SOVEREIGN METALS LIMITED

16 June 2022

KASIYA EXPANDED SCOPING STUDY RESULTS

EXCEPTIONAL ECONOMICS CONFIRM KASIYA AS AN INDUSTRY-LEADING SOURCE OF CRITICAL RAW MATERIALS

Sovereign Metals Limited (**the Company** or **Sovereign**) is pleased to announce the results of the Expanded Scoping Study (**Scoping Study** or **Study**) for the Company's Kasiya Rutile Project (**Kasiya** or **the Project**) in Malawi.

Scoping Study Parameters - Cautionary Statements

The Scoping Study referred to in this announcement has been undertaken to determine the potential viability of an open pit mine, rutile and graphite processing plant constructed onsite at the Kasiya project in Malawi and to reach a decision to proceed with more definitive studies. The Scoping Study has been prepared to an accuracy level of ±30%. The results should not be considered a profit forecast or production forecast.

The Scoping Study is a preliminary technical and economic study of the potential viability of the Kasiya project. In accordance with the ASX Listing Rules, the Company advises it is based on low-level technical and economic assessments that are not sufficient to support the estimation of ore reserves. Further evaluation work including infill drilling and appropriate studies are required before Sovereign will be able to estimate any ore reserves or to provide any assurance of an economic development case.

61% of the total production target is in the Indicated Mineral Resource category with 39% in the Inferred Mineral Resource category. 100% of the scheduled throughput over the first eight and half years of production is in the Indicated Mineral Resource category, with 0% in the Inferred Mineral Resource category. The Company has concluded that it has reasonable grounds for disclosing a production target which includes a modest amount of Inferred material. However, there is a low level of geological confidence associated with Inferred mineral resources and there is no certainty that further exploration work (including infill drilling) on the Kasiya deposit will result in the determination of additional Indicated Mineral Resources or that the production target itself will be realised.

The Scoping Study is based on the material assumptions outlined elsewhere in this announcement. These include assumptions about the availability of funding. While Sovereign considers all 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 outcomes indicated in the Scoping Study, additional funding will likely be required. Investors should note that there is no certainty that Sovereign will be able to raise funding when needed. It is also possible that such funding may only be available on terms that dilute or otherwise affect the value of the Sovereign's existing shares. It is also possible that Sovereign could pursue other 'value realisation' strategies such as sale, partial sale, or joint venture of the Project. If it does, this could materially reduce Sovereign's proportionate ownership of the Project.

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. Given the uncertainties involved, investors should not make any investment decisions based solely on the results of the Scoping Study.

In April 2022, Sovereign announced a new JORC Mineral Resource Estimate (**MRE**) for Kasiya which confirmed the Project as the world's largest rutile (titanium dioxide) deposit and one of the world's largest flake graphite deposits.

The Expanded Scoping Study based on the April 2022 MRE confirms that Kasiya will be one of the world's largest and lowest cost producers of natural rutile and natural graphite with a carbon-footprint substantially lower than current alternatives while significantly contributing to the social and economic development of Malawi.

KEY EXPANDED SCOPING STUDY HIGHLIGHTS

- Significant **increase in NPV and EBITDA** from the 2021 Initial Scoping Study with **lower operating costs** for a relatively small increase in Capex to first production

US$1,537M	**36%**	**US$12,038M**
After Tax NPV_8	After Tax IRR	LOM Revenue
(↑79%)	(No change)	(↑92%)
US$323M	**US$320/t**	**US$372M**
Ave. Annual EBITDA	Operating Cost per tonne of product	Capex to 1st Production
(↑101%)	(↓10%)	(↑ 12%)

- Potential to become a **major producer in both the natural rutile and graphite markets** with steady state production of 265,000 rutile and 170,000 tonnes of graphite with a 25-year mine life
- **Low capital costs to first production** due to exceptional existing available infrastructure offering significant cost reductions and providing optionality and scalability
- **Low operating cost and high margins** due to deposit size, zero strip ratio of soft, friable high-grade mineralisation from surface, amenability to hydro-mining, conventional processing, deposit location and low transport costs
- **Extremely favourable market fundamentals** as rutile (titanium) and natural graphite deemed critical raw materials for the US and EU based on economic importance and supply risk
- Natural rutile market in structural deficit with current global supply estimated to decline 45% in the next three years with graphite demand set to soar as electric vehicle production is forecast to increase 12-fold by 2040

