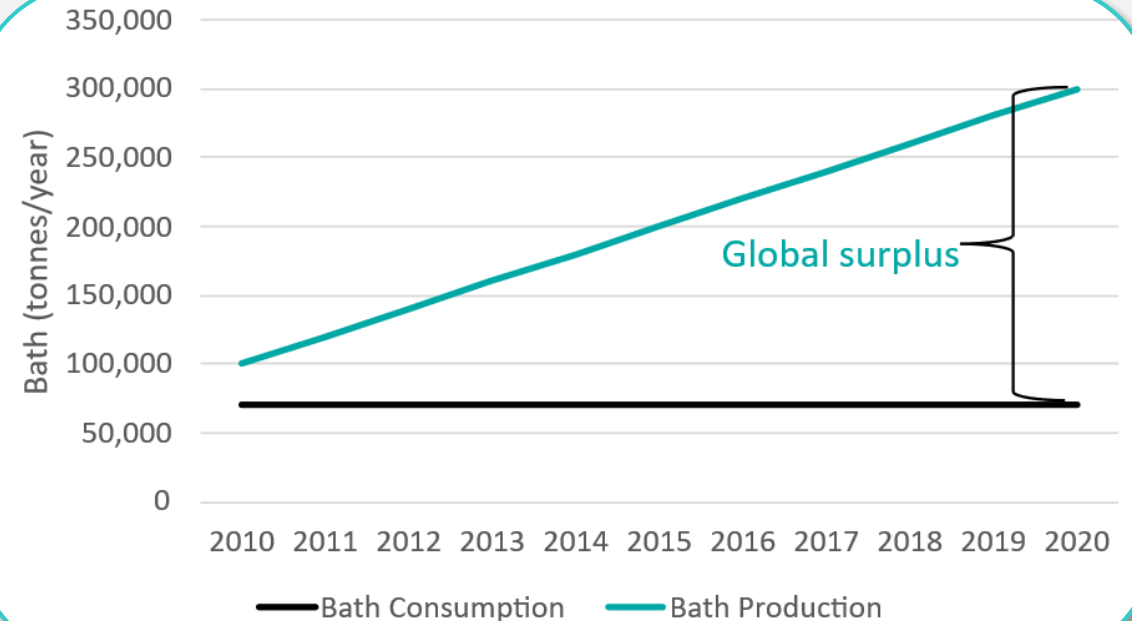
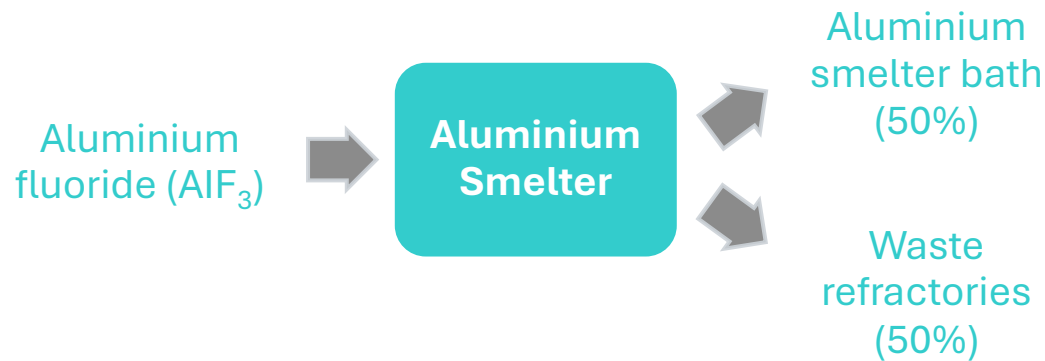
NEW FLUORINE SOURCE AVAILABLE: ALUMINIUM SMELTER BY-PRODUCT

- 50% of fluorine leaves aluminium smelting process as aluminium smelter bath by-product

- New smelter requires bath to commence operations
- New smelter → short term bath demand → long term bath surplus

