

# Manganese: From Critical Mineral to Next Generation Battery Material

## A Fully Integrated Proprietary Platform

TRANSFORMING A FRAGMENTED, MULTI-FACILITY, MULTI-COUNTRY CRITICAL MINERALS AND BATTERY SUPPLY CHAIN INTO A SINGLE INTEGRATED PROCESS

## Why Firebird, why now

Four catalysts converging behind a single, sovereign manganese-to-cathode platform.



### World-first Tech

Perth site readiness underway.  
Equipment arrival, assembly and commissioning Q4 2026.



### Defensible IP to 2045

Five core LMFP patents under exclusive ex-China licence; high-efficiency kiln patent



### Government-validated

A\$2M ARENA grant, non-dilutive; first A\$1.0M milestone payment received.

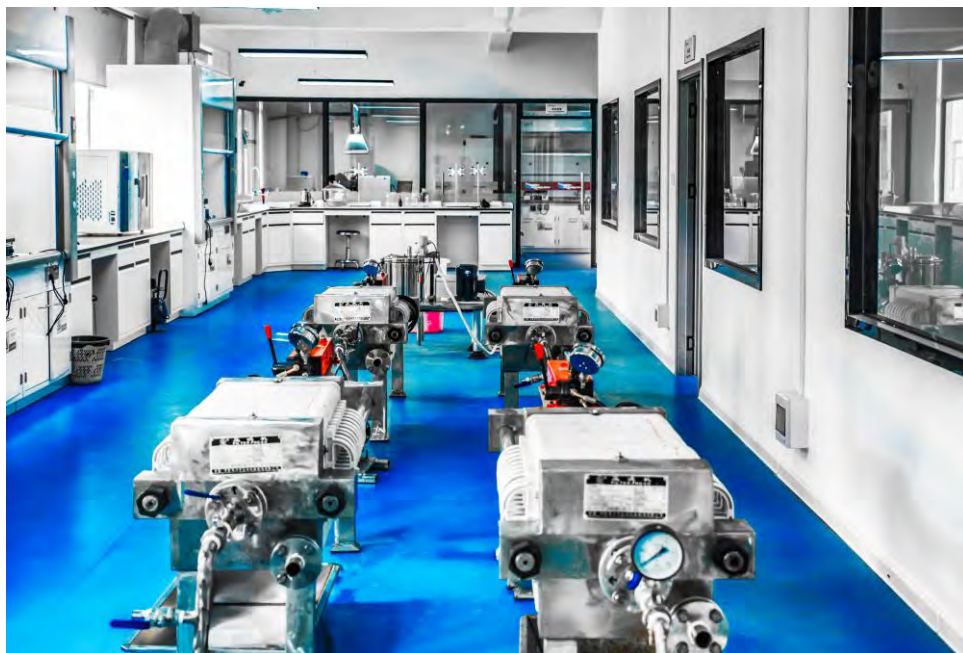


### Upstream optionality

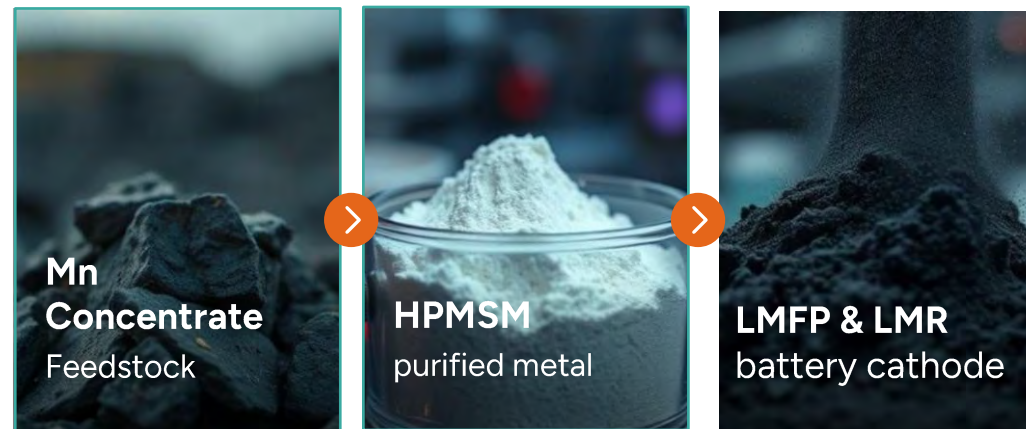
234 Mt of WA manganese resources at Oakover and Hill 616, ore-agnostic flowsheet.

INTEGRATED PROCESS

# From concentrate to cathode in one circuit



## FIREBIRD PROPRIETARY MN CONCENTRATE TO CAM PROCESS



A focused Australian processor pairing proven IP with the only Western fully integrated manganese-to-CAM facility

## Sovereign western HPMSM & cathode production

Battery materials processing is concentrated in China. Western OEMs, energy storage developers and governments need an alternative.



### TODAY

#### Concentrated, dependent supply chain

- ✓ Virtually all global battery materials produced in China
- ✓ Fragmented, multi-facility, multi-country processing
- ✓ Critical vulnerability for Western OEMs, ESS developers and governments
- ✓ Identified as a strategic priority across AU, US, EU, Japan, Korea

### WITH FIREBIRD'S ADP

#### First credible Western pathway

- ✓ Only fully integrated Mn-to-CAM facility outside China
- ✓ First-tier mining jurisdiction (Australia)
- ✓ Aligned with AU Critical Minerals Strategy and Net Zero 2050
- ✓ Commercial pathway via licensing, JVs, equipment sales and CAM offtake

# AUSTRALIAN DEMONSTRATION PLANT



# Perth Site Ready for Deployment

## Osborne Park

**April 2026:** Multi year lease over a 775 sqm purpose-fit facility

**August 2026:** Moved into site.

### SITE SELECTION RATIONALE

- ✓ Sufficient three-phase grid power (+ solar)
- ✓ Light industrial zoning aligned to planned activities
- ✓ Suitable building footprint, layout and scale-up flexibility
- ✓ Proximity to engineering services and skilled workforce
- ✓ Excellent access for customer, OEM and investor site visits
- ✓ Capital-light pathway from demo to commercial deployment