- Natural ESG benefits for Kasiya:
    - **Substantially reduced CO_2 emissions for both rutile and graphite** compared to current alternatives, including substantial Scope 3 emissions reductions for pigment production from rutile compared to alternative feedstocks
    - **Significant social and economic benefits for Malawi** including job creation, fiscal returns, training and continued community social initiatives
- Study based on **conservative commodity price estimates**. Long-term rutile price (real) of **US$1,254/t** versus current spot price of +US$2,200/t[1] and long-term natural graphite basket price (real) of **US$1,085/t** versus current equivalent spot price of US$1,223/t[2]

Managing Director, Dr Julian Stephens

"The Expanded Scoping Study demonstrates Kasiya is a Tier 1 minerals project being the largest natural rutile resource and one of the largest graphite resources in the world. Both minerals are classified on the Critical Minerals lists of the US and EU and rutile is in extreme market supply deficit. In light of these factors, Kasiya is seen as a highly strategic project with the potential to be a major supplier in both rutile and graphite markets.

The project benefits from existing high-quality infrastructure and has inherent ESG advantages. Natural rutile has a far lower carbon footprint compared to other titanium feedstocks used in the pigment industry, and natural graphite is a key component in lithium-ion batteries – crucial to de-carbonising the global economy. Further, the vast majority of power for the planned Kasiya mining operation will be supplied by renewable hydro and solar – giving the mine itself a very low carbon footprint.

The future development of the Kasiya Rutile Project will bring substantial benefits to Malawi in terms of GDP, royalties, taxes, employment and training, local business opportunities and community development."

ENQUIRIES

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Sources:

1. Ruidow
2. RefWin & Asian Metals: Basket: +3295 (5.4%) US$1,950, +595 (25.1%) US$1,490, +895 (30.9%) US$1,250, +195 (10.9%) US$1,000 & -195 (27.7%) US$900

Sovereign's Expanded Scoping Study for Kasiya is based on the updated MRE reported in April 2022, of 1.8Bt containing 18Mt rutile at 1.01% and 23.4Mt graphite at 1.32%. The Study envisages a 25-year mine life during which time both rutile and graphite are produced during two stages:

Stage 1 Years 0-5: 12Mt of ore processed per annum to produce approximately 145,000 tonne of natural rutile and 85,000 tonnes of flake graphite per annum

Stage 2 Years 5-25: Add 12Mt capacity for total 24Mt of ore processed per annum to produce approximately 260,000 tonnes of natural rutile and 170,000 tonnes of flake graphite per annum

Table 1: Key Scoping Study Outcomes

Outcome	Unit	Kasiya Rutile Project
NPV_8 (real post-tax)	US$	$1,537M
NPV_{10} (real post-tax)	US$	$1,185M
IRR (post-tax)	%	36%
Capital Costs to First Production - Stage 1	US$	$372M
Expansion Capex – Stage 2 (funded from project cashflows)	US$	$311M
Operating Costs	US$/t mined	$5.86
Operating Costs	US$/t product	$320
Revenue to Cost Ratio	X	3.0
NPV_8 / Capital Costs to First Production	X	4.1
Throughput (LOM)	Mtpa	21.6
Life of Mine	years	25
Annual Production – rutile	ktpa	242
Annual Production – graphite	ktpa	155
Total Revenue (LOM)	US$	$12,038M
Annual Revenue (Average LOM)	US$	$482M
Annual EBITDA (Average LOM)	US$/year	$323M
Payback – from start of production	years	2.6 years
Payback – from start of construction	years	3.7 years
Government Royalties (LOM)	US$	$601M
Corporate Taxes (LOM)	US$	$2,138M

EXPANDED SCOPING STUDY OVERVIEW

Sovereign is aiming to develop an environmentally and socially sustainable operation to be the largest supplier of highly sought-after natural rutile to global markets and an important low-cost natural graphite supplier.