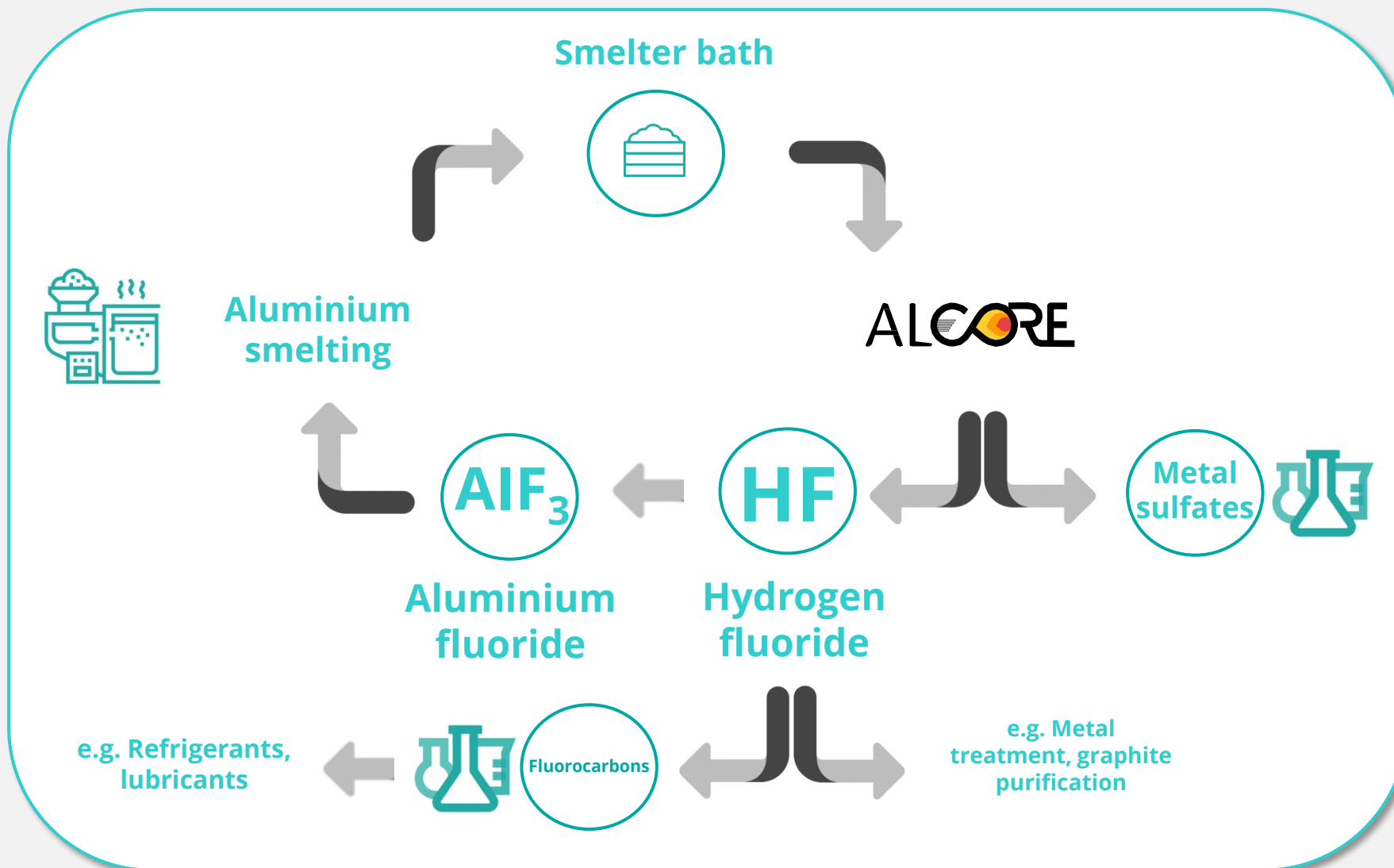
Increasing global surplus of aluminium smelter bath

