



FIREBIRD METALS – AUSTRALIA'S NEXT BATTERY TECH COMPANY

May 2025

ASX:FRB

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This presentation has been approved by the Board of Firebird.

JORC Compliance Statement

This announcement 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.

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 and 28/10/24

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

CAUTIONARY STATEMENT – 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.

CAUTIONARY STATEMENT- 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.

DELIVERING ON STRATEGY AND VISION

THE FIREBIRD PURPOSE

As an **Australian-owned company**, we specialise in the processing and development of battery cathode raw materials. With a state-of-the-art research and development facility in China and a world-class technical team with decades of experience, we are committed to innovation. **Our goal is to become a fully integrated cathode manufacturer, delivering advanced solutions worldwide.**

Sector-Leading Team

Firebird's battery chemicals team boasts more than 50 years of experience in manganese and chemical production, strengthened by experts from China's Central South University, bringing unmatched knowledge in cathode materials.

Move Towards Manganese Rich Battery Cathodes

Across all types of battery cathodes, manganese is playing an increasingly vital role in delivering cost-effective cathodes and batteries to the market.

Unique Lithium Manganese Iron Phosphate "LMFP" Capabilities

Only western company with the ability to combine High Purity Manganese Sulphate & pCAM processors in solution to produce LMFP cathode.

Innovative, Low Cost & Environmentally Friendly

Potential **MnSO₄ costs ~50% lower than industry average.** Our process is designed to be environmentally sustainable, ensuring that all residues are either consumed or sold, minimising waste and environmental impact.



MOVE TO MANGANESE RICH BATTERY CATHODE CHEMISTRY

MOVE TOWARDS MANGANESE RICH BATTERY CATHODES

CRITICAL ROLE OF MANGANESE IN LMFP



Cathode chemistry development is increasingly focused on boosting manganese content

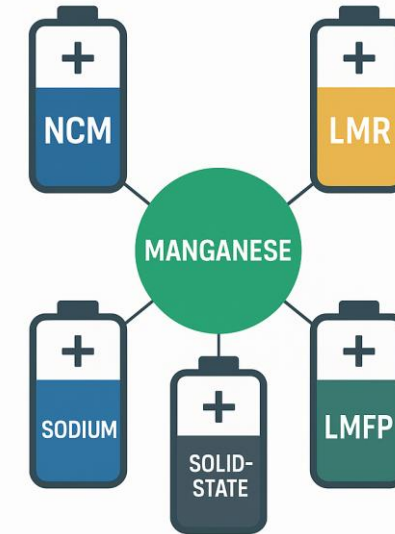
MOVE TOWARDS MN RICH BATTERY CATHODES

Manganese use in batteries will be much higher than even the most ambitious projections in the past, mainly due to the combination of:

- ✓ 1. Mid Nickel NCM (Mn between 15 to 20%)
- ✓ 2. Sodium-ion batteries (Mn ~20%)
- ✓ 2. LMFP (Mn ~25%)
- ✓ 3. Lithium Manganese Rich (LMR) (Mn ~ 50%)
 - ✓ 3a. Lithium Manganese Oxide LMO (Mn ~60%)
 - ✓ 3b. Lithium Manganese Nickel Oxide LMNO (Mn ~45%)

Source: Giga Mn newsletter & Magnus Bekker Note: elemental content in cathode

- Lithium Iron Phosphate (LFP) is the world's most used Li-ion **cathode material for use in EV batteries**
- Three critical key considerations for battery manufacturers when assessing and developing a cathode mix is **safety, cost and capacity**
- **Adding high purity manganese sulphate (MnSO_4) to LFP, creates LMFP (Lithium Manganese Iron Phosphate)**
- **LMFP delivers significant operational and safety benefits to a battery**
- ***LMFP is more economical, safer, more flexible, and more energy dense, making it the future of electric vehicle batteries***