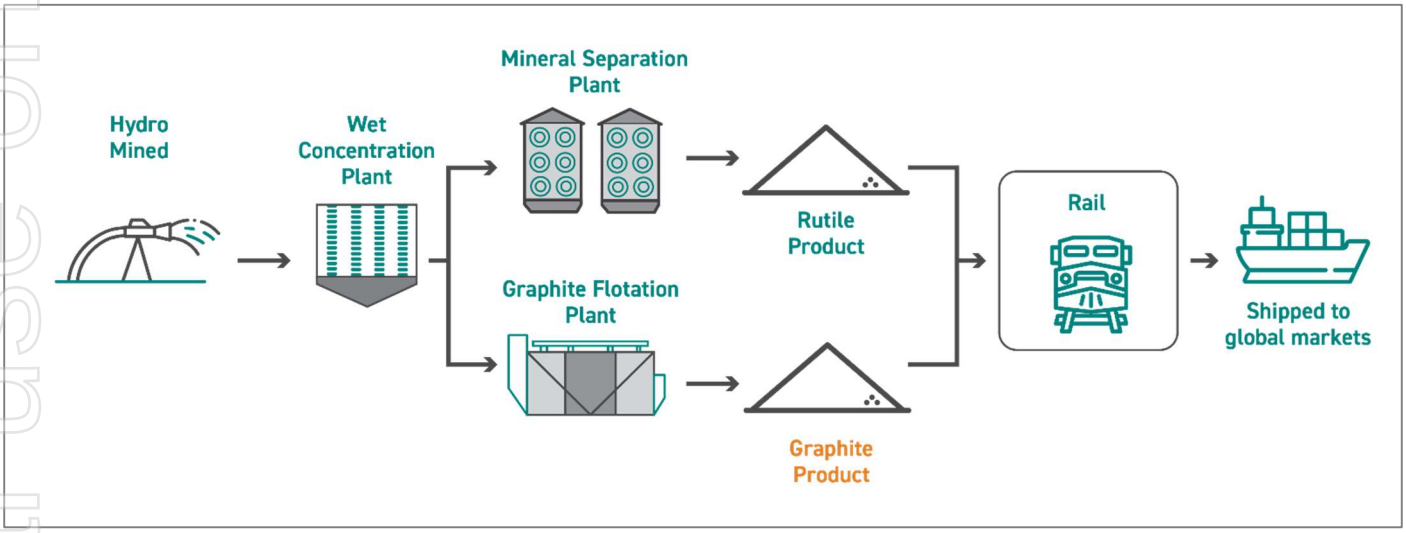


Figure 1: High-level schematic of the proposed Kasiya Rutile Project

The proposed large-scale operation will process soft, friable mineralisation from surface. The operation will primarily employ conventional hydro-mining to produce a slurry that is pumped to a Wet Concentration Plant (**WCP**) where the material is sized. A Heavy Mineral Concentrate (**HMC**) is produced via processing the sand fraction through a series of gravity spirals. The HMC is transferred to the dry Mineral Separation Plant (**MSP**) where premium quality rutile is produced via electrostatic and magnetic separation.

Graphite rich concentrate is collected from the gravity spirals and processed in a separate graphite flotation plant, producing a high purity and high value coarse-flake graphite product.

The Project has excellent surrounding infrastructure including bitumen roads, a high-quality rail line connecting to the deep-water of Nacala on the Indian Ocean and hydro-sourced grid power. At full production, rutile and graphite products will be railed directly from a purpose built rail dry port at the mine site eastward via the Nacala Logistics Corridor (**NLC**) to the deep-water port of Nacala or southward via the Sena Rail Line to the deep-water port of Beira.

LOW CARBON ADVANTAGE FOR TWO CRITICAL RAW MATERIALS

Natural Rutile – critical to lowering the Titanium industry's carbon footprint

Like many other industries globally, the titanium dioxide pigment industry is targeting reduced carbon emissions, reduced energy consumption and a move toward renewable energy and waste minimisation. A shift towards a greater percentage of natural rutile feedstock offers the titanium pigment industry a simple and short lead-time opportunity to significantly lower its carbon intensity and total environmental impact.