Fluorine process flow in aluminium smelters



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

ALCORE PROCESS

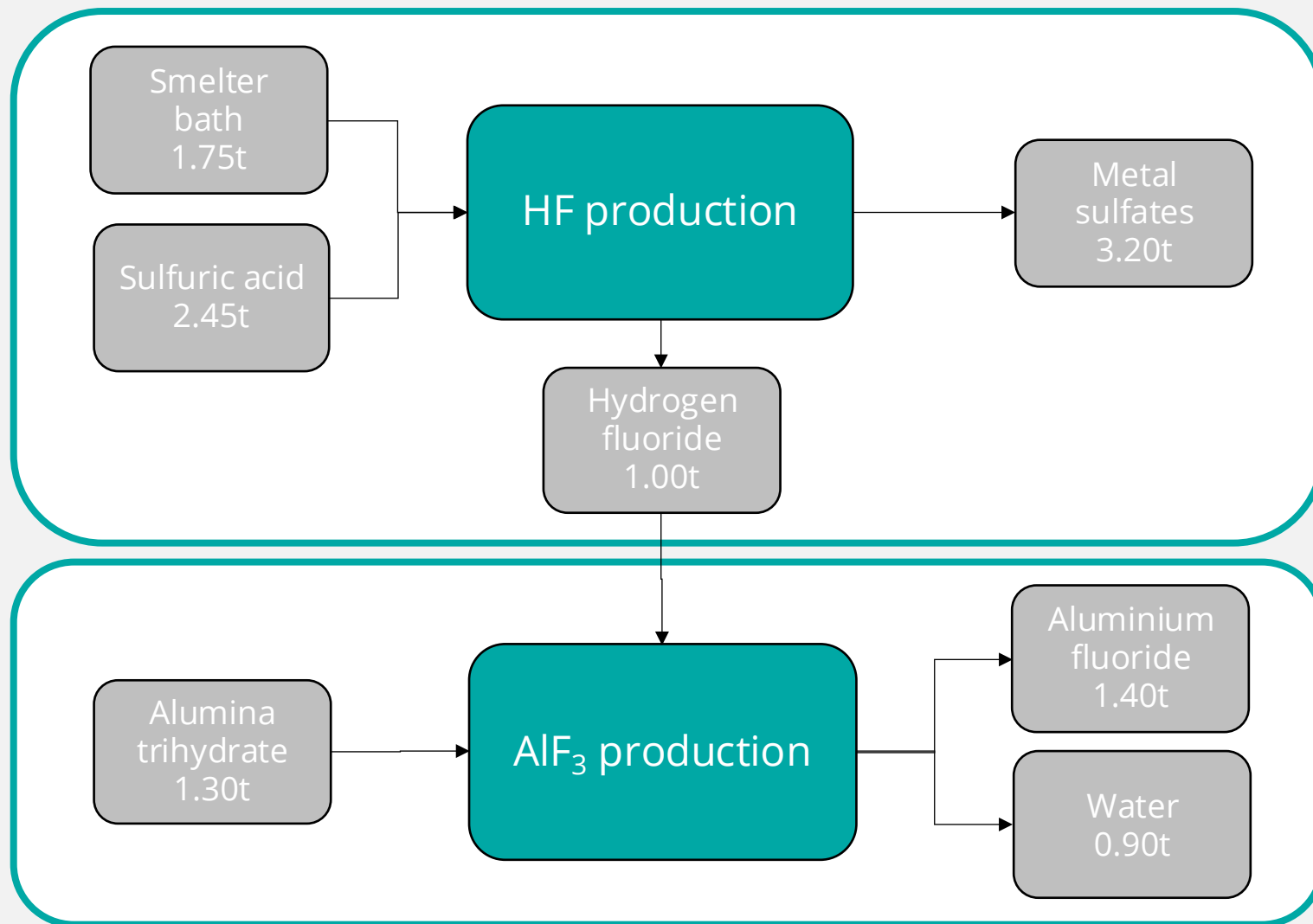


Low technical risk

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

Exemplary demonstration of circular economy

PROCESS FLOWSHEET



Existing commercial process

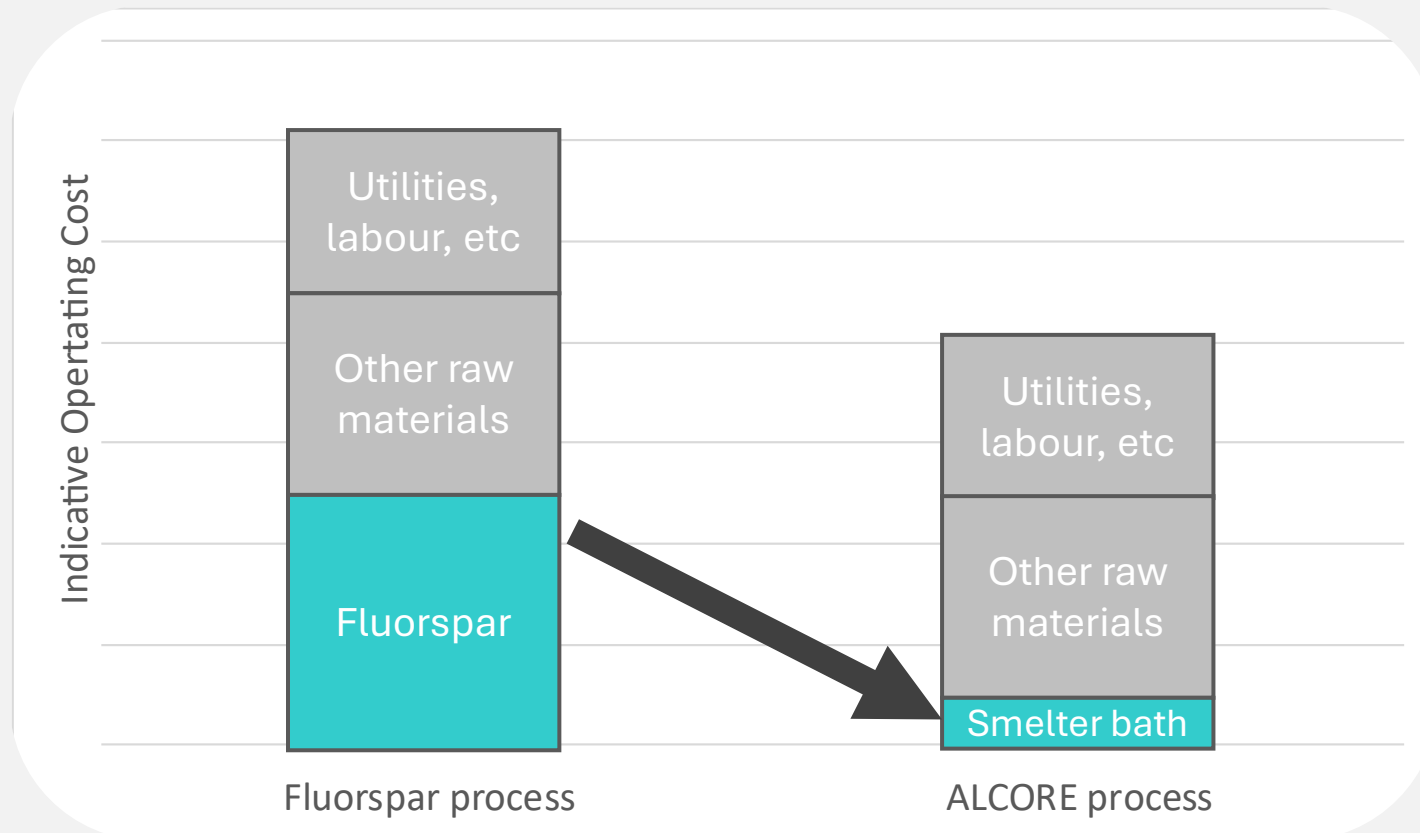
Overall energy consumption: ~1 kWh/kg AlF₃

SIGNIFICANT COST ADVANTAGE OF REPLACING FLUORSPAR WITH SMELTER BATH

A rare opportunity that is financially, strategically and environmentally attractive

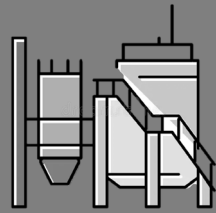
- ❑ ALCORE process produces same hydrogen fluoride product using a much lower cost feed material
- ❑ Aluminium smelter bath is a good quality material (low impurities)

Potential for significant profit margin



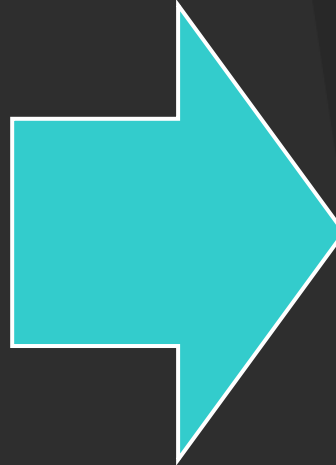
VISION FOR CLEAN FLUORINE CHEMICALS PRODUCTION BUSINESS

COMMERCIALISATION



Production

Construct plant in Tasmania to produce hydrogen fluoride and aluminium fluoride from aluminium smelter by-product



