DATE 7th May 2024

FEASIBILITY STUDY CONFIRMS POTENTIAL FOR LOW-COST, HIGH-PURITY MANGANESE PRODUCTION

HIGHLIGHTS

CHINA-BASED HIGH-PURITY MANGANESE PROJECT FEASIBILITY STUDY RESULTS

- **Study results demonstrate the opportunity for Firebird to become a low-cost producer of high-purity manganese sulphate**
- **Significant cost, development and operational advantages gained by building a plant and establishing operations in China**
- **Feasibility Study incorporated conservative cost estimates and the lowest selling sulphate price compared with peers**
- **Key results include:**
  - **Projected CAPEX of US$ 83.5 million** – refer to pages 14, 15 and 17 of the Feasibility Study
  - **Projected Working Capital of US$ 10.6 million** - refer to pages 14 and 15 of the Feasibility Study
  - Chinese circular industry and plant location within the Jinshi High-Tech Industrial Park provides **localised key reagents and inputs that drive a low OPEX of approximately US$609/mt for production of battery grade manganese sulphate**
  - Plant Capacity for Battery Grade Manganese Sulphate (MnSO4) of 50kt/a & Manganese Tetra Oxide (Mn_3O_4) 10kt/or equivalent $MnSO_4$ of 72.5kt/a
- **Firebird aims to become a low-cost producer of battery grade high-purity manganese at a time when the Lithium Manganese Iron Phosphate (LMFP) battery market is forecast to experience significant growth in coming years**

DEVELOPMENT PROGRESS UPDATE

- **Strong progress and support from the Jinshi Government and tier-one banks** for the development and construction of the Company's Battery-Grade Manganese Sulphate Plant
- **Advanced discussions with Chinese Banks regarding attractive financing options, with the Company expecting to provide an update in the coming weeks**
- Positive formal advice from Jinshi Government and relevant departments regarding the process to repatriate profits generated from operations
- **European customer site visits and offtake discussions commenced with initial positive feedback**
- **Third party manganese ore offtake discussions for the Study progressing well**
- Permitting and design completion expected by late Q3 2024
- **Final Investment Decision expected in H2 2024, with a 12-15 month construction**
- **Flagship Oakover Project continues to be an integral part of Firebird's long term manganese battery materials strategy** and development at the site is ongoing

Cautionary Statement

The Feasibility Study referred to in this announcement 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 accompanying this announcement. 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.

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.

Firebird Metals Limited (**ASX: FRB**, "**Firebird**" or "**the Company**") is pleased to announce excellent results from the Company's Battery Grade Manganese Sulphate Feasibility Study ("**Feasibility Study"** or "**Study**") for stage one of production in China, which will utilise third party manganese ore to produce high-purity manganese sulphate.

The Company's long-term strategy is to develop into a low-cost manganese producer and provide security of supply across both traditional outputs and new materials being used in fast-growing energy storage industries.

Completion of the Feasibility Study follows the announcement by Firebird in September 2023 of the Company's China-based Lithium Manganese Iron Phosphate ("**LMFP**") growth strategy, aimed at establishing the Company as a low-cost producer of battery-grade MnSO4 (high-purity manganese sulphate) and Mn_3O_4 (high purity manganese tetra oxide). Both products are key cathode materials in LMFP batteries for electric vehicles.

LMFP is considered a key future cathode for electric vehicle (**"EV"**) batteries and is a significant upgrade from the Lithium Iron Phosphate (LFP) cathode, which is currently he most popular EV battery cathode.

Adding high purity manganese sulphate (MnSO4) to LFP, creates LMFP, delivering significant operational and safety benefits to a battery, including:

- a higher thermal runaway temperature than nickel-based batteries
- costs approximately 30% lower than nickel-based batteries
- enhanced voltage platform and 15-20% increase in energy density

The Chinese chemical project design and engineering process differs from western processes.

A Feasibility Study is completed first and forms the basis of engineering design, government permitting and financing activities. The Feasibility Study contains a large portion of compliance and project economics assessment.

The Feasibility Study was completed by Hunan Chemical Engineering Design Institute Co., Ltd ("**HCEDI**") and in line with stringent Chinese regulations. Importantly, HCDEI have completed several similar studies for the Chinese Manganese Sulphate industry.

HCEDI is the leading $MnSO_4$ project design institute globally and Firebird's in-country technical team have previously worked closely with HCEDI on several projects.

Results from the China-based high-purity manganese project Feasibility Study validates Firebird's LMFP battery strategy to produce battery grade manganese sulphate in China.

These results have continued to build upon the solid platform for Firebird to successfully deliver on its vision to become a global leader in the manganese industry, combining mining and downstream processing with a dedication to the advancement of the Li-ion battery sector.

The company is working closely with HCEDI on preliminary plant design which is 50% complete. At the same time, equipment supplier engagement and due diligence of supplier's manufacturing process and supplier's customer experience are vital in the development and operational process in China. **Through this process, the Company has identified that further efficiencies can be achieved and has applied for two patents on energy saving (calcining process & product drying), which will further improve the impressive economics of the Project.**

The ongoing development of the Flagship Oakover Project, located in Western Australia, remains a critical pillar of Firebird's manganese battery materials strategy. Since listing in 2021, Firebird has delivered significant and rapid progress at Oakover, with key development and environment studies progressing as planned. It is intended that, once Oakover is in production, ore from the Project will be used to feed the Company's Battery Grade Manganese Sulphate plant in China.

Firebird Managing Director Mr Peter Allen commented: *"We are extremely pleased to deliver another key milestone in our pursuit of becoming a low-cost, near-term high-purity manganese producer. The rapid progress made from a development and in-country standpoint since announcing our China-based strategy in September 2023 is a testament to the hard work of our team and places the Company in a very exciting position moving forward.*

"The results from our Battery Grade Manganese Sulphate Feasibility Study for stage one of production highlight the compelling opportunity we have in front of us to become a key high-purity manganese producer and validates our decision to work towards building a Battery Grade Manganese Sulphate Plant and establish operations in China.

"We have already seen significant cost, development and operational advantages that can be gained by building a plant in China and, most importantly, the Company has been buoyed by the incredible level of support and interest received from key government agencies and tier-one banks in assisting us establish operations in China. With their support, Firebird is well-positioned to deliver on key remaining development and financing milestones to meet our objective of commencing operations in China in Q4 CY2025. This support also extends to ongoing discussions regarding third-party manganese offtake for stage one, which will expedite our production capabilities and pave the way for a cash flow-positive business.

"What excites the team the most is we are executing our strategy at the right time. LMFP batteries are forecast for the largest growth of all the manganese-based batteries, due to the fact it meets the key criteria of car manufacturers which is cost competitiveness, safety and good range. We believe we are seeing a new era of Li-ion batteries with the commercialisation of LMFP and we are well-positioned to benefit greatly from this rising demand."

This announce has been approved for release by the Board.