Sovereign's natural rutile product is expected to have substantially lower Global Warming Potential (**GWP**) (Scope 1, 2 and 3 scope emissions) when compared to other titanium feedstock alternatives produced by upgrading ilmenite (i.e., synthetic rutile and titania slag). Using natural rutile from Kasiya as titanium feedstock for the chloride pigment process would significantly reduce Scope 1, 2 and 3 greenhouse gas emissions.

Titanium feedstock is a key component of various industrial and consumer products. Therefore, utilising natural rutile such as from Kasiya, as direct use titanium feedstock could hold the solution to developing low-carbon footprint products including low carbon paints.

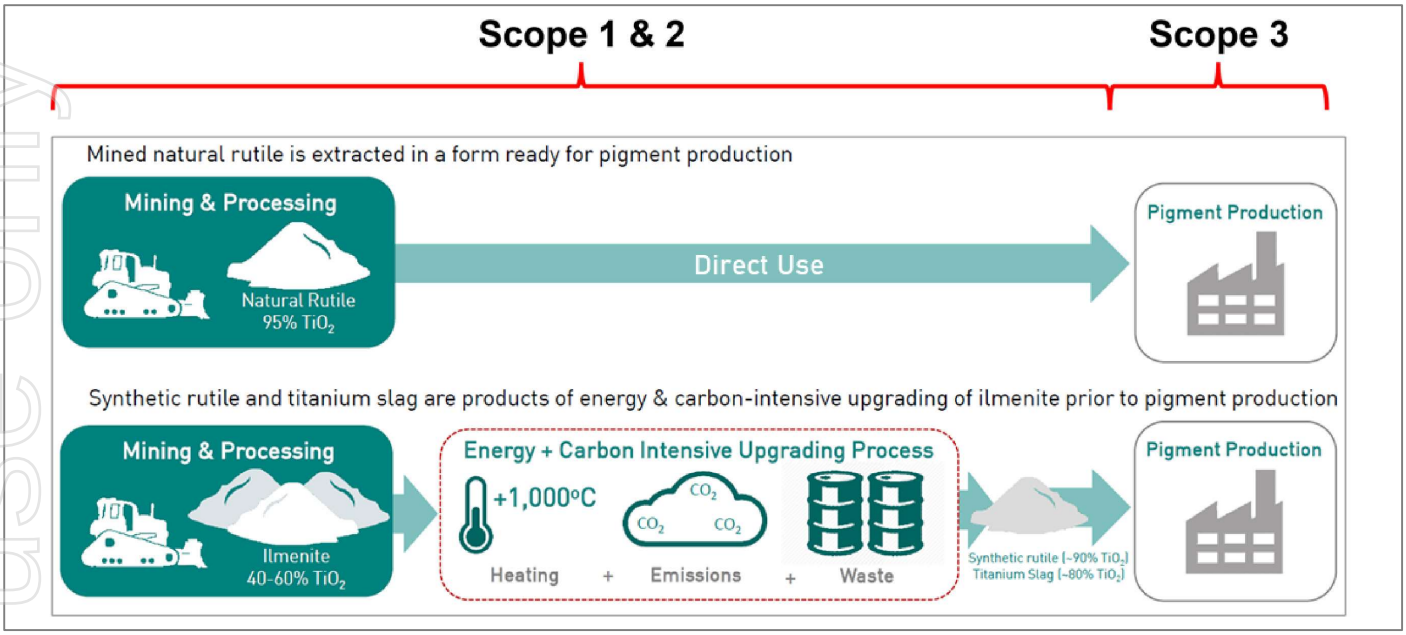