ADVANTAGES OF LMFP VS. LFP & NCM

- ✓ **LMFP has a higher thermal run-away temperature than nickel-based batteries**
- ✓ **LMFP costs ~ 30% of nickel-based batteries**
- ✓ **Mn enhances the voltage platform and increases energy density by up to 20%**
- ✓ **LMFP is flexible, used on its own or mixed with nickel-based batteries**

LMFP MARKET OUTLOOK

Size and growth of LMFP market for applications in electric vehicle batteries is potentially the largest in medium to long term (est. avg. 900kg of MnSO4 per 1 tonne of LMFP)

- McKinsey forecasts global battery share for L(M)FP is expected rise from 11% in 2020 to **44 percent in 2025**
- McKinsey estimate by 2026 that eight of the top automotive groups will have at least one L(M)FP-equipped vehicle in the volume and premium segments, up from only a couple of groups in 2023

“Battery technology is on the cusp of a major shift. Our analyses suggest that L(M)FP batteries could become the technology with the largest global market share before 2030”

- Soochow Securities forecast LMFP will replace 50% of LFP batteries by 2030
- **LMFP market is forecasted to become a >US\$20 billion market by 2030.**
- Caitong Securities forecast blending LMFP with nickel-based batteries in China to reach 30% by 2030

Firebird is executing on its battery technology and MnSO4 downstream processing at the perfect time and will be well-positioned to supply into this rapidly growing market

Battery Manufacturers



Cathode Manufacturers



Tesla has stated plans to have two thirds of their batteries as manganese-based

New TESLA Model 3 uses CATL M3P

Source: Soochow Securities Report 16/8/23, Caitong Securities report “Cost and performance advantages—LMFP industrialization is imminent” 31/1/2024 and McKinsey “The Battery Chemistries powering the future of electric vehicles Dec 2024”



FIREBIRD'S UNIQUE LMFP CAPABILITIES

LMFP KNOW HOW – STRATEGIC COLLABORATION WITH CENTRAL SOUTHERN UNIVERSITY (CSU)

THE CONCEPT

Firebird will target a substantial cost advantage in LMFP production by **bypassing the manganese sulphate crystallisation process.**

This streamlined approach not only reduces costs but also results in a higher-quality LMFP product, strengthening Firebird's position in the market

OUR PARTNER

CSU has strong reputation for producing world-leading battery materials processes. CSU staff include global experts in the Li-ion battery supply chain, with alumni including the founders of BYD and Rongbay Technology

BENEFITS OF PROCESS

Will guarantee mix quality
Less grinding = less cost

Largest cost of producing MnSO₄ is energy consumed in crystallisation process, not crystallising is a huge cost advantage

Further costs savings of no packing, transport and redissolving of MnSO₄

Competitors who buy MnSO₄ as crystals and use wet mix process will not have same cost advantage