Source: ASX announcement, 30 April 2026

### 13 Sangiorgio Court

Osborne Park, Perth WA



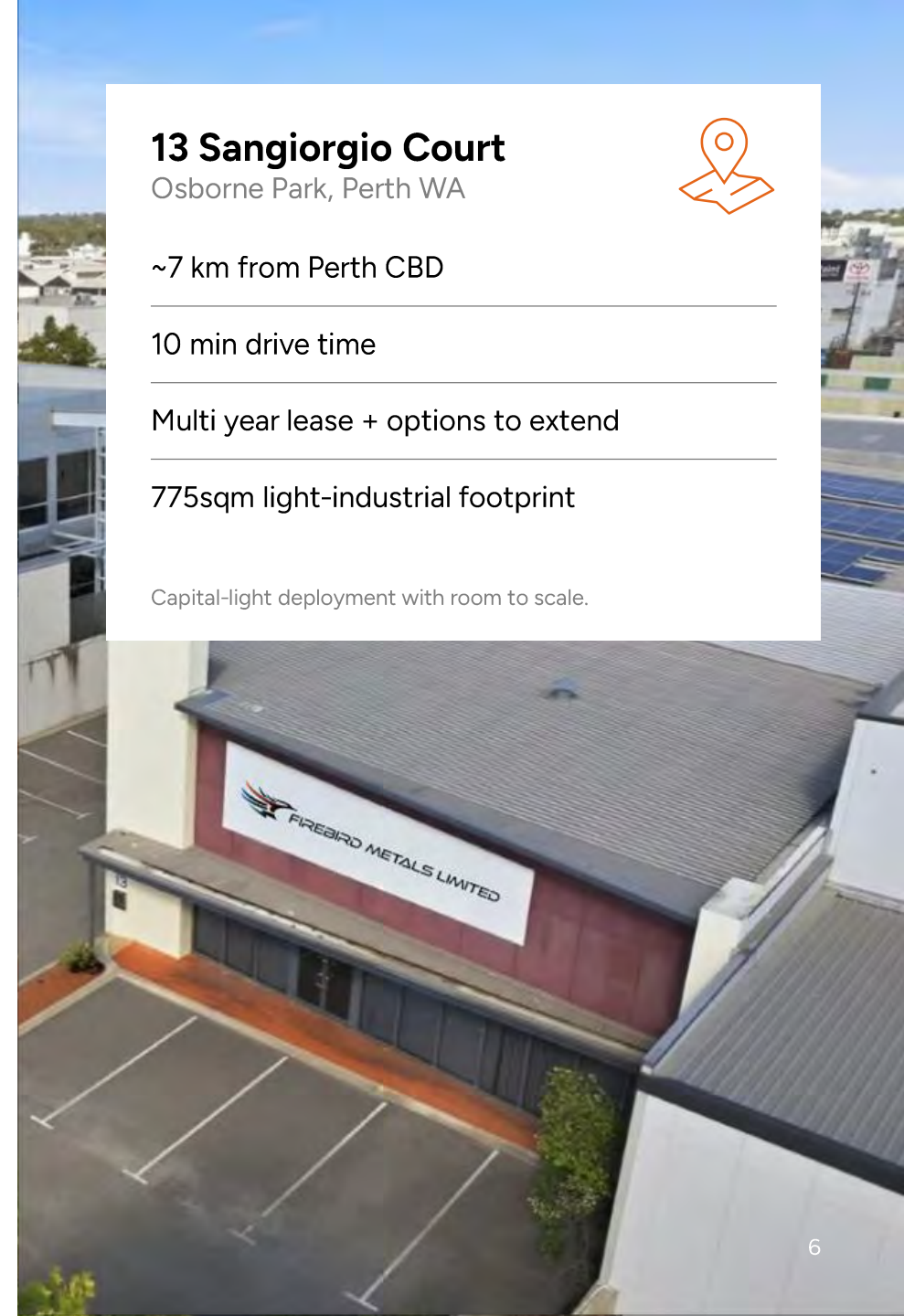
~7 km from Perth CBD

10 min drive time

Multi year lease + options to extend

775sqm light-industrial footprint

Capital-light deployment with room to scale.

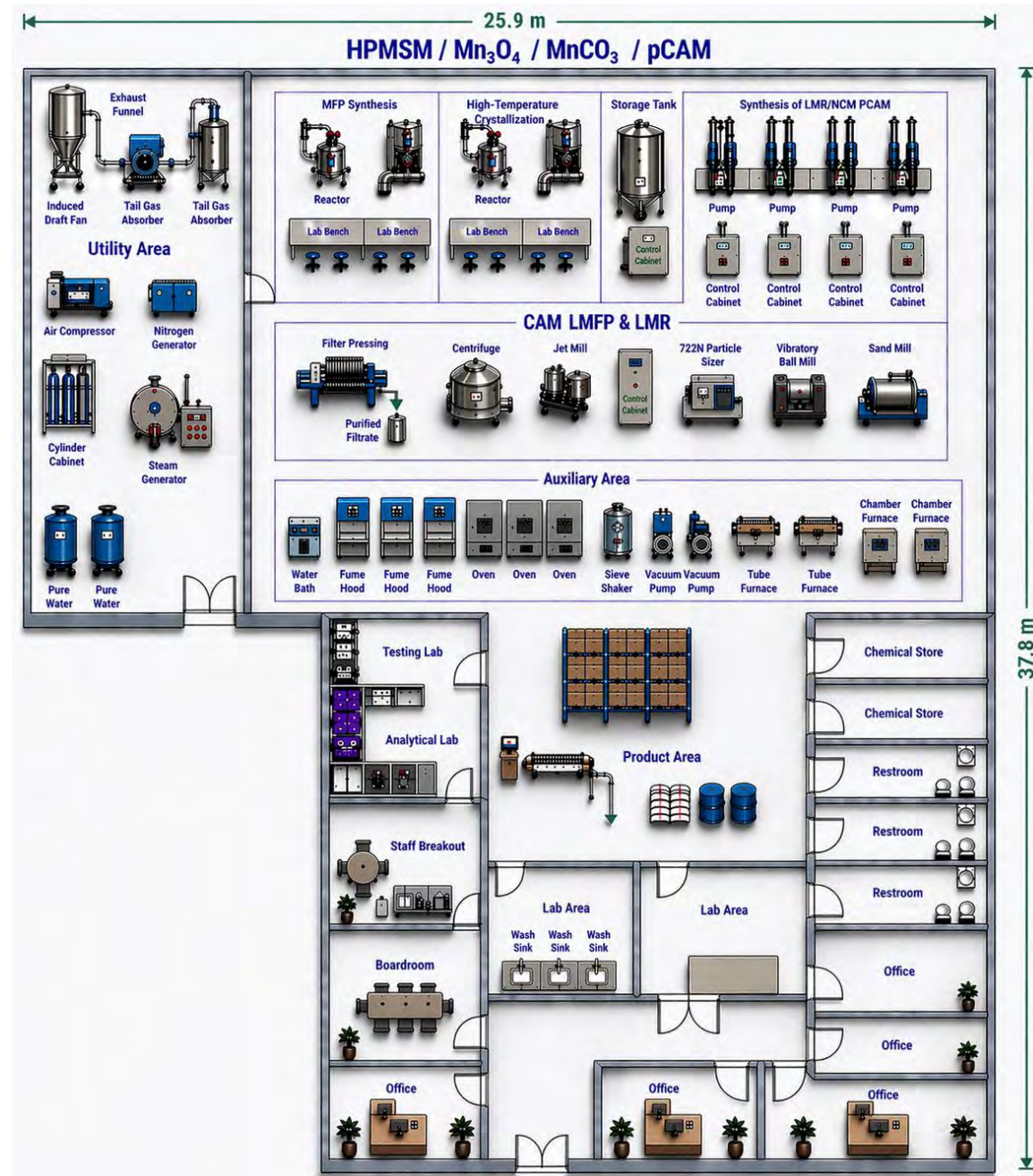


ADP - SITE SECURED



# ADP Site Layout

"The ADP is designed to demonstrate Firebird's world-first, fully integrated technology platform, converting manganese ore directly into high-purity manganese sulphate monohydrate (HPMSM), precursor cathode active material (p-CAM), and finished cathode active material (CAM) within a single facility and process line. This integrated approach removes conventional intermediate processing steps, delivering significant energy, capital and operating cost advantages."