Figure 2: Natural rutile is a direct use titanium pigment feedstock

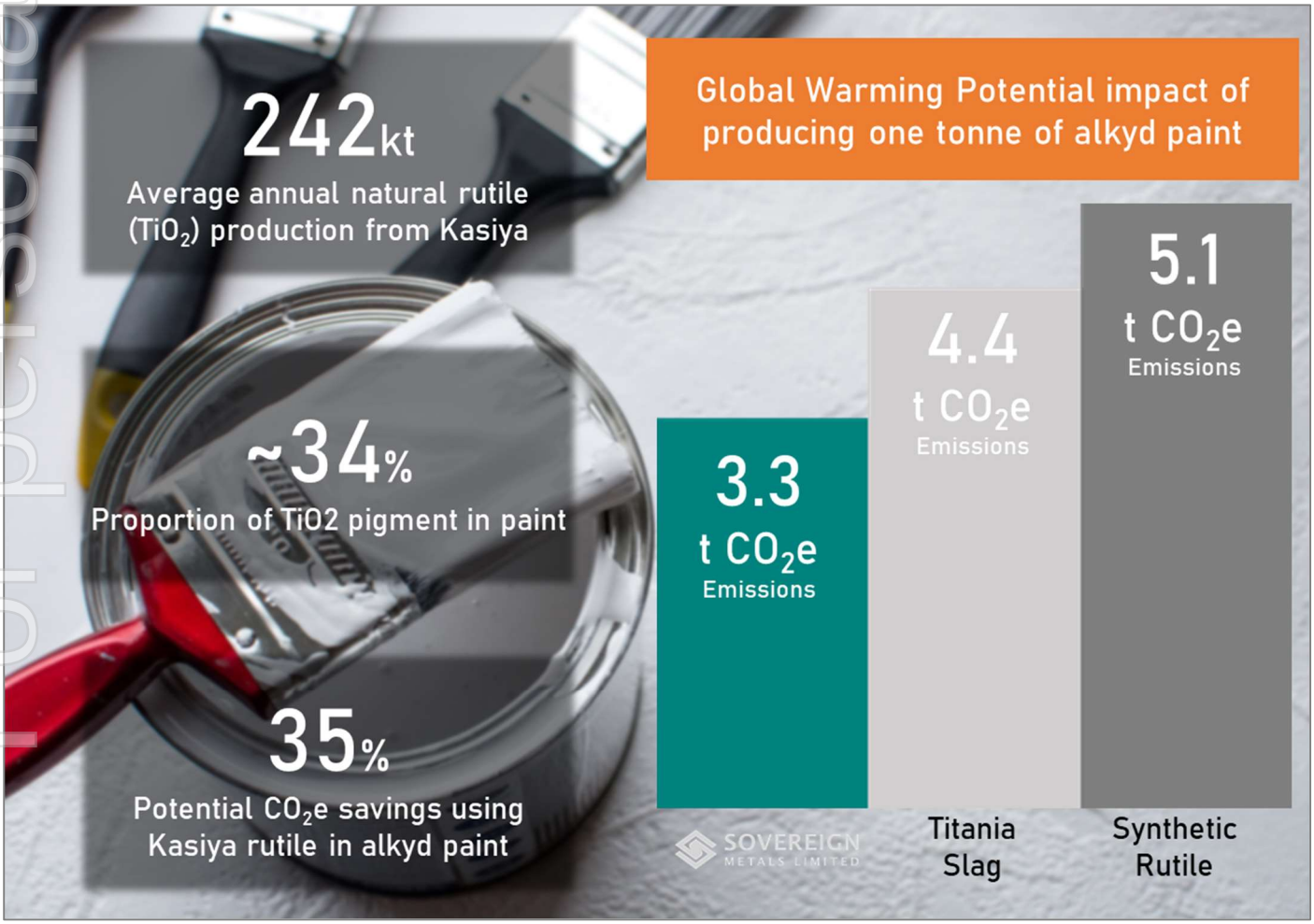


Figure 3: GWP impact of natural rutile production from Kasiya as a titanium feedstock vs. alternatives
(Source: Minviro)

Natural Graphite – a significant component in lithium-ion batteries for electric vehicles

The lithium-ion battery sector is the main emerging market for flake graphite. Greater capacity batteries, such as those required for electric vehicles, are expected to drive significant demand for graphite over the coming years. It is forecast the battery sector will drive the largest demand for graphite by 2028, with graphite making up to 50% of the composition of a lithium-ion battery.