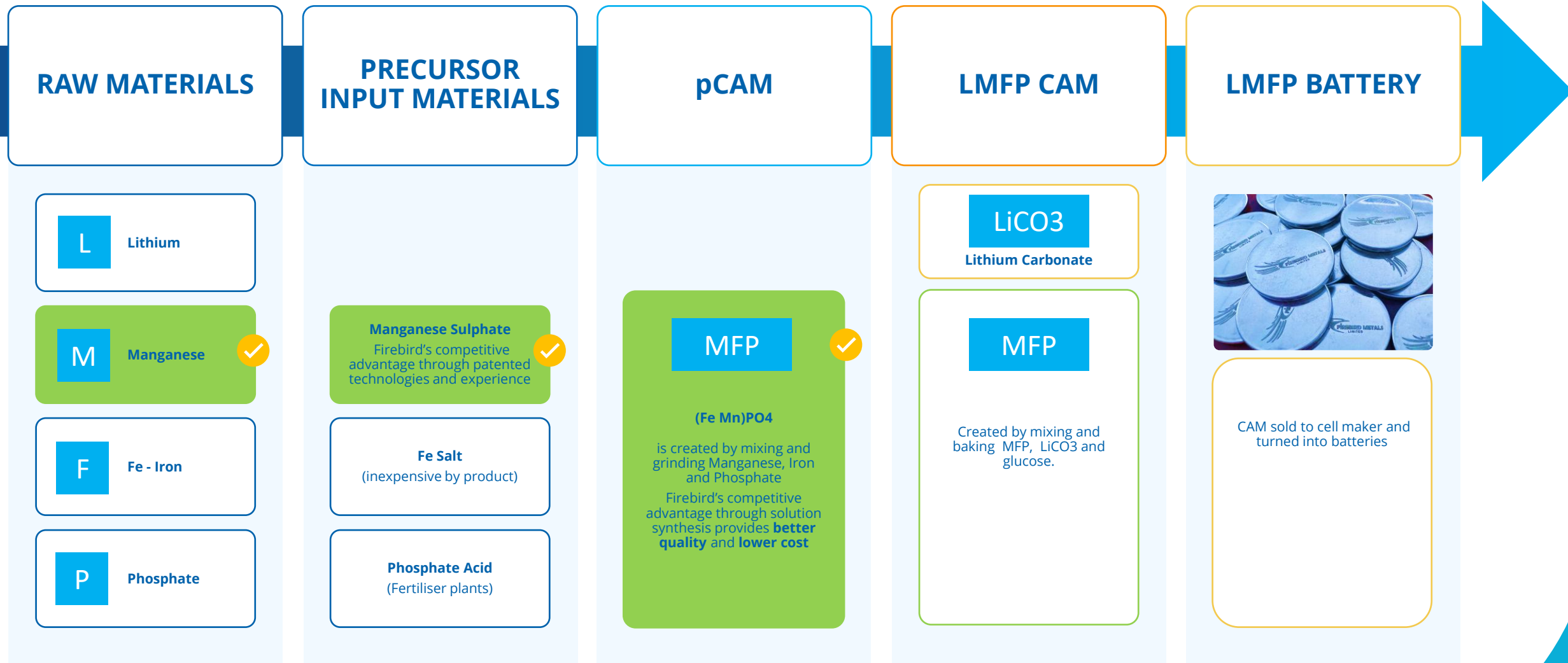
30 batches completed

100 batches expected to be completed in total

All equipment ordered to enable test work at one Firebird R&D centre

Firebird intends to lodge patents both within China and internationally

FIREBIRD'S COMPETITIVE ADVANTAGE & POSITION IN LMFP BATTERY VALUE CHAIN



FIREBIRD LMFP BATTERIES



MANGANESE SULPHATE PLANT

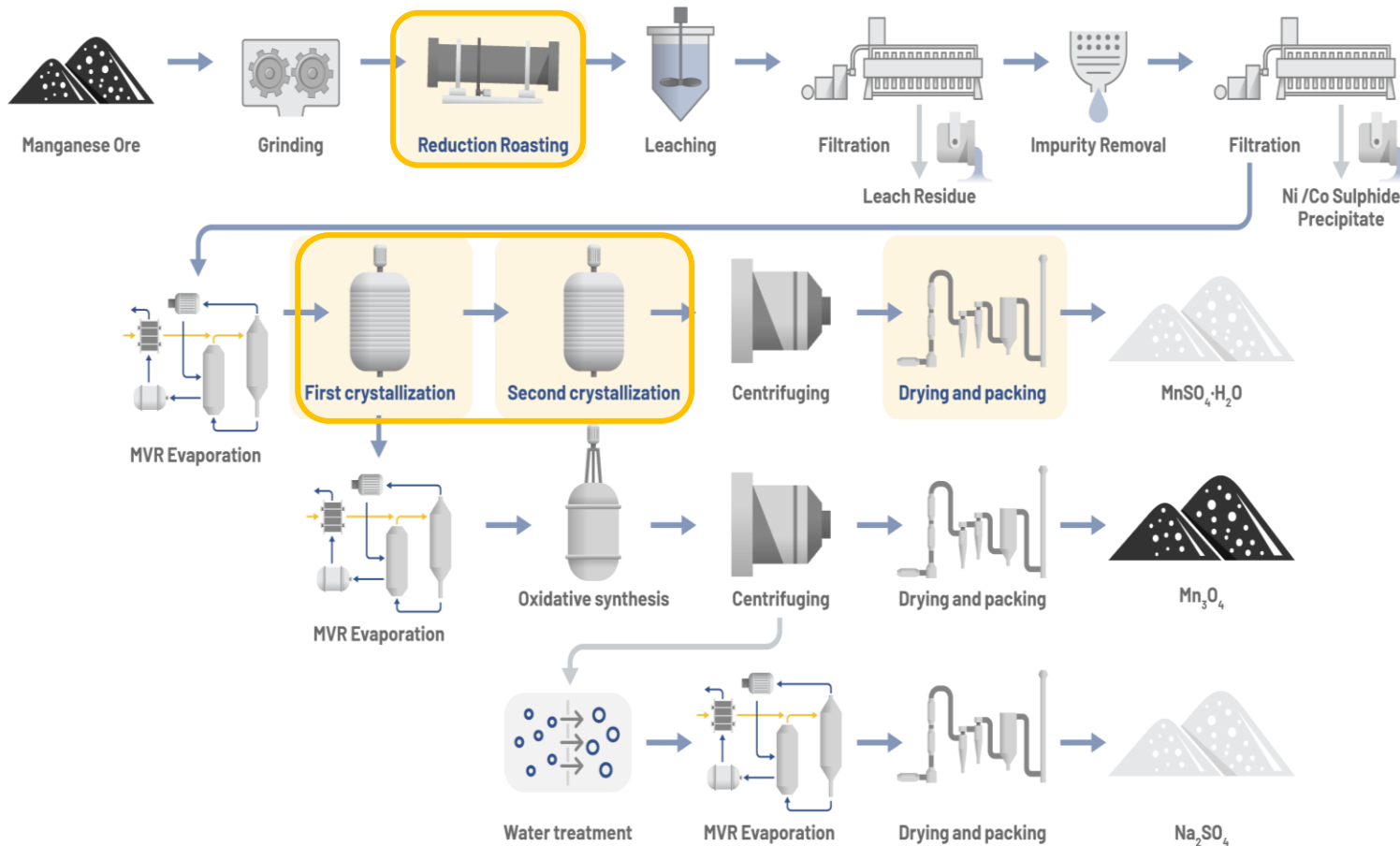
AERIAL VIEW OF PROPOSED PLANT

- Preliminary design and key permits secured in less than 12 months
- Production Capacity – Battery grade 50kt MnSO₄ plus 10kt Mn₃O₄, (72.5Kt MnSO₄ equivalent)
- 12.09 hectares land with 84,399sqm building area
- >5,000 sqm land available on site for future expansion
- Firebird can build the proposed plant in 12 to 15 months from making FID - a key advantage of establishing operations in China
- Can be replicated worldwide

Note: Artist Impression

Refer ASX announcements 7/5/24, 2/10/24

SIMPLE & EFFECTIVE MANGANESE SULPHATE PROCESS



- **Efficient and Cost-Effective Operations:** Firebird's technical team has developed a unique process underpinned by a low capital intensity design and lower operational costs, demonstrating their expertise and sector-leading credentials
- **Sustainable and Eco-Friendly:** The process is designed to be environmentally sustainable, ensuring that all residues are either consumed or sold, minimising waste and environmental impact
- **Innovative Proprietary Technology:** The project is supported by proprietary technology specifically aimed at reducing operational expenses (OPEX), enhancing overall cost efficiency and competitiveness