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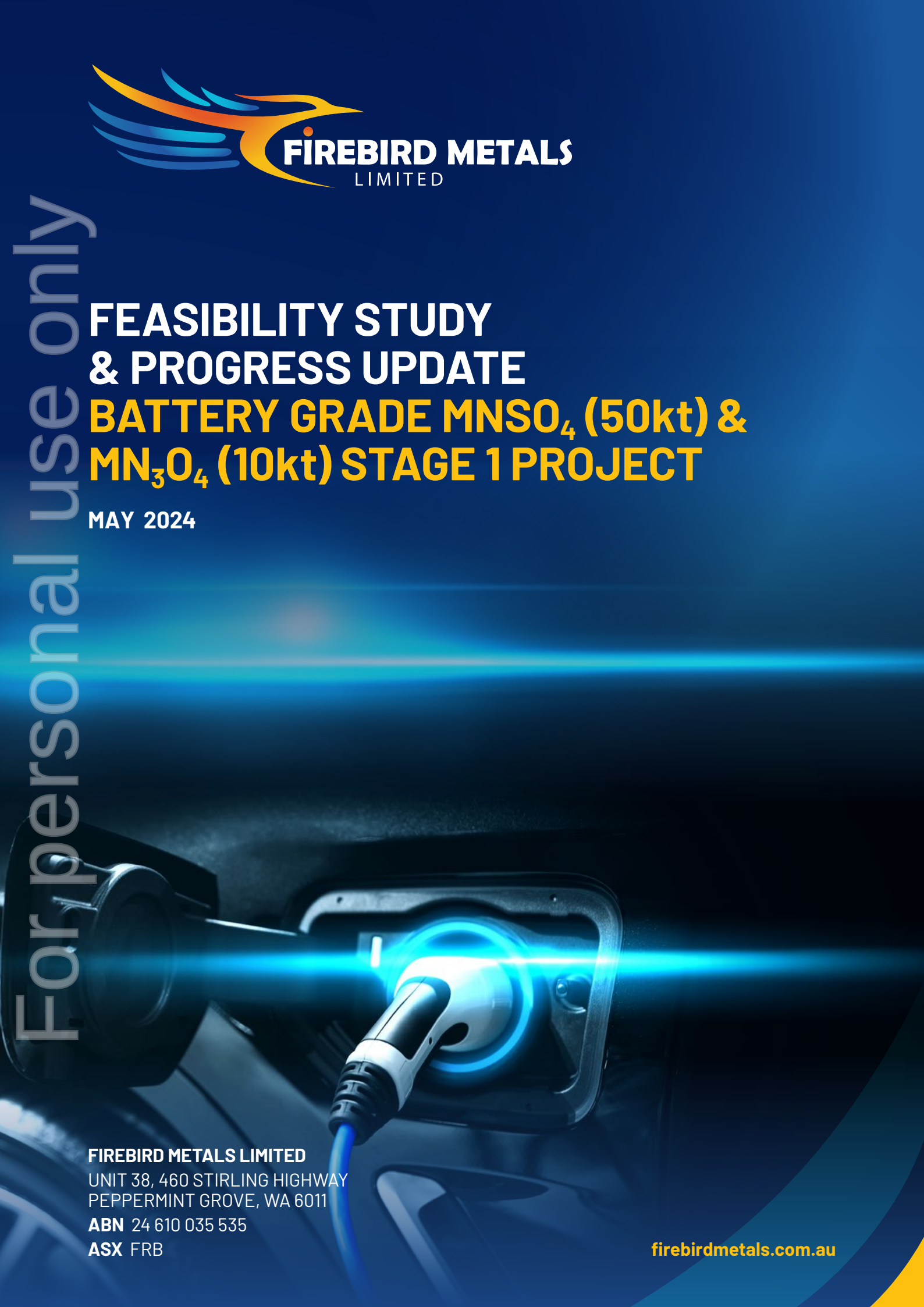
FIREBIRD METALS LIMITED

FEASIBILITY STUDY & PROGRESS UPDATE

BATTERY GRADE $MnSO_4$ (50kt) & Mn_3O_4 (10kt) STAGE 1 PROJECT

MAY 2024



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Firebird's Vision - next phase of strategic growth

Since listing in 2021, Firebird has delivered significant rapid progress at its flagship Oakover Project ("**Oakover**") to evaluate mining and processing of the manganese ore and is now set to transition to the next stage of strategic growth. While the development of Oakover remains a crucial pathway for the Company, the opportunity to expedite the establishment of the Battery Grade Manganese Sulphate Project Stage 1 in China positions the Company uniquely to supply the rapidly expanding Chinese and rest of world battery market.

The strategy has been established to develop Firebird into a near-term producer of battery-grade $MnSO_4$ (high-purity manganese sulphate monohydrate) and manganese tetra oxide (Mn_3O_4), which is a key cathode material in LMFP (Lithium, Manganese, Iron and Phosphate) batteries for electric vehicles & energy storage.

Demand for LMFP batteries and hence Battery Grade $MnSO_4$ is forecast to grow rapidly, with many industry participants touting the batteries as superior to other technologies. This strategy is underpinned by extensive research completed by Firebird in China on the high-purity manganese sulphate market.

Execution of the LMFP growth strategy is expected to place Firebird at the forefront of manganese sulphate production to meet the further downstream aspirations of becoming a cathode producer and this places the Company in a strong position to benefit from growing demand for LMFP batteries.

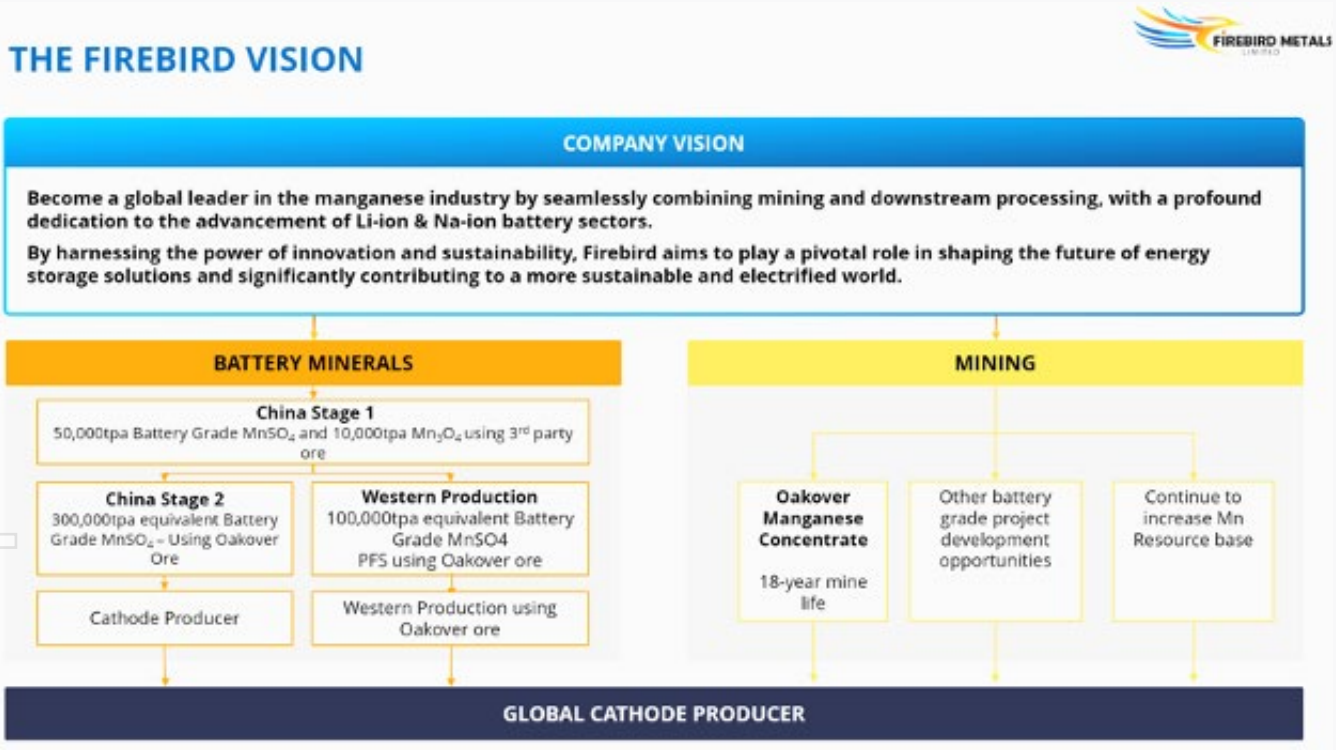


Figure 1: Company Vision

Introduction - Feasibility Study

The Company has completed a feasibility Study for Battery Grade Manganese Sulphate Project Stage 1. The Feasibility Study looks to develop a plant with a total equivalent capacity of 72,500 tpa battery grade manganese sulphate producing 50,000 tpa of Battery Grade Manganese Sulphate ($MnSO_4$) and 10,000 tpa of manganese tetra oxide (Mn_3O_4) from 66,000 tpa manganese ore from a third-party supplier.

The Company announced on 30 November 2023 that it had established a wholly owed subsidiary Hunan Firebird Battery Technology Co Ltd ("HFBT"). HFBT will own and operate the project.

Last year, Firebird carried out extensive due diligence on possible factory locations within China, visiting 10 industrial park sites in different provinces. The Company has considered all facets when visiting these industrial parks, from availability of sulphuric acid, steam, key reagents, proximity to customers, transportation routes and factory residue consumers.

On 13 December 2023 the Company announced its preferred location is the Jinshi High Tech Industries Development Zone, Jinshi, Hunan Province, China. Hunan is central to the Lithium-ion battery industry in the south of China. Benchmark Minerals Intelligence estimates that Hunan and the surrounding provinces accounted for 26% of worldwide Gigafactory capacity in 2023, which is estimated to be 27% by the end of this decade.