AUSTRALIAN DEMONSTRATION PLANT

# A world-first, end-to-end manganese cathode facility

From manganese concentrate to high purity manganese sulphate to advanced cathode active material (CAM) in a single integrated process line, the first outside China.

**1<sup>st</sup>**

Outside China

**100%**

Integrated process

**1<sup>st</sup>**

Quartile of the  
technology cost curve

**150+**

Batches outperforming  
China Industry Standards

## WHY IT MATTERS

### De-risked

China-developed process know-how with Western engineering, safety and regulatory standards.

### Proven

End-to-end process demonstrated across multiple campaigns at our wholly owned Hunan pilot plant.

### Flexible

Ore-agnostic feedstock; circular by-product recycling for a zero-tailings system.

## WHAT IT PRODUCES

### HPMSM

High-purity manganese sulphate monohydrate.

### p-CAM

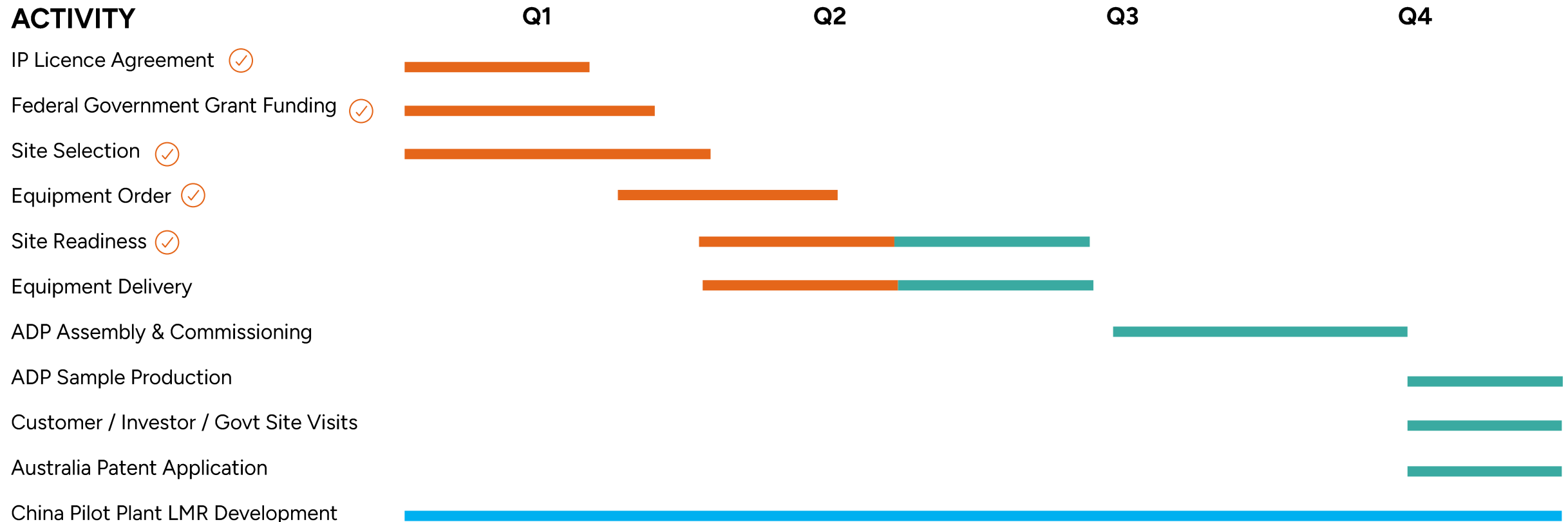
Precursor cathode active material.

### CAM

Finished LMFP and LMR cathode active material for OEM qualification, licensing and product sales.

# Australian Demonstration Plant CY2026 Development Timeline

## ACTIVITY



# A\$2.0M ARENA grant secured, A\$1.0M received

## FEDERAL GOVERNMENT BACKING

Non-dilutive funding under the Battery Breakthrough Initiative, validating Firebird's technology platform and delivery track record

# A\$2.0M

ARENA grant secured | A\$1.0M received

Non-dilutive • No IP rights granted • Matched 1:1 by Firebird

**Battery Breakthrough Initiative**

Federal Government Program | National Battery Strategy



## GRANT VALIDATION AND DELIVERY

### Technical viability

Independent technical review confirms the integrated manganese-to-CAM platform is credible and commercially relevant.

### Strategic alignment

Direct fit with Australia's Critical Minerals Strategy, energy storage priorities and Net Zero 2050 commitments.

### Milestone 1 complete: A\$1.0M received

Osborne Park ADP site secured, all key equipment ordered and Risk Management Plan accepted by ARENA, ahead of schedule and within budget.

### Milestone 2 underway

Firebird relocating to the Osborne Park ADP facility; remaining A\$1.0M payable across coming milestones.

**ARENA CEO Darren Miller: "...an important step toward building domestic capability to convert Australian manganese into battery cathode materials."**

Source: ASX announcement, 23 April and 17 July 2026

# THE PROVEN INTEGRATED PROCESS

**Delivering exceptional performance and cost metrics  
benchmarked against China Industry Standards**

TECHNOLOGY FOUNDATION

# Proven, patented, ready to deploy

ADP de-risked by an operating pilot plant, an extensive patent portfolio and a sector-leading technical team

## 650 sqm

HUNAN  
PILOT PLANT

Operating since Dec 2023  
with multiple successful  
concentrate-to-cathode  
campaigns

## 5+1

LMFP &  
KILN PATENTS

Five core LMFP patents  
under exclusive ex-China  
licence through 2045,  
plus high-efficiency  
electric calcination kiln  
patent