Currently, China is the world's largest supplier of natural flake graphite. In 2020, leading data provider and market intelligence publisher Benchmark Mineral Intelligence reported that China produced 86% of all lithium-ion battery anodes from natural and synthetic graphite and 100% of all the world's natural graphite anodes.

Sovereign's natural flake graphite concentrate has significantly lower greenhouse gas emissions than the Chinese produced natural flake graphite concentrate from the Heilongjiang Province. Each tonne of Sovereign's natural graphite is estimated to have a GWP of 0.2 tonnes CO_2e – 5x lower than producing natural flake graphite concentrate in the Heilongjiang Province, China and 103x lower than production of synthetic graphite.

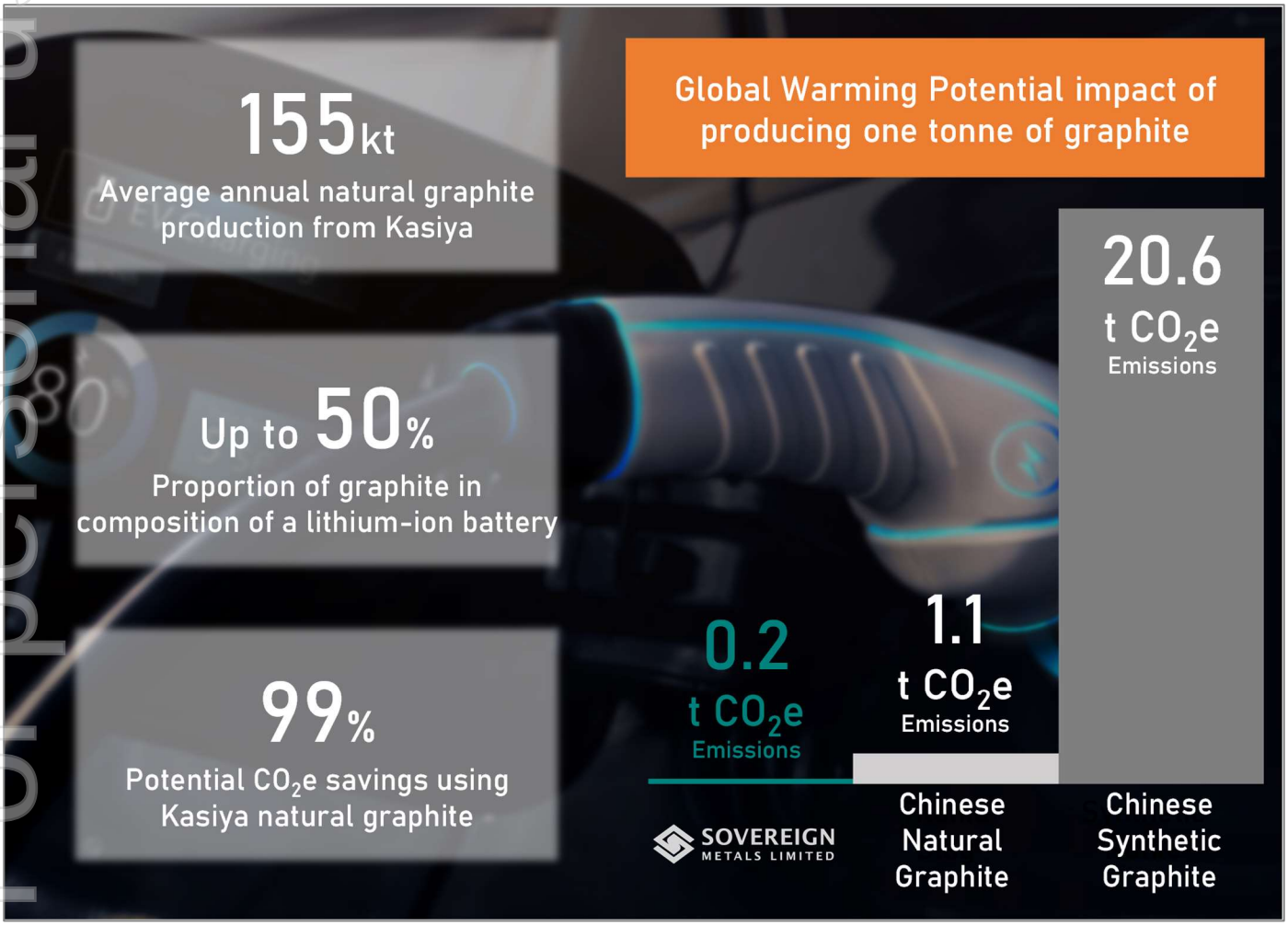


Figure 4: Global Warming Potential of Kasiya's natural graphite vs. natural graphite produced in Heilongjiang Province, China and synthetic graphite produced in China
(Sources: Minviro Ltd; Journal of Industrial Ecology)

The significantly lower GWP for Kasiya graphite is due to the fact that it is hosted in soft, friable saprolite material which will be mined via hydro methods (high pressure water monitors) powered by renewable energy sources - hydro power from the Malawi grid and on-site solar power. This is opposed to the production in Heilongjiang Province, China where hard-rock ore requires drilling, blasting, excavation, trucking, crushing, and grinding – overall high CO2e activities.

SUSTAINABLE AND ESG DRIVEN PROJECT DEVELOPMENT STRATEGY

Sustainability is a vital element of Sovereign's strategy for Kasiya. The Company is committed to making informed choices that improve our corporate governance, financial strength, operational efficiency, environmental stewardship, community engagement and resource management.

The Project aims to meet the requirements of international guidelines and standards, including the IFC Performance Standards on Environmental and Social Sustainability (IFC, 2012), the World Bank Group Environmental, Health and Safety Guidelines (WBG, 2007), the Equator Principles (Equator Principles Association, 2020) and the International Council on Mining & Metals (**ICMM**) principles for future studies and development phases of the Kasiya project.

The Kasiya project will be designed considering both the Equator Principles and Scope 1, 2 and 3 emissions under the Green House Gas protocol so that the design meets high Environmental, Social and Governance (**ESG**) standards from the outset.