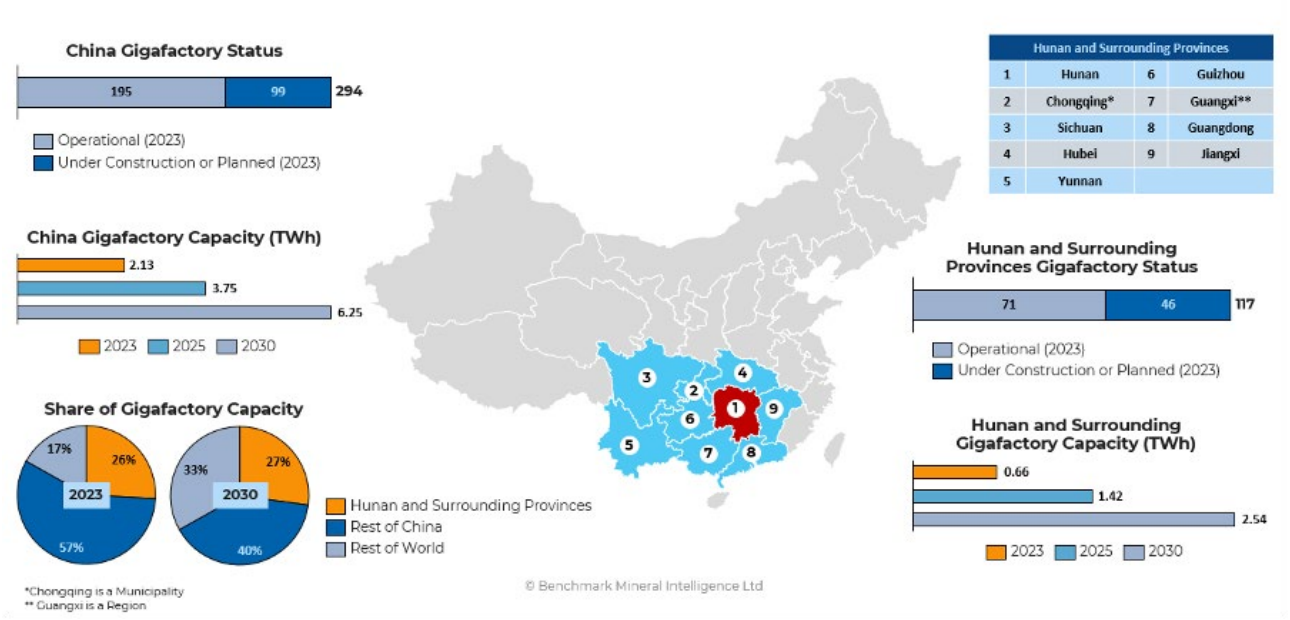


Figure 2: Chinese Gigafactory Snapshot, Source: Benchmark Mineral Intelligence

The Company will process ore through a proprietary process consisting of grinding, roast reduction, leaching, filtration, impurity removal, crystallisation and precipitation stages to produce key Battery Grade $MnSO_4$ and Mn_3O_4 products. The Feasibility Study has been completed by Hunan Chemical Engineer Design Institute Co.,Ltd ("HCEDI") to Chinese feasibility study standards. HCEDI have completed several similar studies for the Chinese Manganese Sulphate industry.

The Chinese chemical project design and engineering process differs from Western process. A feasibility study report is completed first to be the basis of engineering design, government permitting & financing activities. It contains a large portion of compliance and project economics assessment.

HCEDI is the leading $MnSO_4$ project design institute in the world and Firebird's technical team have worked with HCEDI closely in the past.

With the completion of the Feasibility Study, the Company now focuses on Preliminary Engineering and civil work design, with more than 50% of the preliminary design work completed. The Company has engaged several high-quality equipment suppliers with equipment costs being fed into the design work and detailed estimates.

Once completed, the design work will be reviewed by the relevant government department for preliminary permitting of the construction process.

There are a total of 8 major permits required to commence construction, with the key permits being environmental, safety & energy.

- The Environmental impact assessment report should be completed during April and will be put to Expert Panel review, full approval is expected before the end of the financial year.
- The Safety report has been approved by the Expert Panel and changes in design have been incorporated to reflect the Panel's review comments and permit is likely to be received at the end of April.
- The Energy consumption report is being drafted and expected completion is mid-April. Expert Panel review and permitting is expected to be received before the end of June.

The Company has received positive formal advice from the Jinshi Government and relevant government departments on the process to repatriate profits and capital received, with the only significant rule being that local taxes must be paid before repatriation of funds can occur.

The Chinese development process summary is outlined in Figure 3: Timeline to Production (Indicative) on the following page.

Ore Supply Feed

Firebird's long-term strategy is to use manganese concentrate from the Company's Oakover Project which is located 85 km east of Newman in the Eastern Pilbara region of Western Australia.

However for Stage 1 of the Battery Grade MnSO4 project the Company will buy third party ore to feed its plant. Future stages and potential western production of manganese sulphate is expected to be fed from the Company's Flagship Oakover Project. The project requires approximately 66,000 tonnes of third-party ore and the Company is very confident in securing the required tonnage.

Manganese ore is freely traded on international markets with China being the largest seaborne destination and China has the world largest secondary spot market.

China imports in excess of 30 million tonnes per annum of manganese ore and spot trading stockpiles are kept at Chinese main ports.

Since 2020, Chinese port stocks have ranged on a monthly basis from 3.9 million tonnes to 6.8 million tonnes, typically with an average of 5.6 million tonnes.

The Company's management has significant experience with sales of manganese ore in China and has significant network to source supply if required.

The Company has advanced discussions with an existing substantial manganese ore mining company (approximate production of 7Mtpa) who regularly exports to China, who has provided samples for test work and visited the Company's pilot plant in Jinshi.

Formal discussions regarding offtake arrangements are ongoing, with the Company anticipating the finalisation of these discussions prior to a decision to commence construction. The Company advises that there are currently no executed supply agreements in place.

It is envisioned in this Chinese Manganese Sulphate feasibility study to use third party ore as the principle feed for the Project as Oakover concentrate production is a several years away. The development status of concentrate production at the Oakover Project is currently at the Scoping Study level, references to any Oakover feed to be supplied into future Manganese Sulphate production are based on low accuracy level technical and economic assessments that are insufficient to support estimation of Ore resources.

Further exploration and evaluation work and appropriate studies are required before the Company will be able to estimate any Ore Reserves or to provide any assurance of an economic development case for Oakover concentrate production. For a full cautionary statement regarding the Oakover Concentrate Scoping Study, refer to the Company's ASX announcement dated 30/8/2023.

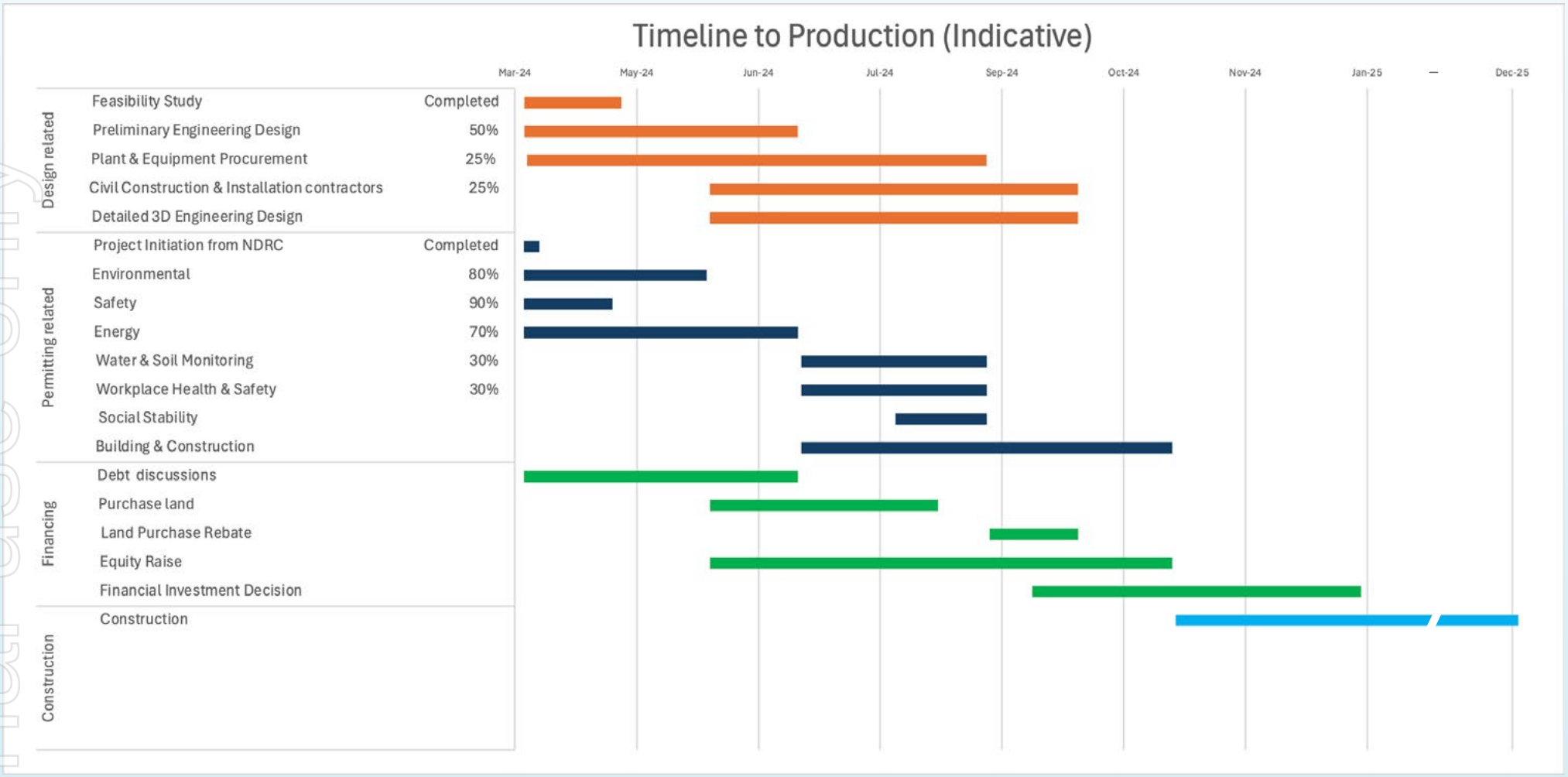


Figure 3: Timeline to Production (Indicative)

Process

The circuit will grind manganese concentrate prior to reductive roasting and being leached in Sulfuric Acid at an elevated temperature. Following additional reagent addition to remove major impurities, the slurry will be filtered to produce a pregnant leach solution (PLS). The leach residue will be washed and sold for use in the construction industry. The PLS will be purified further to remove trace amounts of base metals, producing a saleable sulphide precipitate.