## +50 yrs

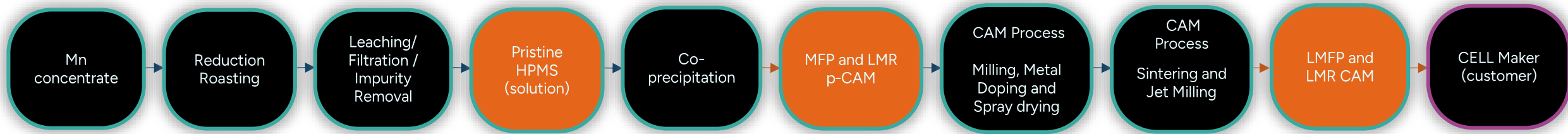
MANGANESE  
EXPERTISE

Combined manganese,  
battery and resource  
sector experience  
across the team that  
is unmatched in Western  
markets



Fully operational since 2023 - Multiple Manganese Battery Chemistry Capabilities

# Advanced China R&D & Pilot Plant Facility



INDEPENDENT VALIDATION – High Purity Manganese Sulphate

# Customer testing confirms >99.99% purity

Independent international customer testing exceeds Chinese industry standards across all key parameters

**PURITY**  
**>99.99%**  
MnSO<sub>4</sub> purity confirmed by international customer testing in June 2026.

**GRADE**  
**32.6%**  
Manganese content exceeds the Chinese Superior Grade benchmark of 32.18 Wt.%.

**IMPURITIES**  
**<0.5 ppm**  
Most impurity elements below detection limits, validating in-line impurity removal.

IMPURITY LEVELS BENCHMARKED TO CHINA INDUSTRY STANDARD

| Element        | China standard (Superior) | Firebird HPMSM (Jun 2026) |
|----------------|---------------------------|---------------------------|
| Iron (Fe)      | ≤ 10 ppm                  | <0.5 ppm                  |
| Copper (Cu)    | ≤ 10 ppm                  | <0.5 ppm                  |
| Lead (Pb)      | ≤ 10 ppm                  | <0.5 ppm                  |
| Chromium (Cr)  | ≤ 10 ppm                  | <0.5 ppm                  |
| Aluminium (Al) | ≤ 10 ppm                  | <0.5 ppm                  |
| Potassium (K)  | ≤ 30 ppm                  | <0.5 ppm                  |
| Calcium (Ca)   | ≤ 50 ppm                  | <0.5 ppm                  |
| Sodium (Na)    | ≤ 100 ppm                 | 2.6 ppm                   |

HPMSM battery-grade prices up 23% year-to-date, on growing EV and storage demand (SMM, June 2026)

## LMR CATHODE PROGRAM

# LMR cathode matches commercial benchmark

**One of the first western companies to report Independent electrochemical testing**

Confirms Firebird's proprietary LMR cathode performance in line with commercial benchmark material

## 263.7

mAh/g DISCHARGE  
CAPACITY (0.1C)

0.1C discharge capacity of 263.7 mAh/g and 1C capacity of 211.2 mAh/g, in line with commercially sourced benchmark material

## +65%

VS TYPICAL LFP  
CATHODES

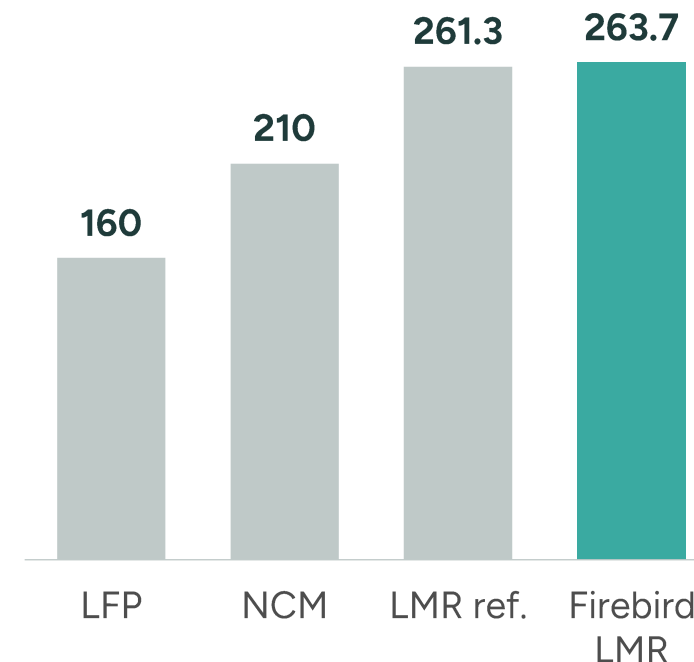
Approximately 65% higher discharge capacity than typical LFP and 26% higher than high-nickel NCM cathode materials

## 20

SYNTHESIS  
CAMPAIGNS

Among the first Western-listed companies to publicly report electrochemical performance data for proprietary LMR cathodes

0.1C discharge capacity (mAh/g)