GROWTH



Expansion

Construct similar plants overseas

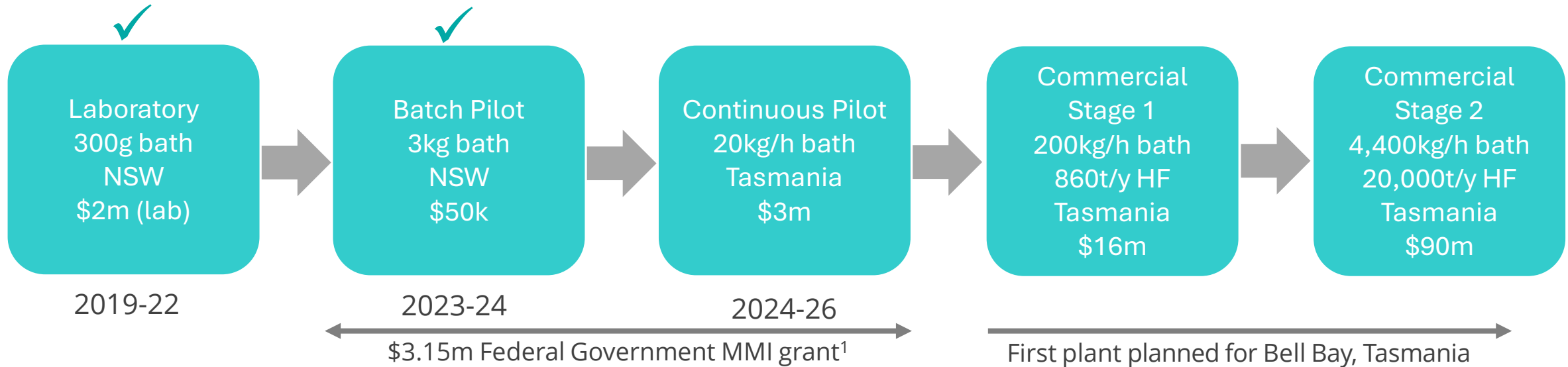


Value-adding

Enable Australian fluorochemical industry

PATHWAY TO PRODUCTION: PROJECT DEVELOPMENT

ALCORE has first mover advantage



Critical process steps demonstrated²



Achieved target fluorine recovery³

- At facility leased from Rio Tinto at reduced rate⁴
- \$1m conditional loan from Tasmanian Government⁵
- Orders placed for all key equipment⁶
- Produce saleable hydrogen fluoride for evaluation by customers
- Determine design and operating parameters for commercial plant