The solution will then be crystallised in a two-stage crystallisation process to produce Battery Grade $MnSO_4$ which typically contains 32%Mn. The company has achieved Battery Grade $MnSO_4$ result with Oakover ore previously, refer announcements dated 21/11/2023 "Excellent results generated from China-Based Battery Grade $MnSO_4$ Scoping Study" The company intends to buy similar style mineralisation third party ore to Oakover as feed stock.

The details of the reagents used are commercially sensitive and of a confidential nature. Mn_3O_4 will be produced by taking solution streams from the $MnSO_4$ crystallisation circuit and processing it through a separate circuit using oxidative synthesis with the addition of further reagents to produce a Mn_3O_4 product. Mn_3O_4 has a typical Mn content of 71.5% Mn. Sodium Sulphate is produced as a waste product that is sold into the detergent and glassmaking industries.

Expected annual production tonnages from the plant are as follows				
	Saleable Products	**Unit**	**Quantity**	**Comments**
1	Battery Grade manganese sulphate	t/a	50,000	Main-product
2	Manganese tetra oxide	t/a	10,000	Main-product
3	Sodium sulphate	t/a	15,000	By-product
4	Nickel sulphide	t/a	300	By-product
5	Cobalt sulphide	t/a	300	By-product

Figure 4: Expected Production Volumes

The Company's flow sheet has been designed based on real world production experience with significant input and refinement from the Company's subsidiary HFBT Chief Operating Officer Mr Zhou and is largely based on processes that are proven in full scale production plants on similar feed materials.

Mr Zhou Qiyun, is a graduate of the Hunan University of Chemical Engineering, with a major in Chemical Process Engineering. Mr Zhou's career has spanned more than 20 years and has been largely focused on manganese sulphate processing. Furthermore, Mr Zhou is a specialist in Mechanical Vapor Recompression ("**MVR**") and holds numerous patents in generational redesigns for MVR crystallisers. Mr Zhou has previously been a part-owner of a manganese sulphate plant in China and has consulted to numerous manganese sulphate plants for both process and crystallisation optimisation.

The Firebird flowsheet builds on Mr Zhou's extensive experience and expertise and has some significant advantages over flowsheets and technologies that are being used by peers in the Chinese $MnSO_4$ industry as listed in Figure 7: Firebird's key process competitive advantage.

Trace element analyses for typical impurity elements on Battery Grade $MnSO_4$ produced at the pilot plant from the third party ore was conducted to determine impurity levels in the crystals and levels of individual impurity elements listed in the Manganese Sulphate for Battery Materials Specification (HG/T 4823-2015) were within specified limits.

High-level Process Flow Diagram
50ktpa high purity $MnSO_4.H_2O$ and 10ktpa high purity Mn_3O_4