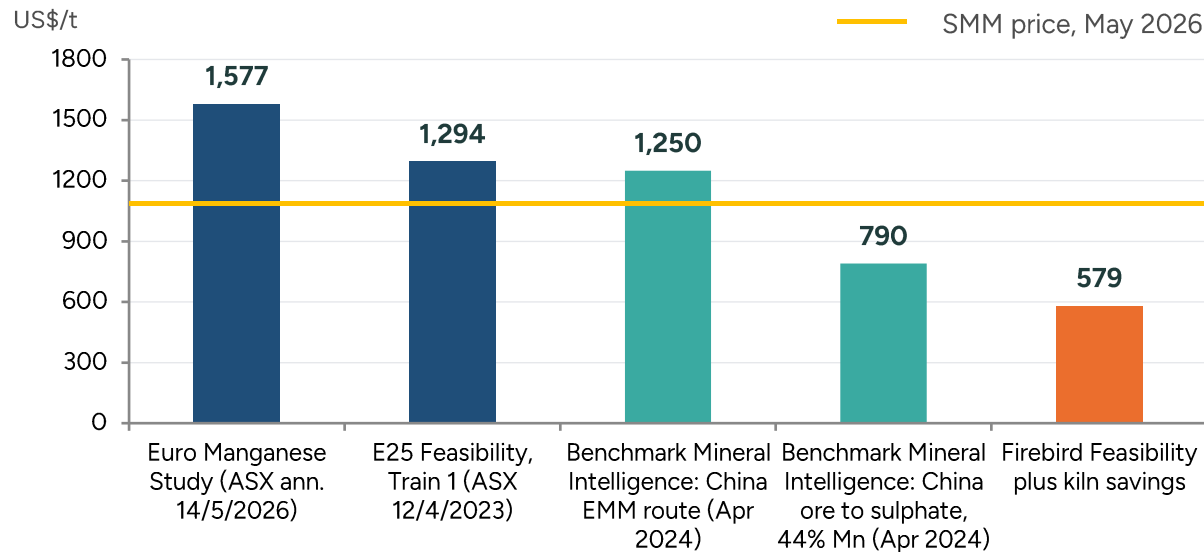


TECHNOLOGY POSITIONED ON THE FIRST QUARTILE OF THE COST CURVE IN A MARKET THAT IS GROWING SIGNIFICANTLY

# Commercial Opportunity

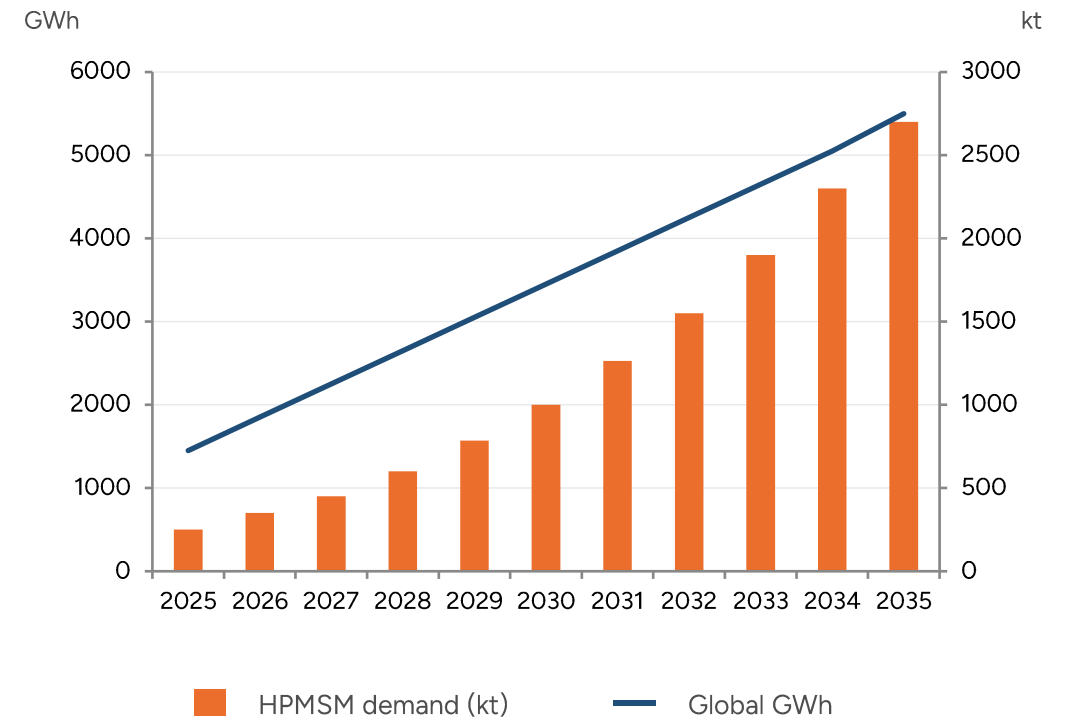
US\$579/t<sup>1</sup>

Firebird maintains the lowest OPEX among global manganese sulphate producers



Source: ASX announcement, 7 May 2024

## Bloomberg GWh forecast (Dec 2025) and FRB HPMSM demand (kt)



Source; Bloomberg GWh forecast (Dec 2025), Firebird-derived HPMSM demand.

# THE MARKET DRIVERS



MARKET DRIVER

# The shift to manganese-rich cathodes

Manganese is cheaper, safer, more abundant and supply-secure, and it is moving up the cathode mix

TODAY

## LFP

Lithium Iron Phosphate dominates ~80% of cathode market.

EMERGING

## LMFP

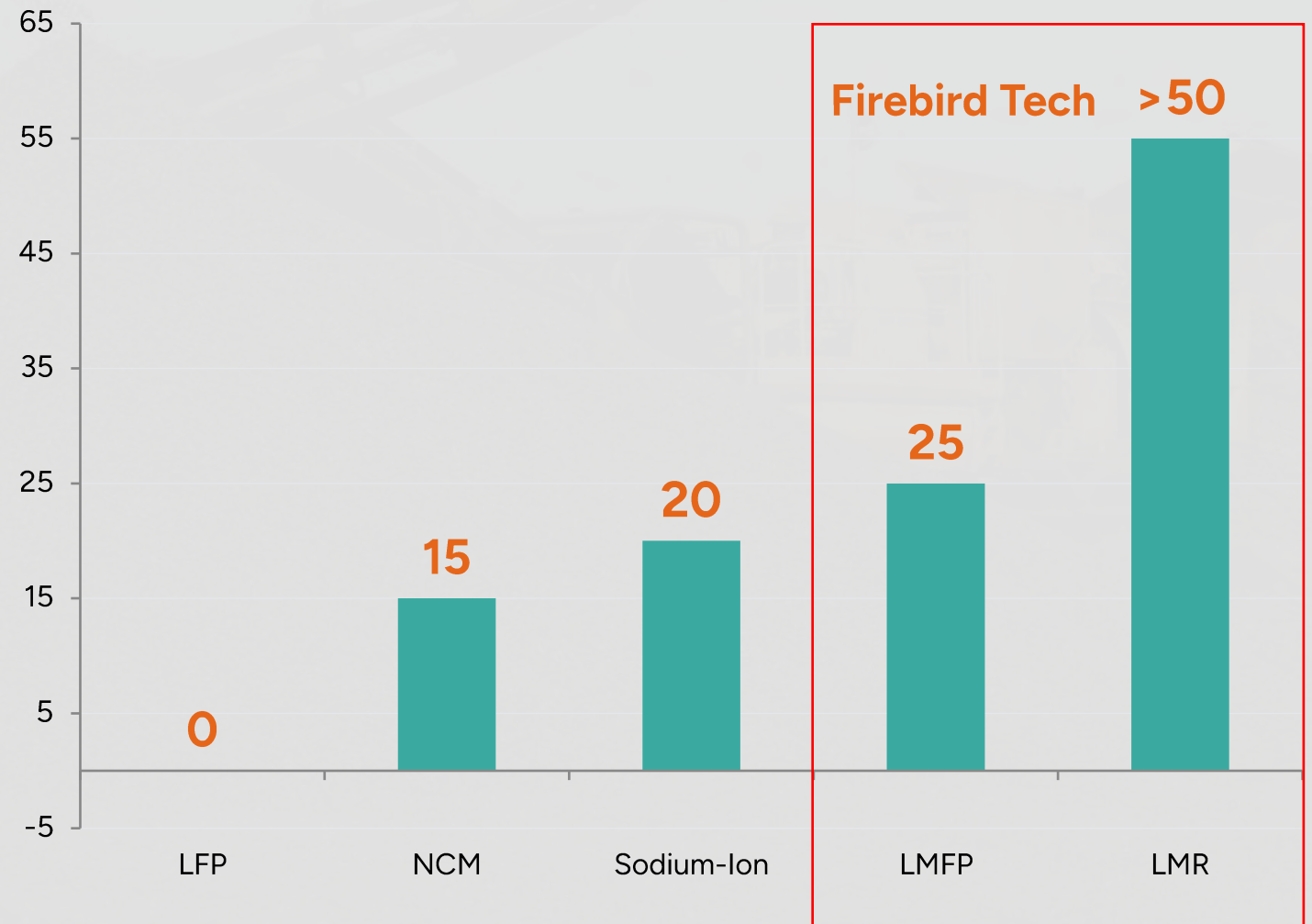
Lithium Manganese Iron Phosphate, rapid adoption from 2028.