TIER-1 ECONOMICS & LOW-COST PATHWAY TO PRODUCTION



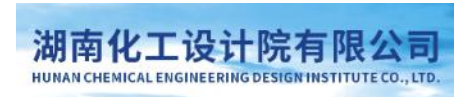
- **Economics:** Feasibility Study completed in May 2024 outlined a compelling opportunity to establish a **near-term, cost-competitive, battery-grade manganese sulphate operation**. Key highlights included:
 - **Low Capital Expenditure (CAPEX): US\$83.5 million**
 - **Working Capital: US\$10.7 million**
 - **Plant Capacity:** Producing 50,000 tonnes per annum (t/a) of battery-grade MnSO_4 and 10,000 t/a of Mn_3O_4 , or an equivalent of 72,500 t/a of MnSO_4
 - **Sustainable Process:** Facility designed to be environmentally friendly, generating no wastewater and ensuring all residues are utilised by a cement plant
- **Operational Efficiency:** Project OPEX very competitive with peers in China, profitable with today's pricing and does not depend on subsidies from joint venture partners or Government, underscoring the plants economic viability
- **~60% of Financing Secured:** Through indicative and non-binding agreements with key partners, including China Chemical and China Construction Bank
- **Permits and Approvals:**
 - All critical permits required to operate, including environmental, safety, and energy obtained in a timely manner
 - Preliminary design completed and approved by the Jinshi High-Tech Industrial Park Committee, covering roughly 80% of the requirements for the building permit
 - Building permit expected to be granted shortly after completion of the detailed engineering design