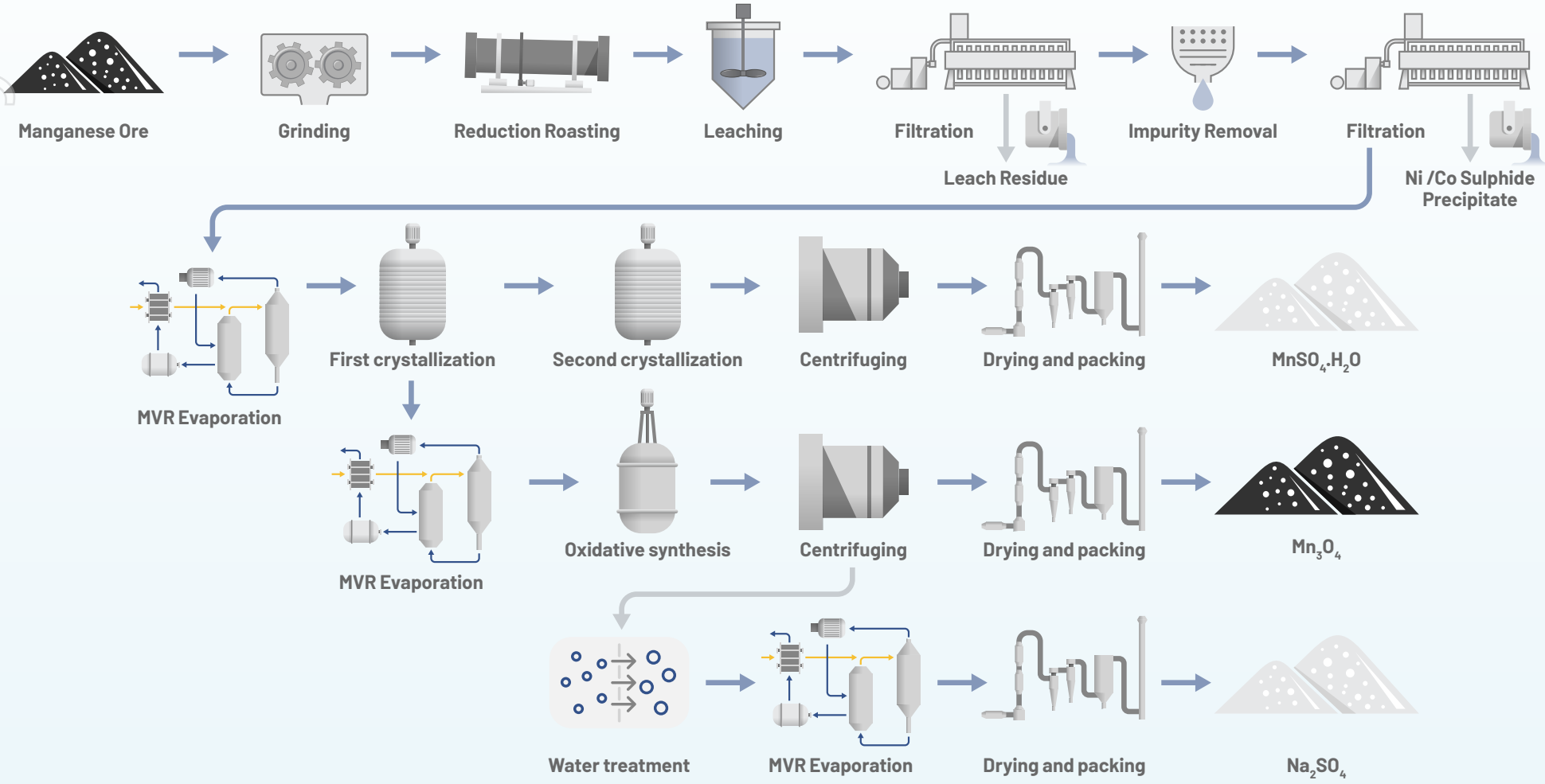


Figure 5: Simplified Process flow Diagram

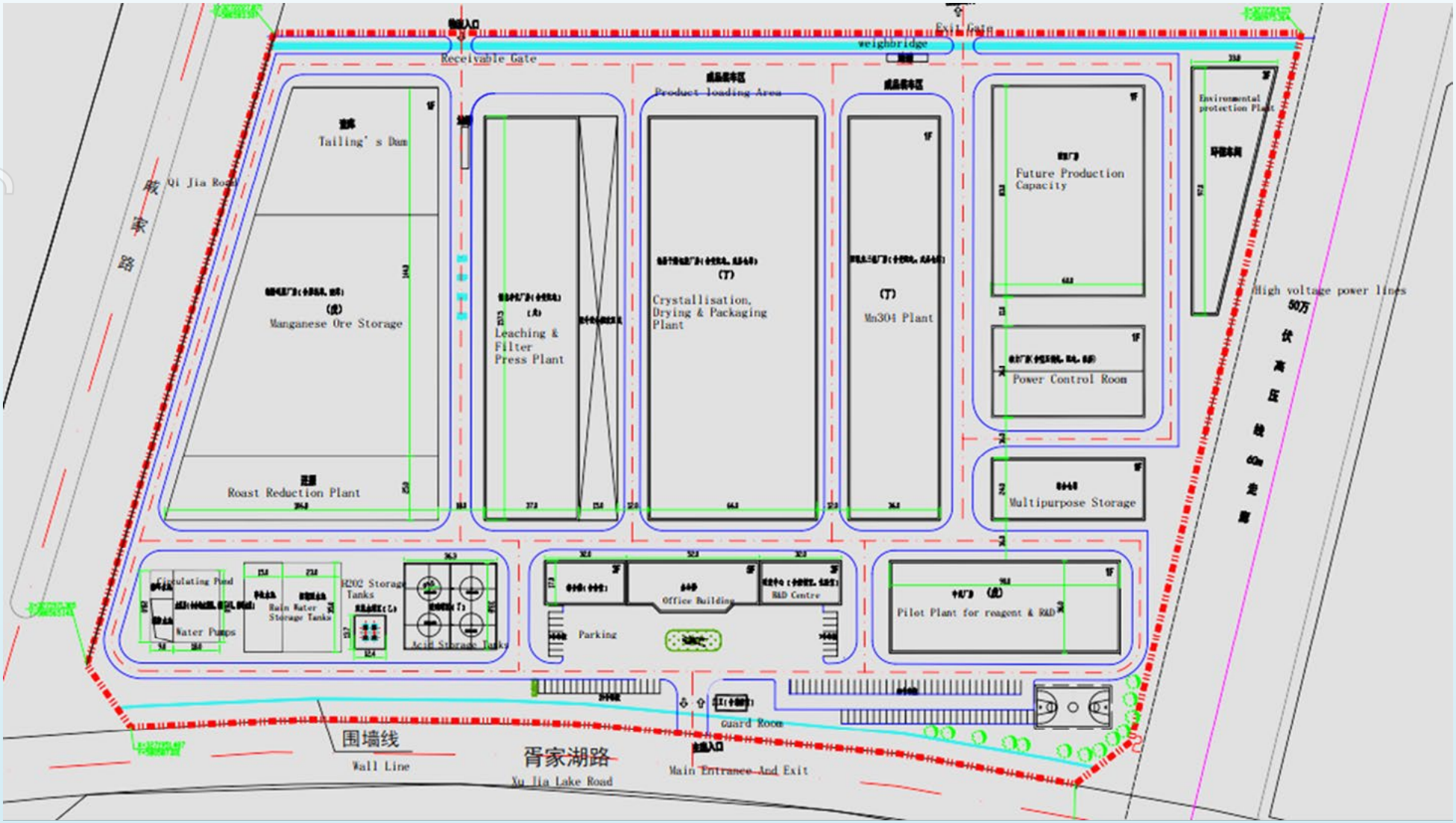


Figure 6: Plant layout

Process	FRB Advantage	Competing Processes
Ore Treatment	FRB uses a calcining process that creates less leach residue and which is in demand for use in cement making. FRB's residue produced at the R&D centre has been approved for use by two nearby cement plant.	Around half of existing producers use pyrite in their process which creates more residue that is high in sulfur and requires further treatment prior to being used in cement plants.
Impurity removal of Mg & Ca	FRB's technical team has more than 20 years experience in $MnSO_4$ production and has developed a process to remove Mg & Ca without using hydrofluoric acid.	Around half of existing & planned production is using hydrofluoric acid which results in 10-20% higher OPEX and leaves residual fluorine in the product.
5th Generation Crystallisation Reactor	FRB's patented 5th Gen Crystallisation Reactor is industry leading technology and used in commercial production. It has much lower energy consumption than alternatives. The use of this technology alone has put FRB's production cost in the lowest quartile.	Most competitors are using 2nd–4th Gen crystallisation reactor or MVR crystallisation processes at a higher energy consumption and resultant higher cost.
R&D Capabilities	FRB's vision & establishment of an R&D Centre enables our technical team to test and realise new ideas rapidly. FRB is in the process of applying for two patents both aiming to reduce energy consumption and cost through energy recovery technologies.	Some competitors use FRB's technologies and have engaged members of our technical team in the past as experts in cost reduction.
Efficient Plant Design	Mother liquor from production of Battery Grade $MnSO_4$ is used in the production of Mn_3O_4. This achieves the best value creation from the purge stream and produces the best battery grade products. FRB's design also leaves flexibility to increase Mn_3O_4 production or produce other Mn salts required in battery materials.	Only one competitor uses a similar process. Majority of competitors use mother liquor to produce fertiliser grade $MnSO_4$ or they use hydrofluoric acid to make Battery Grade $MnSO_4$.
EMM as alternate feedstock for $MnSO_4$ & Mn_3O_4	Using Mn ore as feed stock results in most cost-effective production and products of the highest quality.	EMM costs more, impurity removal is complex & not environmentally friendly. Mn_3O_4 particle shape difficult to control & attracts lower price than FRB Mn_3O_4.
Technical Capabilities	In addition to having vast expertise on the high purity $MnSO_4$ production process, FRB's technical team has expertise in the design and installation of the key equipment used in FRB's process, including MVRs, Crystallisers and Reactors.	Before engagement by FRB, technical team members consulted to more than half of the existing High purity & Fertiliser grade $MnSO_4$ plants on process design and equipment selection while improving the designs.

Figure 7: Firebird's key process competitive advantage

R&D Centre and Pilot Plant

The Research & Development ("**R&D**") Centre is strategically situated within the Jinshi High Tech Industries Development Zone, Jinshi, Hunan province, China to support the development of the project. The initial focus will be used to confirm the proposed flowsheet and process design using a combination bench scale and pilot plant testwork.

Initially, the Pilot Plant will produce samples of battery grade manganese sulphate ($MnSO_4$) and manganese tetra oxide (Mn_3O_4) for potential customers, offtake parties and financiers. The Pilot Plant utilises scaled versions of the equipment described in the Process Flow Diagram (Figure 5), except for the MVR Evaporation. The MVR Evaporation uses (4^{th}) generation equipment as the Pilot Plant operates on a batch production basis, whereas the proposed (5^{th}) generation technology requires continuous feed and operation.

In the future the R&D Centre will be instrumental in conducting comprehensive testing on several other potential manganese-rich precursor cathode active materials. The Company has commenced processing approximately 200kg of third-party ore to demonstrate the efficacy of our processes.

Figure 8: Pilot Plant

Figure 9: Pilot plant

Project Location

The Company carried out extensive due diligence during 2023 on possible factory locations within China, visiting 10 industrial park sites in different provinces. The Company has considered various facets of the project when visiting these industrial parks, including availability of sulphuric acid, steam, key reagents, and proximity to customers, transportation routes and factory residue consumers. On 13th December 2023 the Company announced its preferred location for its Battery Grade $MnSO_4$ and Mn_3O_4 Stage 1 Project is the Jinshi High Tech Industries Development Zone, Jinshi, Hunan Province, China.

Key reason behind the decision are:

- Proximity to existing and potential customer base. Within a 150km radius, Firebird estimates that existing Lithium Iron Phosphate ("**LFP**") capacity is approximately 3Mtpa. Even if a fraction of these convert from LFP to LMFP, it will exceed the project production capacity by many times.
- Strong support from Central and Local governments on foreign investments. HFBT permitting is being fast tracked. Being the first fully owned foreign entity in Jinshi, it is a significant project for the region.
- World class chemical industrial park built by China Chemical and local government has attracted more than 100 companies, with demand outstripping land availability.
- Easy access to Yangtze River which is the most cost-efficient transport system in China.
- Attractive land price & tax incentive. FRB also qualifies for all Chinese domestic companies grants.

Figure 10 : Firebird's industrial land at Jinshi Chemical Park

Hunan is a leading battery metals region, a major Chinese hub for existing and planned cathode and cell capacity and provides Firebird with direct access to rapidly growing gigafactory development. Due to these key competitive advantages, along with the key location criteria mentioned above being met, the Company selected the land available within the Hunan region as the location for its sulphate plant.

Jinshi City is situated in the north of Hunan Province and located approximately 237km from Changsha the capital of Hunan. Jinshi City has a population of 280,000 people and provides direct access to a significant land and water transportation network. The Jinshi High-Tech Chemical Park is situated in the Li Shui River and is a key city in the Yangtze River economic zone's growth plan. Currently there are 126 large scale industrial enterprises within the Jinshi High-Tech Industries Development zone.