THE FUTURE

## LMR

Lithium Manganese Rich, mass adoption after 2030.

Manganese content of cathode (%)

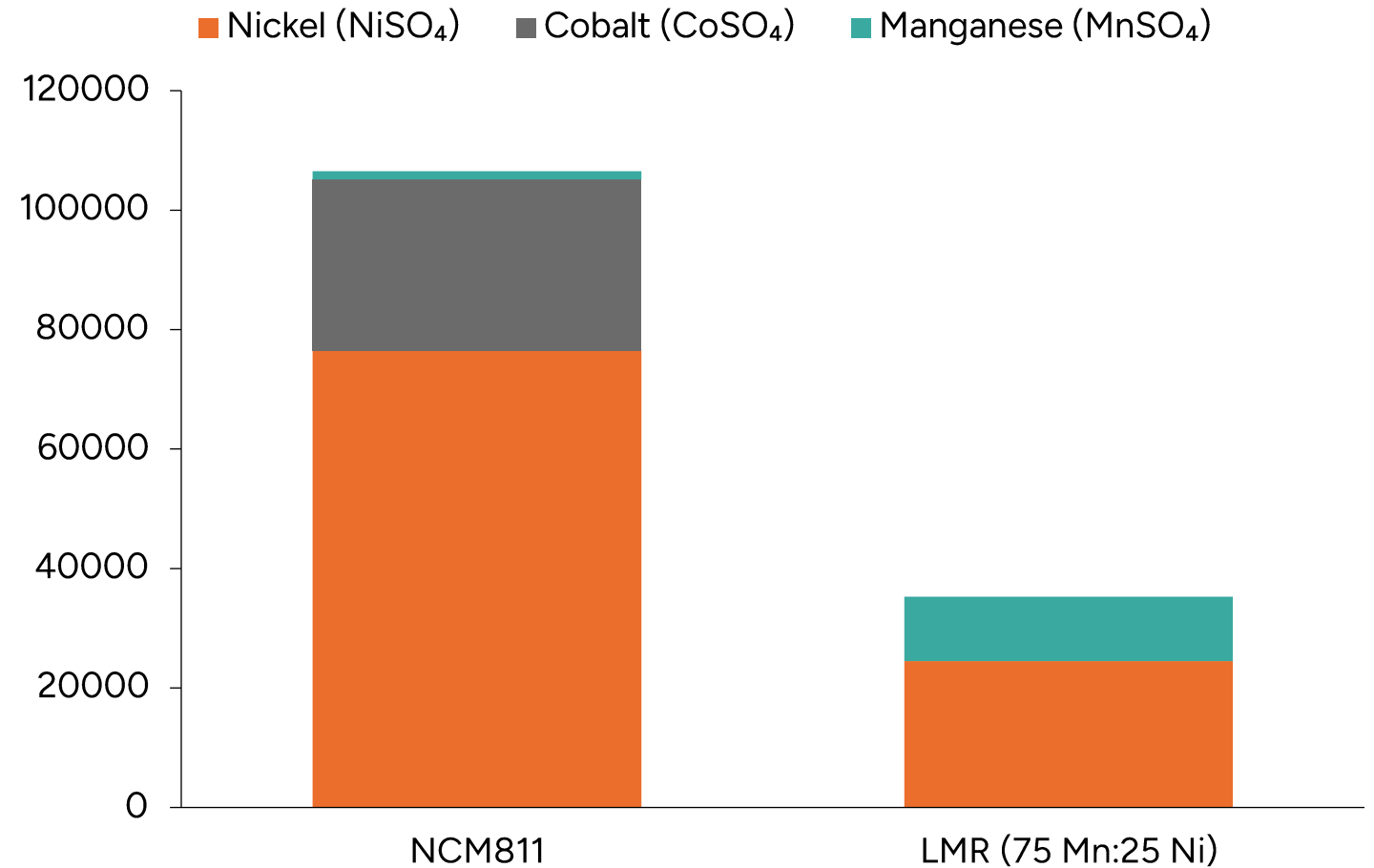


MARKET DRIVER

# LMR v NCM: delivers ~1/3 the p-CAM raw-material cost

vs high-nickel NCM811: comparable high energy density at a fraction of the input cost

Raw-material cost per tonne of p-CAM (¥)



|                                |                                |
|--------------------------------|--------------------------------|
| NICKEL<br>NiSO <sub>4</sub>    | NCM811: ¥76,494 → LMR: ¥24,525 |
| COBALT<br>CoSO <sub>4</sub>    | NCM811: ¥28,637 → LMR: —       |
| MANGANESE<br>MnSO <sub>4</sub> | NCM811: ¥1,400 → LMR: ¥10,787  |

Source: Firebird analysis of China domestic raw-material prices

## DEFENCE APPLICATIONS

## Strong fit across the defence battery value chain

LMFP and LMR address distinct defence requirements, from low-cost attritable drones to high-energy missile-replacement systems

### Soldier systems

Portable power. LMFP for safety, durability and portability



### Loitering munitions

LMFP and LMR for high-performance, longer-range systems.

### Remote power

Strongest LMFP use case: long-duration reliability for forward operating bases.

### Military vehicles

Dual chemistry pathway: LMFP safety with LMR energy density for ground platforms.

### Swarm / attritable drones

Cost-driven, high-volume LMFP deployment for thousands of units.

### Naval / submarines

LMFP thermal stability for safety-critical applications below deck.

**Western chemistry. Sovereign supply.**  
**Defence-ready platform**

# OAKOVER MANGANESE PROJECT

**100% owned**

**Granted mining lease**

**176Mt JORC resource**

**Tier 1 mining jurisdiction**



## UPSTREAM SECURITY

# 100% Owned Oakover Manganese Project

234 Mt of manganese resources in Western Australia provides long-term feedstock optionality for the ADP

## 176.65 Mt

**Oakover JORC Resource**  
@ 9.9% Mn

## 73%

**IRR**  
(DMS scoping study, 2023)

## A\$741M

**NPV**  
@ 8% discount rate

## 18 yrs

**Life of Mine**

Source: ASX announcements, 23 March 2023 and 30 August 2023

## JORC Mineral resource estimate

| Classification | Tonnes (Mt)   | Mn (%)     | Fe (%)     | SiO <sub>2</sub> (%) | Al <sub>2</sub> O <sub>3</sub> (%) | P (%)       |
|----------------|---------------|------------|------------|----------------------|------------------------------------|-------------|
| Indicated      | 105.78        | 10.1       | 8.9        | 39.2                 | 9.8                                | 0.10        |
| Inferred       | 70.87         | 9.6        | 8.0        | 36.5                 | 9.5                                | 0.09        |
| <b>Total</b>   | <b>176.65</b> | <b>9.9</b> | <b>8.6</b> | <b>38.1</b>          | <b>9.7</b>                         | <b>0.10</b> |