中国化学工程集团有限公司
China National Chemical Engineering Group Corporation Ltd



中国建设银行
China Construction Bank

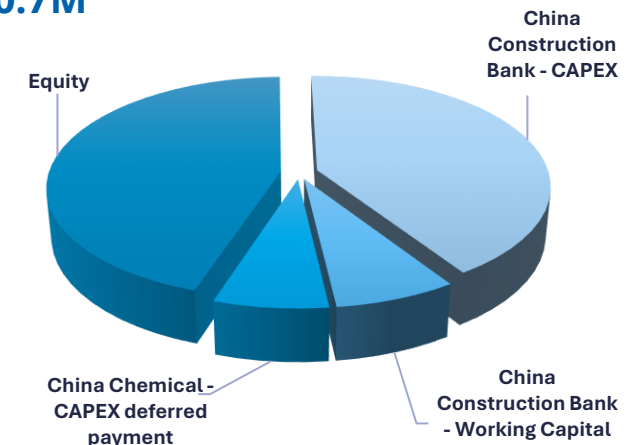


SUNWARD



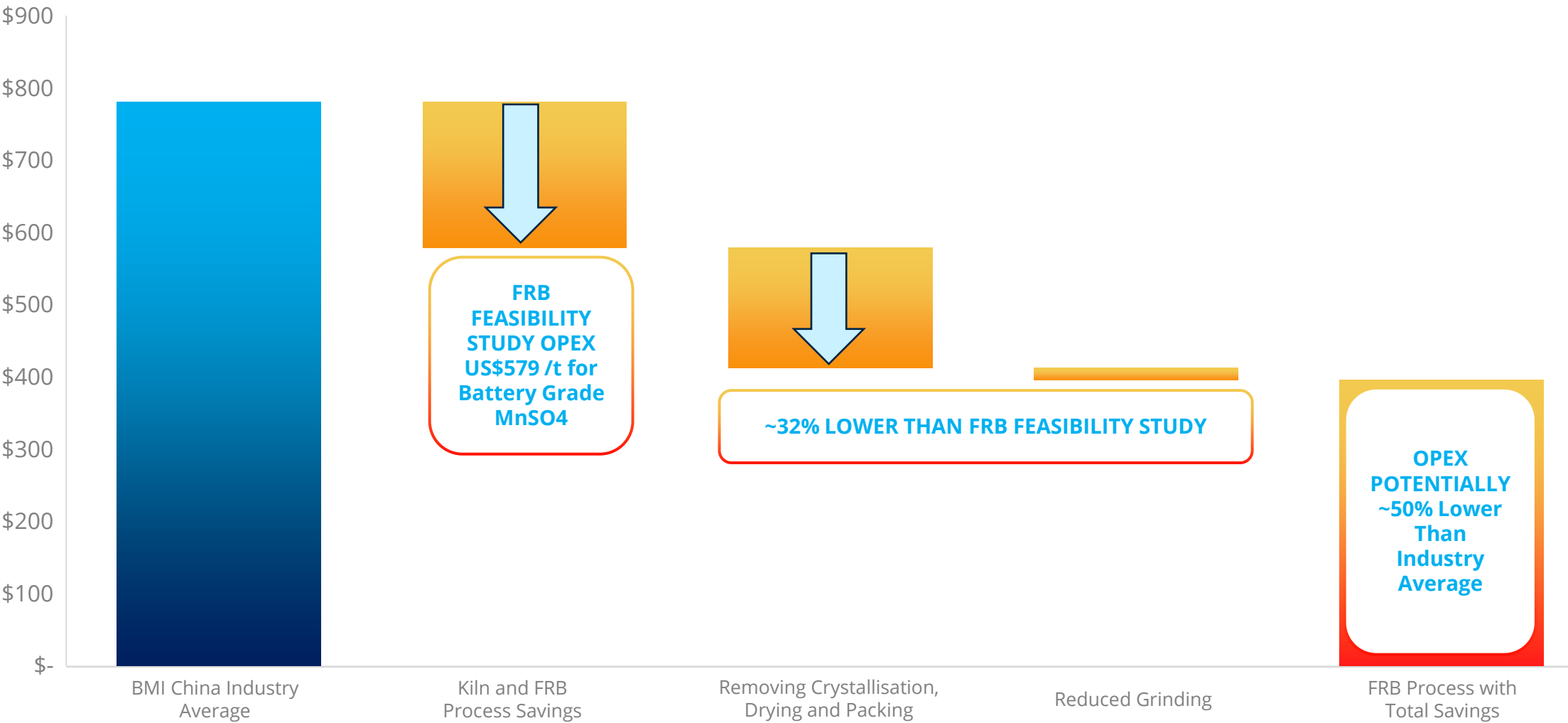
中南大學
CENTRAL SOUTH UNIVERSITY

CAPEX US\$83.5M + Working Capital US\$10.7M



FIREBIRD'S COMPETITIVE ADVANTAGE

MnSO₄ & LMFP PROCESSES COMBINED DELIVERS EXCEPTIONAL COST POSITION



Using 44% Mn ore based at \$5 / dmtu (MAY 2024)



INNOVATION & TECHNOLOGY

ADVANCED PROVEN TECHNICAL CAPABILITIES

- Driven by the Company's sector leading technical team, who bring decades of manganese and downstream processing experience, **Firebird is progressing technical development processing opportunities to continually innovate and improve operational efficiency, further driving an already impressive low-cost base**
- **Since establishing the team, HFBT has developed numerous processing opportunities led by the calcining kiln and 5th generation crystallisation reactor, and has established a strategic collaboration with China Southern University**
- The Company's technology is advanced and commercially proven, setting Firebird apart from industry peers
- Unique process prioritises cost efficiency, environmental responsibility, and quality



RESEARCH & DEVELOPMENT LAB

WORLD'S MOST ENERGY-EFFICIENT MANGANESE REDUCTION ROASTING KILN



- **Innovative Technology for Reduced Energy Consumption:** Traditional Manganese calcining technology requires a minimum of 300 kWh per tonne of feed, heating materials to 900°C and then cooling with water and air, leading to significant energy loss
- **Revolutionary Energy-Saving Solution:** Firebird's proprietary technology, currently under patent, recycles heat from the calcined material to pre-heat incoming feed, drastically cutting energy usage and boosting the cost-efficiency of its high-purity manganese sulphate plant
- **Strategic Partnership with Sunward:** Firebird entered a development agreement with Zhongji Sunward Technology Co., Ltd, a prominent producer of rotary tunnel kilns in China. Sunward will pay a 5% royalty on future sales revenue for using this innovative technology
- **Numerous Industrial Applications:** The energy-saving rotary kiln technology is adaptable for various industrial uses