Figure 11: Aerial view of Jinshi Chemical Park

Figure 12: Aerial view of Jinshi Chemical Park

Study Pricing and Financials

The selling price used in the Study is based on the Benchmark Minerals Intelligence price forecast for Battery Grade Manganese Sulphate for China domestic trade, with an average price of US$1419 Ex factory including VAT. The Mn_3O_4 market is both a relatively new market and a small market, currently there is no long-term price forecast for Mn_3O_4 and hence the price used for Mn_3O_4 is a Firebird management assumption extrapolated from the battery grade manganese sulphate forecast.

The Study envisions 80% of sales will be made domestically in China with the remaining 20% to be targeted towards export markets. Export prices are assumed to be sold on a CIF port of destination basis at a 20% premium to Chinese domestic prices to cover additional international logistics costs.

Manganese ore feed price for the 3rd party ore has been based on the Company's price estimate of US$5.50 CIF China / DMTU (Dry Metric Tonne Unit), This price has been based on the long term average price for 44% Mn ore CIF Tianjin, China (average from 2018 to date) as reported by the International Manganese Institute.

Chinese company tax is 25%, Jinshi local government has agreed to provide local tax incentives for the project's first 6 years, reducing the tax rate by 8.3% to 16.7% for the first three years and by 5% to 20% for years four to six.

The capital costs estimate has been developed by Hunan Chemical Engineering Design Institute Co and the the HFBT technical team with +/-15% accuracy.

Total investments	**USD M**
Equipment	$40.2
Installation	$5.4
Civils	$21.9
Other	$5.08
Contingency 15%	$10.9
Total project capital	**$83.5**
Working Capital	$10.6

Figure 13: Capital Estimates Summary

The Company has received positive formal advice on the process to repatriate profits and capital received from the Jinshi Government and relevant government departments, with the only significant rule being that local taxes must be paid before repatriation of funds can occur.

Cost Summary	USD M per annum	USD/mt (metric tonne)
Raw Materials – Manganese	$10.629 M	$212.60
Raw Materials – Reagents	$5.579 M	$111.59
Steam and Power	$6.039 M	$120.78
Labour	$2.616	$52.32
Fixed Costs	$5.556 M	$111.13
Total Cost of Battery Grade $MnSO_4$	**$30.419 M**	**$608.42**
Raw Materials - Manganese	$4.783 M	$478.34
Raw Materials - Reagents	$6.082	$608.27
Steam and Power	$3.003 M	$300.38
Labour	$1.203	$120.34
Fixed Costs	$2.556 M	$255.61
Total cost of Mn_3O_4	**$17.627M**	**$1,763.36**

Figure 14: Project Opex – Financial Model

Battery Grade Manganese Sulphate Stage 1 Key Figures		
Ore Feed	Ktpa	66
Battery Grade $MnSO_4$ produced	Ktpa	50
Mn_3O_4 produced	Ktpa	10
Battery Grade $MnSO_4$ price (China)	US$/mt	$1,419
Mn_3O_4 price (China)	US$/mt	$3,365
Operating Cost - BG $MnSO_4$ (excluding VAT)	US$/mt	$608/t
Operating Cost – Mn_3O_4 (excluding VAT)	US$/mt	$1,763/t
CAPEX	**US$**	**$83.5M**
WORKING CAPITAL	**US$**	**$10.6**
CNY/USD exchange rate		**7.2**

Figure 15: Key Financial Data

Permitting

In China, the construction process necessitates obtaining essential permits. To navigate this regulatory landscape effectively, our Company has enlisted the expertise of specialised engineering and consulting firms. These entities are tasked with conducting thorough evaluations encompassing environmental, energy, and safety considerations.

It's worth noting that these permit applications can proceed concurrently with the ongoing feasibility studies, engineering assessments, and financing endeavours. There are total of 8 major permits required before construction begins, being:

1. Project Initiation Permit by the NDRC (National Development and Reform Committee)
2. Project Environmental Permit via the Environmental Impact Assessment document
3. Project Safety Permit
4. Project Energy Permit via the Energy Technology Evaluation document
5. Water and Soil Monitoring Permit
6. Workplace health and Safety Permit
7. Social Stability Permit
8. Building and Construction Permit

The key permits being environmental, safety & energy permits.

- Environmental impact assessment report should be completed during April and will then go on Expert Panel review, full approval is expected before the end of the financial year.
- Safety report has been approved by Expert Panel and changes in design have been made to reflect the Panel's review points and permit is likely to be received at the end of April.
- Energy consumption report is being drafted and expected completion is mid-April. Expert Panel review and permitting is expected to be received before the end of June.

Project Funding

The Company considers the Project to be inherently low risk and technically straightforward nature. This, coupled with its robust economic underpinnings, provides a solid foundation for Firebird to access traditional financing avenues via debt and equity markets.

An estimated sum of US$83.5 million, excluding working capital and finance costs, is necessitated to realize the production outlined in the Feasibility Study.

There is, however, no certainty that Firebird will be able to source funding as and when required. Formal funding discussions have commenced with China Construction Bank (Jinshi) and Firebird has engaged with a number of financial institutions and potential partners which have expressed a high level of interest in being involved in the funding of the Project.

It is envisioned that a working capital of approximately US$10.7M will be required, finance costs of these funds have been built into the financial model. Typical project development financing would involve a combination of debt and equity. Firebird has formed the view that there is a reasonable basis to believe that requisite future funding for development of Oakover will be available when required.

There are grounds on which this reasonable basis is established including:

- Global debt and equity finance availability for high-quality projects remains robust
- The Project is low risk and technically simple
- The Firebird Board and Management Team has extensive experience in project development, financing and production in the resources industry.
- Members of the Board were involved in the funding and development of New Century Resources Ltd (ASX:NCZ), Benz Mining Corporation (ASX:BNZ), Vital Metals Ltd (ASX:VML) and Boss Energy Ltd (then known as "Boss Resources Limited") (ASX:BOE).

Manganese Market

Manganese is an industrial metal that has a wide range of applications. The most significant use of manganese is in steel production (about 90%) where every tonne of steel requires approximately 1-2% of manganese in the form of manganese alloys. Manganese acts as deoxidiser and desulfuriser agents in steel production, to remove oxygen and sulphur to increase the quality of steel products. Specifically, manganese helps to prevent corrosion, make steel more resistant to abrasion and increases the hardenability rate. Manganese ore is predominantly mined in the form of carbonate, semi-carbonate or an oxide and is smelted into a manganese alloy, for consumption in the steel industry.

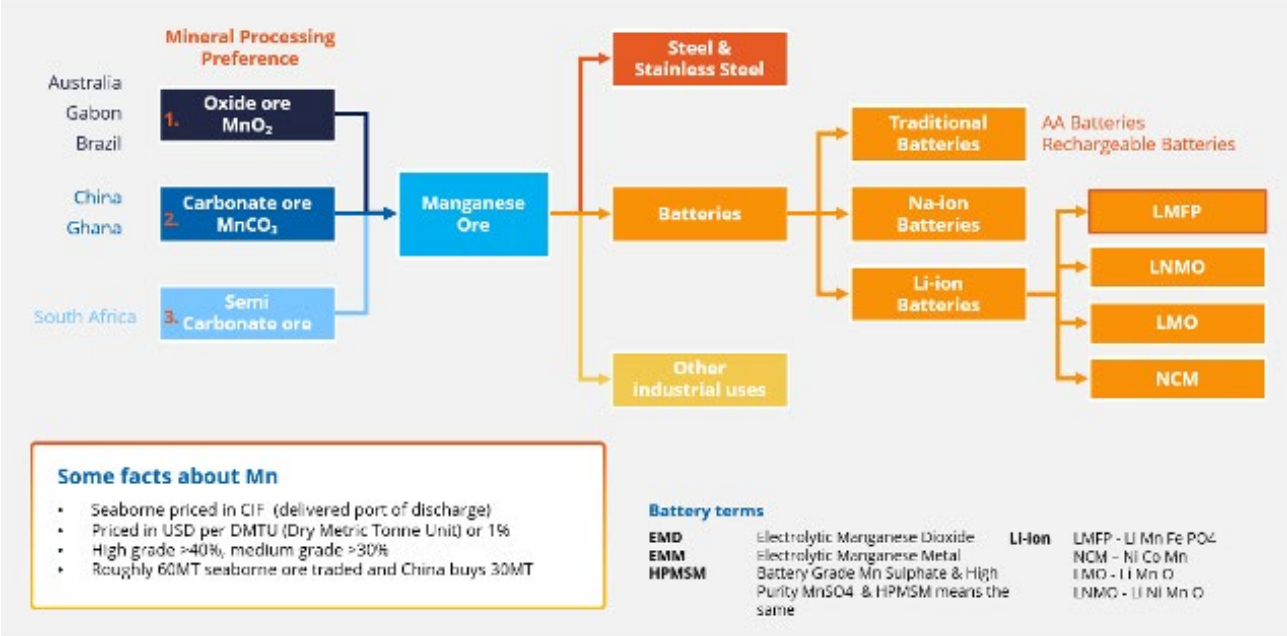


Figure 16: Manganese Market Snapshot

Importantly, the use and demand for manganese in EV batteries is growing rapidly. Manganese is a key and critical element required in the production of cathodes for lithium-ion batteries, which are at the centre of the clean energy transition. The use of these batteries in EVs continues to grow exponentially, forming a major market for supply and consumption of battery grade manganese sulphate. Historically the main consumption and use of $MnSO_4$ has been within Ternary cathodes, for example Nickel Cobalt Manganese (NCM) and Lithium Manganese Oxide (LMO) cathodes.