¹ABX ASX Announcement, 26 June 2025

²ABX ASX Announcement, 24 October 2022

³ABX ASX Announcement, 30 October 2024

⁴ABX ASX Announcement, 15 January 2025

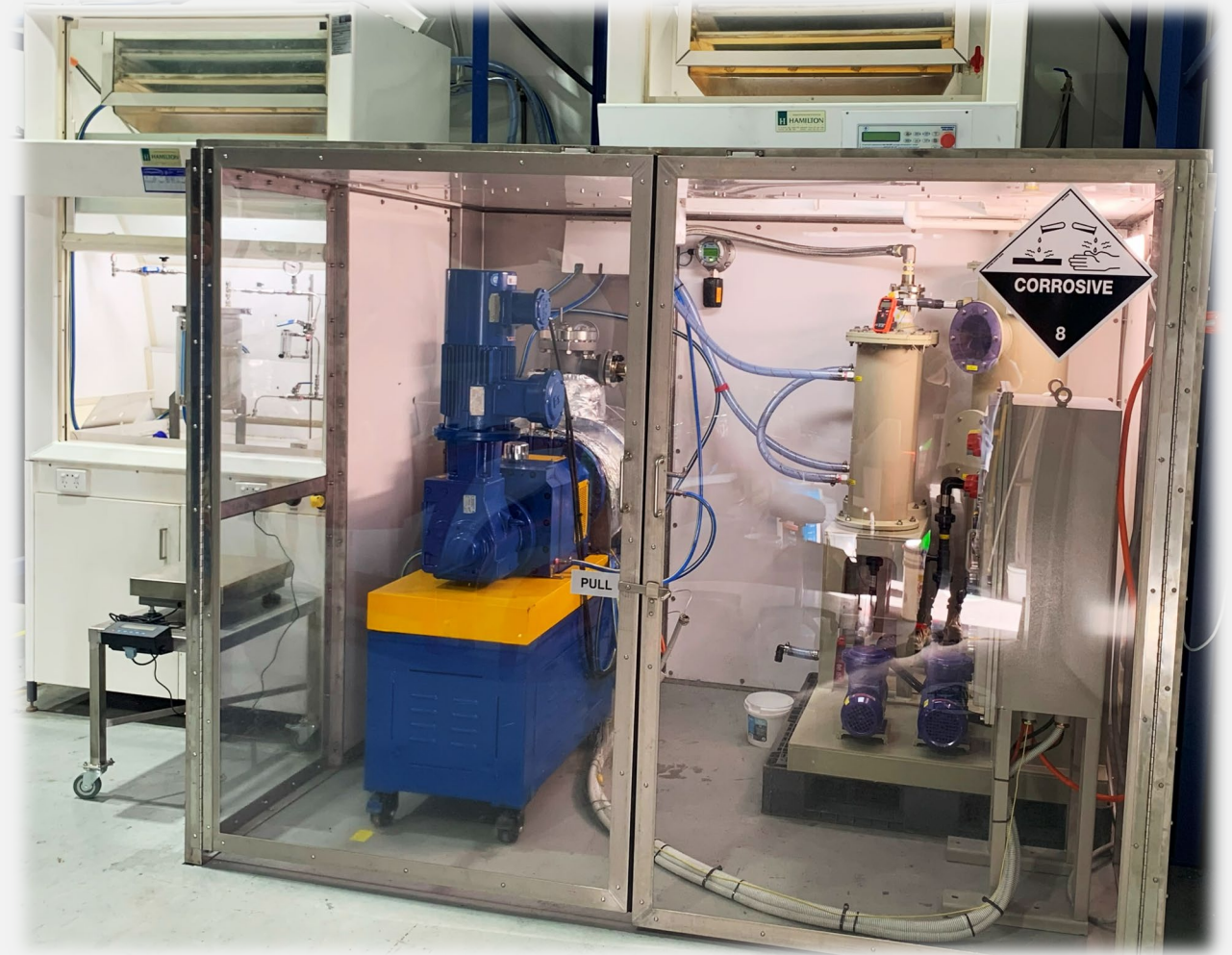
⁵ABX ASX Announcement, 19 December 2024

⁶ABX ASX Announcement, 9 April 2025

BATCH PILOT REACTOR PERFORMANCE

4 kg crushed bath and 6 kg H₂SO₄

97% of fluorine extracted from bath as HF (two stage process)¹



¹ABX ASX Announcement, 30 October 2024

CONTINUOUS PILOT PLANT – BELL BAY, TASMANIA

Location



Facility



- ❑ Leased from Rio Tinto at reduced rate¹
- ❑ Orders placed for all key equipment. Most of the specialised equipment is being fabricated by experienced overseas suppliers²
- ❑ Expect equipment to be delivered late 2025 to Q1 2026³

¹ABX ASX Announcement, 15 January 2025

²ABX ASX Announcement, 9 April 2025

³ABX ASX Announcement, 15 October 2025

ANTICIPATED PROJECT MILESTONES

Project Activities

Continuous Pilot Plant

Engineering Studies

Environmental Approvals

Commercial Stage 1 Plant

Commercial Stage 2 Plant

2025

Q4

2026

Q1

Q2

Q3

Q4

2027

Q1

Q2

Q3

Q4

2028

Q1

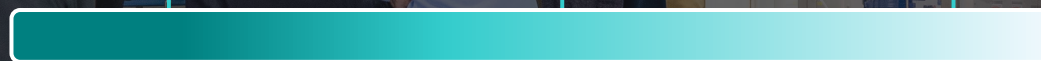
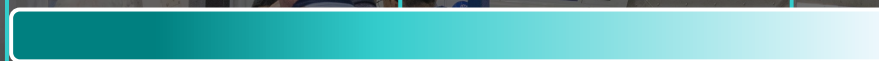
Q2

Q3

Q4

2029

Q1





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ABx Group

ASX:ABX

www.abxgroup.com.au

Suite 2, Level 11, 385 Bourke St
Melbourne VIC 3000
Australia

Phone: +61 3 9692 7222

E: investors@abxgroup.com.au

Mark Cooksey

Managing Director and CEO

E: mcooksey@abxgroup.com.au