HILL 616 +

## 57.5 Mt

@ 12.2% Mn (Inferred)

**Total 234 Mt**  
across Firebird's WA portfolio.



# Mining Lease

## Firebird has been granted Mining Lease ML 52/1086

for the Oakover Manganese Project

Receipt of the Mining Lease is conditional on the Company's development of a mining proposal, requiring approval from the Department of Energy, Mines, Industry Regulation and Safety (DEMIRS)

The Mining Lease covers a large area of 3,429.8 ha, including the Sixty Sixer, Jay Eye and Karen Pits, as well as proposed processing plant, tailings storage and waste dump

Source: ASX announcement, 18 March 2025

## DMS Manganese concentrate scoping study

Updated Dense Media Separation (DMS) Manganese Concentrate Scoping Study (30/8/23) results confirm flagship Oakover Project as long-life, tier-one manganese operation.

### Key results include

18-year Life of Mine

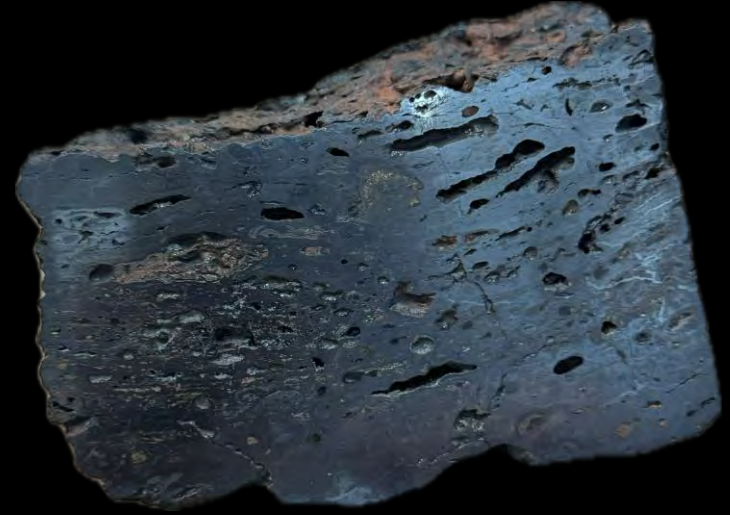
Approximate A\$741.3 M NPV at a discount rate of 8% , Impressive IRR of 73.1%, with pay back in 16 months

~4Mt annual processing, ~1.2 Mt of 30-32 % Manganese (Mn) concentrate annually

Capex estimated of A\$123 million

Low mine strip ratio of 0.45:1

Indicated material accounts for 99.2% of the material processed



## Environmental surveys/studies



Flora, Fauna, Sub  
Terranean Fauna,  
Aquatic Fauna  
surveys complete



Desk top Water  
study complete

# LEADERSHIP & CORPORATE

LEADERSHIP

# Sector-leading Battery Materials Australian-Chinese team

Over 50 years of combined manganese expertise paired with deep battery materials and capital markets experience



## Evan Cranston

Executive Chairman

Mining executive; corporate & mining law background.



## Ron Mitchell

Chief Executive Officer

25+ yrs commercial, strategy & BD; 15 yrs in lithium and battery materials.



## Wei Li

Executive Director

Chartered Accountant; led commissioning of A\$150M EMD plant, Hunan.



## Ashley Pattison

Non-Executive Director

Chartered Accountant; 20+ yrs in resources operations, finance & strategy.



## Brett Grosvenor

Non-Executive Director

25+ yrs mining & power industry; engineering & MBA qualified.



## Ken Hoffman

Special Advisor (Board)

Former Global Head of Battery Materials, McKinsey; battery value chain strategy.



## Peter Allen

Key Consultant

20+ yrs marketing manganese, lithium and other commodities.



## Mr Zhou Qiyun

China CTO

20+ yrs in Mn sulphate processing; MVR crystalliser design and patents.



## Mr Tang

China CEO

Mn sulphate plant operations & engineering; MVR commissioning and process optimisation.



Central South University partnership, global leaders in Li-ion battery materials processes; alumni founded BYD and Ronbay Technology.



# Corporate Snapshot

## Global technology platform

Scalable IP model designed in China, owned in Australia, deployable worldwide



**\$0.165**

Share price  
7 August 2026



**182.36 M**

Shares on issue



**\$30.09 M**

Market  
capitalization



**49 M**

Options  
@ \$0.3 to \$1.00



**0.8 M**

Performance  
rights

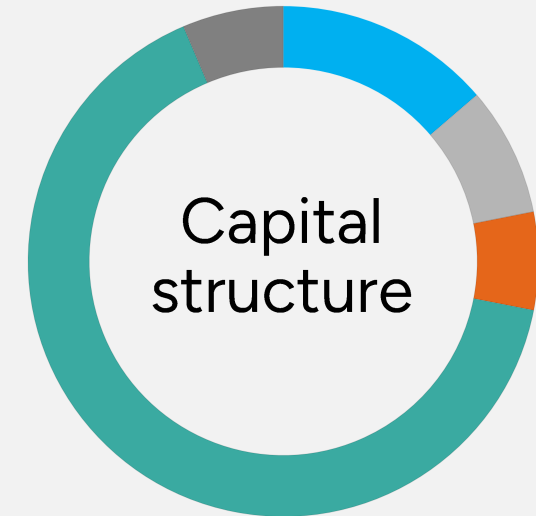


**\$3.6 M**

Cash on hand:  
30 Jun 2026

(excludes \$1.0 M received by ARENA on 17 July 2026)

## Shareholders



|                             |        |
|-----------------------------|--------|
| Board & Management          | 13.64% |
| Tolga Kumova                | 8.14%  |
| Westbeck Capital Management | 6.40%  |
| Canmax Technologies         | 6.20%  |
| Other Shareholders          | 65.62% |

# THANK YOU

ASX: FRB

## RON MITCHELL

CHIEF EXECUTIVE OFFICER

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## IMPORTANT INFORMATION

# Disclaimer

This presentation contains summary information about Firebird Metals Limited (Firebird) (ABN 24 610 035 535) and is current as of July 2026. The information in this presentation is of a general background and does not purport to be complete. This presentation is not investment or financial product advice (nor tax, accounting or legal advice) and is not intended to be used for the basis of making an investment decision.