Pilot Plant Results

- Following internal trials and independent reports from Sunward, the kiln demonstrated remarkable energy savings.
 - Compared to conventional kilns, which typically require more than 300 kWh per tonne of 44% Mn ore feed, Firebird's pilot kiln operates at only 80-100 kWh per tonne for 44% Mn ore feed

delivering 70% in energy savings

DEVELOPING NEW 5TH GENERATION CONTINUOUS HIGH-PRESSURE CRYSTALLIZATION REACTOR



1st generation
Single effect evaporator



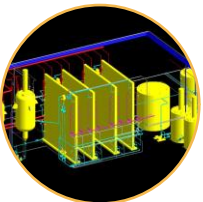
2nd generation
Multi-effect evaporator



3rd generation
MVR



4th generation
Single high pressure, high temperature reactor



Firebird's 5th generation, patent technology, utilising a continuous high-pressure system, **with 8% energy use of 1st generation**

- **1/3 energy use of 4th generation**
- Based on 4th generation system, it operates continuously & residual energy is used in pre-heating feed solutions



CURRENT INDUSTRY STANDARD:

Most companies are **still utilising 1st to 4th generation technologies** for sulphate production

ADVANCED 5TH GENERATION TECHNOLOGY:

Firebird's 5th generation technology is already in successful commercial use, with three systems sold to date

SIGNIFICANT STEAM SAVINGS:

Steam is a major cost factor in sulphate production. This advanced technology is expected to reduce steam consumption **to less than half of the industry average**, greatly improving cost efficiency

OAKOVER MANGANESE PROJECT

OAKOVER PROJECT

KEY HIGHLIGHTS

- Long term strategic supply source
- Mining Lease Granted – Subject to Mining Proposal approval
- Oakover is a sizeable, low-cost project, near-surface, gently dipping geology
- Metallurgical test work demonstrated saleable 30 - 32% Mn concentrate product achievable
- Hydrometallurgy test work demonstrated Battery Grade MnSO_4 achievable
- Updated DMS Manganese Concentrate Scoping Study generated strong results and highlighted Oakover as a long-life, high-quality operation:
 - 18-year Life of Mine,
 - ~A\$741.3 M NPV at a discount rate of 8%
 - Impressive IRR of 73.1%,
 - CAPEX of A\$123M

Mineral Resource Classification	Tonnes (Mt)	Mn (%)	Fe (%)	SiO ₂ (%)	Al ₂ O ₃ (%)	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
Total	176.65	9.9	8.6	38.1	9.7	0.10



INVESTMENT SUMMARY



Unique LMFP Capabilities in a Market moving towards Manganese Cathodes

An Australian-owned company capable of producing LMFP , we specialise in the processing and development of manganese battery cathode raw materials



Sector-Leading Team

Firebird’s Chinese manganese battery chemicals team boasts more than 50 years of manganese and chemical production experiences



Technology and Innovation

Firebird is committed to innovation. Our goal is to become a fully integrated cathode manufacturer, delivering advanced solutions worldwide



Low-Cost, Environmentally Friendly, Near Term

MnSO4 process is underpinned by a focus on low capital intensity and operational costs, enabled by a plant that can be built in 12 to 15 months from FID



Technology can be replicated anywhere

Firebird’s state-of-the-art research and proposed development facility in China provides competitive advantage. However, can be replicated worldwide

ASX:FRB

Share price as of 1 May 25	\$0.08
Shares on issue	142.36 M
Market capitalisation	\$11.4M
Options @ \$1.00	12.0 M
Performance rights	2.2 M
Options @ \$0.30	12.5 M
Options @ \$0.40	12.5 M
Cash on hand (30 March 2025)	\$2.35 M

Major Shareholders

Canmax Technologies	9.7%
Tolga Kumova	9.5%
Board (incl. related parties) & management	15.05%



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