Figure 17: Mn content (kg) per battery in each vehicle above (Source: Benchmark Mineral Intelligence)

According to a projection by Benchmark Mineral Intelligence in 2023, the demand for manganese in batteries is predicted to rise significantly, surpassing the demand for key battery metals such as lithium, nickel, and cobalt (Benchmark Mineral Intelligence). More recently, the use of manganese has expanded from ternary into LFP to make LMFP cathodes. Traditionally, LFP based batteries are considered safer and cheaper to manufacture, whereas ternary batteries provide more capacity, they are more expensive and not as safe as LFP based batteries.

In the case of LMFP, manganese content within this battery isn't as high as other manganese-based EV batteries, however, the size and growth potential of this market is the largest in medium to long term. LMFP is an upgrade from LFP and by introducing manganese to replace iron, the following benefits are achieved:

- Manganese enhances the voltage platform, increasing energy density;
- Adding manganese increases capacity by 15-20%, nearing mid-range ternary batteries; and
- Flexible, used on its own or mixed with ternary batteries.

The rise of LMFP is imminent as LFP battery capacity is reaching its theoretical energy density capacity and more importantly, LMFP fits strategies of end users as its cost effective, safe and provides strong range.

Hunan is central to the Lithium-ion battery industry in the south of China. Benchmark Minerals estimates that Hunan and the surrounding provinces contributed 26% of worldwide Gigafactory capacity in 2023, which is expected to reach 27% by the end of this decade.

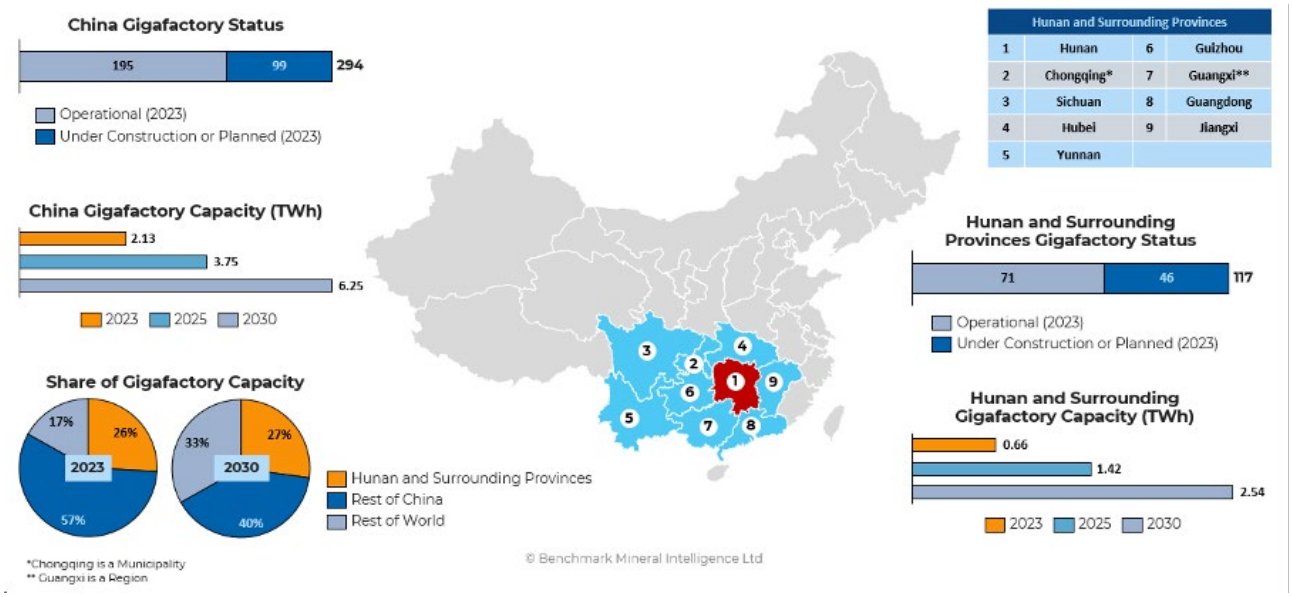


Figure 18: Chinese Battery Forecast by Benchmark Minerals

The Southern regions in China have been significant LFP producers with Benchmark Minerals estimating that 10 million tonnes of LFP is operational, under construction or planned. Chinese cathode producers have responded quickly to the rise of LMFP and in the surrounding provinces of Hunan there has been significant LMFP capacity announcements.

As per table below, Soochow securities is forecasting that LMFP will replace 50% of LFP by the end of this decade, further demonstrating significant growth in LMFP and Battery Grade Manganese Sulphate demand.

LMFP Demand Forecast (excluding current manganese use in batteries)									
	Unit	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E
Global Demand in EV	GWh	879	1,183	1,626	2,152	2,739	3,385	4,106	4,853
LFP penetration rate	%	42%	45%	46%	46%	47%	47%	49%	50%
LFP Demand	GWh	373	531	750	998	1,279	1,607	1,993	2,419
Ternary Batteries penetration rate	%	58%	55%	54%	54%	53%	53%	51%	50%
Ternary Batteries Demand	GWh	506	652	876	1,155	1,460	1,778	2,113	2,434
Forecast LMFP to replace LFP	**%**	**0.5%**	**6.5%**	**13.0%**	**20.0%**	**30.0%**	**40.0%**	**45.0%**	**50.0%**
Forecast LMFP to mix with Ternary	**%**	**0.2%**	**1.5%**	**3.0%**	**5.0%**	**7.0%**	**11.0%**	**13.0%**	**15.0%**
Total LMFP Demand	%	0.4%	3.7%	7.5%	11.8%	17.5%	24.5%	28.2%	32.1%
LMFP Batteries Demand	**GWh**	**4**	**46**	**127**	**262**	**491**	**846**	**1,180**	**1,584**
Growth rate yoy	%	/	1157.8%	177.8%	106.5%	87.6%	72.1%	39.6%	34.2%
Equivalent MnSO4 required	kt	3	62	156	343	624	1,092	1,716	2,278

Source: Soochow Securities 16-8-23

Figure 19: LMFP demand forecast in China by Soochow Securities

Environment, Social and Governance (ESG)

ESG methodologies and future objectives form a significant reflection in how Firebird plans and conducts business, including corporate governance systems, people management systems, support for local communities and management of our operations.

Firebird identifies the importance of ESG affairs while advancing its projects. This Study has been approached with key ESG metrics in mind.

As Firebird grows, systems and processes will be implemented to support and develop the Company's workforce through employee assistance programs, traineeships, apprenticeships, graduate recruitment and training. We will continue to review capabilities and prioritise courses that align with our corporate performance indicators.

The Company plans to complete CO2 and Green House Gas studies for the Battery Grade Manganese Sulphate plant in Jinshi during construction. The Company believes that the location in China will provide very comparable statistics, considering the proximity to sulphuric acid, all reagents, customers and consumers of all residues.