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This presentation contains certain “forward-looking statements”. Forward looking statements can generally be identified by the use of forward-looking words such as, “expect”, “should”, “could”, “may”, “predict”, “plan”, “will”, “believe”, “forecast”, “estimate”, “target” and other similar expressions. Indications of, and guidance on, future earnings and financial position and performance are also forward-looking statements. Forward-looking statements, opinions and estimates provided in this presentation are based on assumptions and contingencies which are subject to change without notice, as are statements about market and industry trends, which are based on interpretations of current market conditions. Forward-looking statements including projections, guidance on future earnings and estimates are provided as a general guide only and should not be relied upon as an indication or guarantee of future performance

This presentation contains statements that are subject to risk factors associated with Firebird and the mining exploration industry. It is believed that the expectations reflected in these statements are reasonable, but they may be affected by a range of variables which could cause actual results or trends to differ materially. Firebird disclaim any intent or obligation to publicly update any forward-looking statements, whether as a result of new information, future events or results or otherwise. To the maximum extent permitted by law, Firebird, their related bodies corporate (as that term is defined in the Corporations Act 2001 (Cth) and the officers, directors, employees, advisers and agents of those entities do not accept any responsibility or liability including, without limitation, any liability arising from fault or negligence on the part of any person, for any loss arising from the use of the presentation or its contents or otherwise arising in connection with it.

This presentation has been approved by the Board of Firebird.

## JORC COMPLIANCE

This presentation contains references to Exploration Results and Mineral Resource Estimates, which have been reported in compliance with ASX Listing Rules 5.7 and 5.8 and extracted from previous ASX announcements as referenced. The Company confirms that it is not aware of any new information or data that materially affects the information included in the said announcements, and in the case of estimates of Mineral Resources, that all material assumptions and technical parameters underpinning the estimates in the relevant market announcements continue to apply and have not materially changed.

The Company confirms that the material assumptions and technical parameters underpinning the production target disclosed in the Company's announcement dated 7 May 2024 continue to apply and have not materially changed.

Oakover Resource: Indicated Resource of 105.8Mt at 10.1%; Inferred Resource of 70.9Mt at 9.6% for global Resource of 176.7 Mt at 9.9% Mn

Hill 616 Resource: Inferred Resource of 57.5 Mt at 12.2% Mn

For full details refer to ASX announcements 10/3/22, 30/1/23, 23/3/23, 26/6/23, 30/8/23, 1/9/23, 18/10/23, 21/11/23, 13/12/23, 29/1/24, 13/3/24, 7/5/24, 14/5/24, 28/5/24, 5/6/24, 10/9/24, 12/9/24, 24/9/24, 2/10/24, 21/10/24, 28/10/24, 9/12/25, 10/2/25, 20/2/25, 18/3/25, 12/5/25, 24/6/25, 21/7/25, 30/7/25, 5/8/25

## CAUTIONARY STATEMENTS SULPHATE FEASIBILITY STUDY

The Feasibility Study referred to in this presentation is a Technical Feasibility of the establishment of the Battery Grade Manganese Sulphate Project Stage 1 Processing Plant in China (the Plant). The Feasibility Study is based on the material assumptions contained in the Feasibility Study document released to the ASX on 7 May 2024. These include assumptions about the availability of funding. While the Company considers all of the material assumptions to be based on reasonable grounds, there is no certainty that they will prove to be correct or that the range of outcomes indicated by the Feasibility Study will be achieved.

Notwithstanding the developments set out in this quarterly report, Investors should note that there is no certainty that the Company will be able to raise the amount of funding to develop the Plant when needed. It is also possible that such funding may only be available on terms that may be dilutive to or otherwise affect the value of Company's existing shares. It is also possible that the Company could pursue other 'value realisation' strategies such as a sale, partial sale or joint venture of the Plant. If it does, this could materially reduce the Company's proportionate ownership of the Plant. Given the uncertainties involved, investors should not make any investment decisions based solely on the results of the Feasibility Study.

## IMPORTANT INFORMATION

### Cautionary statements

# DMS Concentrate Scoping Study

The Updated Scoping Study announced to the ASX on 30 August 2023 has been undertaken for the purpose of initial evaluation of a potential development of the Oakover Manganese Project. The Scoping Study is a preliminary technical and economic study of the potential viability of the Oakover Manganese Project as a manganese producer. The Scoping Study outcomes, production target and forecast financial information referred to in this release are based on low accuracy level technical and economic assessments that are insufficient to support estimation of Ore resources.

The Scoping Study has been completed to a level of accuracy of +/- 35% in line with a scoping level study accuracy. While each of the JORC modifying factors was considered and applied, there is no certainty of eventual conversion to Ore Reserves or that the production target itself will be realised. Further exploration and evaluation work and appropriate studies are required before the Company will be in a position to estimate any Ore Reserves or to provide any assurance of an economic development case. Accordingly, given the uncertainties involved, investors should not make any investment decisions based solely on the results of the Scoping Study. Given that the results of the Scoping Study are subject to the qualifications above (including assumptions as to accuracy), any results reported in this release should be considered as approximates and subject to variances having regard for the assumptions referred to in this release. The Company has reasonable grounds for disclosing a Production Target, given that approximately 99% of the Life-of-Mine (LOM) Production Target is in the Indicated Mineral Resource category, and 1% is in the Inferred Mineral Resource category. The production target stated in this announcement is based on Firebird's current expectations of future results or events and should not be relied upon by investors when making investment decisions. Further evaluation work and studies are required to establish sufficient confidence that the production target will be met. Firebird confirms that the financial viability of the Oakover Manganese Project is not dependent on the inclusion of Inferred Resources in the Scoping Study.

The Company considers all the material assumptions in this Study to be based on reasonable grounds. These include assumptions about the availability of funding. While Firebird considers all of the material assumptions to be based on reasonable grounds, there is no certainty that they will prove to be correct or that the range of outcomes indicated by the Scoping Study will be achieved. To achieve the range of potential outcomes indicated in the Scoping Study, funding of in the order of \$123 million (excluding working capital and finance costs) will likely be required. Investors should note that there is no certainty that Firebird will be able to raise that amount of funding when needed. However, the Company has concluded it has a reasonable basis for providing the forward-looking statements included in this announcement and believes that it has a "reasonable basis" to expect it will be able to fund the development of the Project. It is also possible that such funding may only be available on terms that may be dilutive to or otherwise affect the value of Firebird's existing shares. It is also possible that Firebird could pursue other 'value realisation' strategies such as a sale, partial sale or joint venture of the project. If it does, this could materially reduce Firebird's proportionate ownership of the project. Given the uncertainties involved, investors should not make any investment decisions based solely on the results of the Scoping Study.

The Mineral Resources underpinning the production target in the Scoping Study have been prepared by a competent person in accordance with the requirements of the JORC Code (2012). For full details of the Mineral Resources estimate, please refer to Firebird's ASX release dated 23 March 2023. Firebird has confirmed that it is not aware of any new information or data that materially affects the information included in that release. All material assumptions and technical parameters underpinning the estimates in that ASX release continue to apply and have not materially changed.