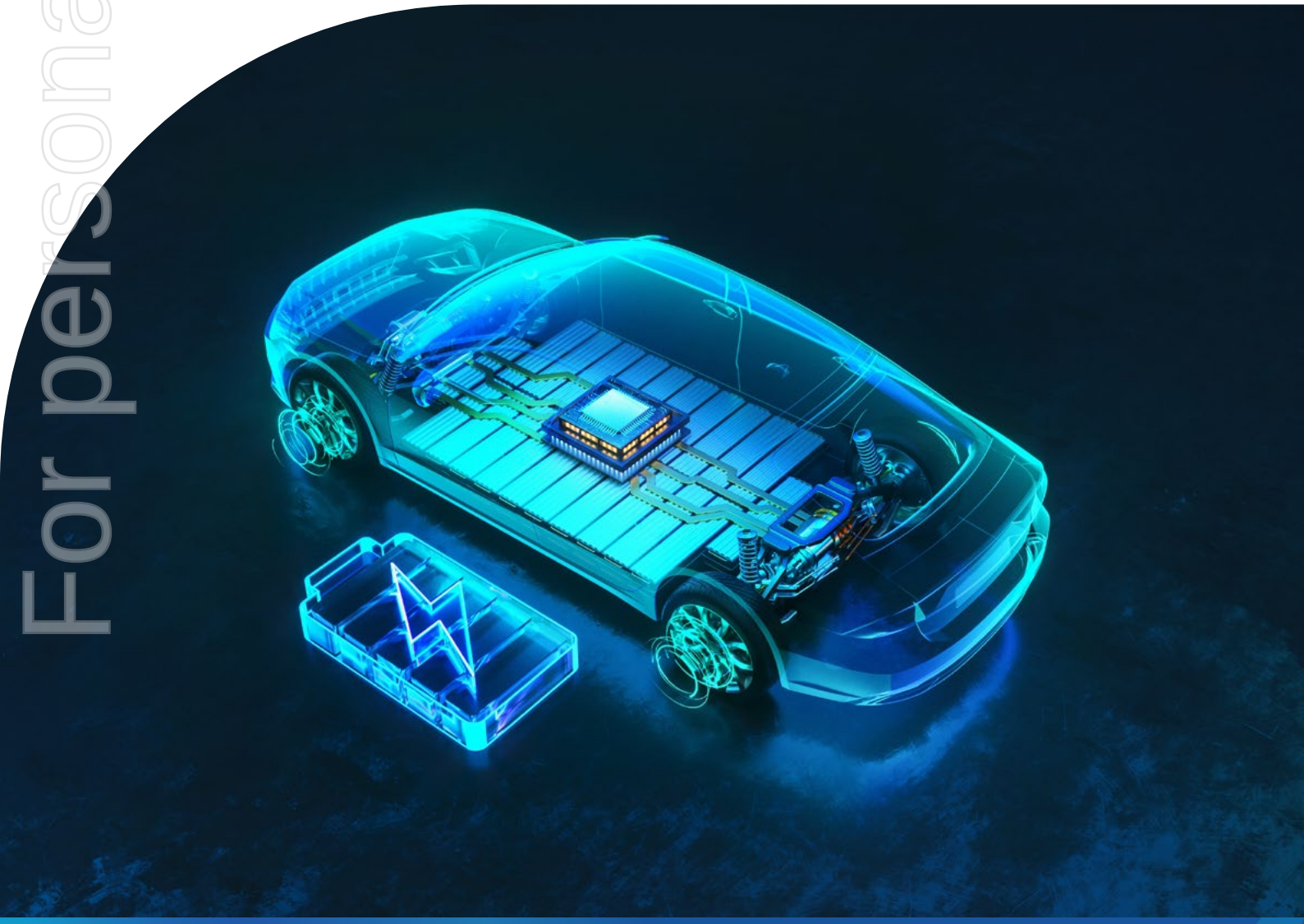
Chinese Circular Industries effectively make the project a zero-waste project with all products and residues being consumed.

Sources

The entities that have contributed to various aspects of the Feasibility Study for the Battery Grade Manganese $MnSO_4$ and Mn_3O_4 processing plant in China are listed below.

Category	Source
Sulphate Processing	Mr Zhou and HFBT technical team
Capital Costs	Hunan Chemical Engineer Design Institute Co.,Ltd and HFBT technical team
Operating Costs	Hunan Chemical Engineer Design Institute Co.,Ltd and HFBT technical team
Logistics	Hunan Chemical Engineer Design Institute Co.,Ltd and HFBT technical team
Manganese Market	FRB Management
Financial Modelling	Mining Insights
Exchange Rate	FRB Management
Sales price	FRB Management and Benchmark Minerals Intelligence

Figure 20: Key Inputs for China-based in-house Manganese Sulphate Study



Risks

Market Risk

Market studies demonstrate significant growth in demand over this decade, which is directly linked to the growth in EV sales and lithium-ion batteries. Manganese is consumed in solid state lithium batteries and the majority of sodium-based batteries providing further demand protection. The Company's chosen location in China further mitigates risks with the China being the largest single existing demand market for manganese sulphate.

Design and Process Risk

The technology being used in this process is based on a combination of standard chemical processes commonly used within the Chinese manganese chemical industry and a recently patented iteration of energy-saving technology to which FRB's subsidiary has secured rights (see ASX announcement dated 30 November 2023). The technology is designed to utilise residual heat from the initial crystallisation step to recycle and preheat solutions feeding into the crystalisation process and expected to ultimately lead to energy consumption of around 1/10th of standard crystallisation plants.

While previous iterations of the technology are understood to have been implemented in around 14 existing plants operating in China, the latest (5th) generation (to which FRB holds patent rights) has only recently begun to be implemented in two plants (operated by private companies and other enterprises in China), which the Company has limited access to production and performance information.

The Company is using a scaled (4th) generation process within its pilot plant operations, which is operated on a batch production basis whereas (5th) generation technology requires continuous feed and operation.

Accordingly, the (5th) generation technology proposed to be used by FRB should be considered to be at partially novel / emergent and the proposed operation may be exposed to risks which are customary to the use of such processes.

The Company's considers that this design and process risk is mitigated by the Company's in house experts led by the appointment of Mr Zhou Qiyun who has vast manganese sulphate experience spanning over 20 years in the production, development, and optimisation of manganese sulphate plants in China. The Company has commenced production at its R&D centre and Pilot Plant, producing both Battery Grade $MnSO_4$ and Mn_3O_4 from third party pore provided by potential suppliers.

Manganese Ore Supply Risk

A manganese ore supply risk for Stage 1 is apparent but is mitigated by the sizeable Chinese manganese market which imports approximately 30 million tonnes of various grades of manganese ore annually and has port stocks principally sold by trading companies for domestic consumption of approximately 5.6Mt every month providing significant optionality for supply sourcing. Firebird's executive management team has significant experience with sales of manganese ore in China and has significant network to source supply if required.

Supply risk will be further mitigated with the development of the Company's Flagship Oakover Project. It is intended that, once the Oakover Project is in production, the Oakover ore will be used to feed the Battery Grade Manganese Sulphate plant.

Safety Risk

The main hazards and harmful factors of the project are fire, poisoning, & suffocation injuries and measures should be taken to prevent and control them, ensuring that protective measures are in place. Other hazards such as impact from objects, vehicle injuries, mechanical injuries, electric shock, burns, falls from heights, collapses, drowning, lifting injuries, container explosions, noise hazards, dust hazards, and other hazards are not prominent but should not be overlooked. Corresponding measures should also be taken to protect against them to achieve the goal of safe production.

Construction Cost and Schedule Risk

Construction cost risk is mitigated by the experience HCEDI has had with various similar plants, plus the extensive experience of our Chinese Technical team. The capital estimate contains a contingency of +/- 15%. Implementation of the project within the proposed schedule is a key risk. The transition through feasibility phase and subsequent phases requires continuous momentum to enable schedule success. Delays and gaps will increase schedule risk.

Forward-looking Statements

This announcement contains forward-looking statements which are identified by words such as 'may', 'could', 'believes', 'estimates', 'targets', 'expects', or 'intends' and other similar words that involve risks and uncertainties. These statements are based on an assessment of present economic and operating conditions, and on a number of assumptions regarding future events and actions that, as at the date of this announcement, are considered reasonable. Such forward-looking statements are not a guarantee of future performance and involve known and unknown risks, uncertainties, assumptions and other important factors, many of which are beyond the control of the Company, the Directors and the management. The Directors cannot and do not give any assurance that the results, performance or achievements expressed or implied by the forward-looking statements contained in this announcement will actually occur and investors are cautioned not to place undue reliance on these forward-looking statements. The Directors have no intention to update or revise forward looking statements, or to publish prospective financial information in the future, regardless of whether new information, future events or any other factors affect the information contained in this announcement, except where required by law or the ASX listing rules.

Firebird has concluded that it has a reasonable basis for providing these forward-looking statements and the forecast financial information included in this release. To achieve the range of outcomes indicated in this Study, funding of in the order of an estimated US$83.5 million will likely be required by the Company. Based on the current market conditions and the results of studies to date there are reasonable grounds to believe the Project can be financed via a combination of debt and equity. Debt may be secured from several sources including Chinese banks, international banks, the high yield bond market, resource credit funds, and in conjunction with product sales of offtake agreements. It is also possible the Company may pursue alternative funding options, including undertaking a corporate transaction, seeking a joint venture partner or partial asset sale.

There is, however, no certainty that Firebird will be able to source funding as and when required. Whilst no formal funding discussions have commenced the Company has engaged with a number of potential financiers on the Oakover Manganese project and these potential financiers have expressed an interest in being involved in the funding of the project. No commercial terms have been agreed between the parties, the discussions are incomplete, and there can be no certainty that any agreement or agreements can be reached or that any transaction will eventuate from these discussions. Accordingly, no investment decision should be made on the basis of this information. As the discussions mentioned above are at an early stage and are incomplete, any announcement of the details of these discussions would be premature and speculative.

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