- Access to hydro-generated grid power and a solar power system to be installed on site will ensure low carbon power supply for the project and the use of predominantly rail rather than road transport for rutile and graphite products will further help give the mine a low carbon footprint.
- The Scoping Study contemplates that the operation will use a closed, zero discharge process water circuit and tailings storage facility designed for chemically benign tailings during operations which will be rehabilitated and restored progressively.
- Sovereign continues to undertake several initiatives to assist in the development of Malawi and its local communities. The Company aims to become an industry leader in social responsibility having successfully worked with communities in Malawi over the last decade who remain highly supportive and are well positioned to benefit from the development of new mining projects.

Figure 5: Traditional dance at the opening ceremony of the community centre

LOW-COST OPERATION

Kasiya's low operating costs are achieved through deposit size and grade, zero strip ratio, location and excellent existing operational infrastructure. Central Malawi boasts hydropower and an extensive sealed road network. The Kasiya Rutile Project is strategically located in close proximity to the capital city of Lilongwe, providing access to a skilled workforce and industrial services.

The existing quality logistics routes to the Indian Ocean deep-water ports of Nacala and Beira for the export of products to global markets provides significant capital cost savings for Kasiya compared to many other undeveloped minerals projects.

The soft, friable and high-grade mineralisation occurring from surface results in no waste stripping requirement and the amenability to hydro-mining means the mining cost component is kept relatively low.

One of the highest Revenue : Cost of Sales Ratio in the Mineral Sands Industry

The revenue-to-cash cost ratio of 3.0x positions Kasiya in the first quartile compared to other undeveloped mineral sands operations. The production of high value natural rutile and graphite provides strong margins with a cash margin of over 67% for the life of the operation.

The Study has applied conservative pricing assumptions for both products which still results in a strong position on the revenue to cost ratio. This supports the robustness of the Kasiya operation and its strong profitability during different pricing environments and the revenue stability of two different products with different demand drivers.

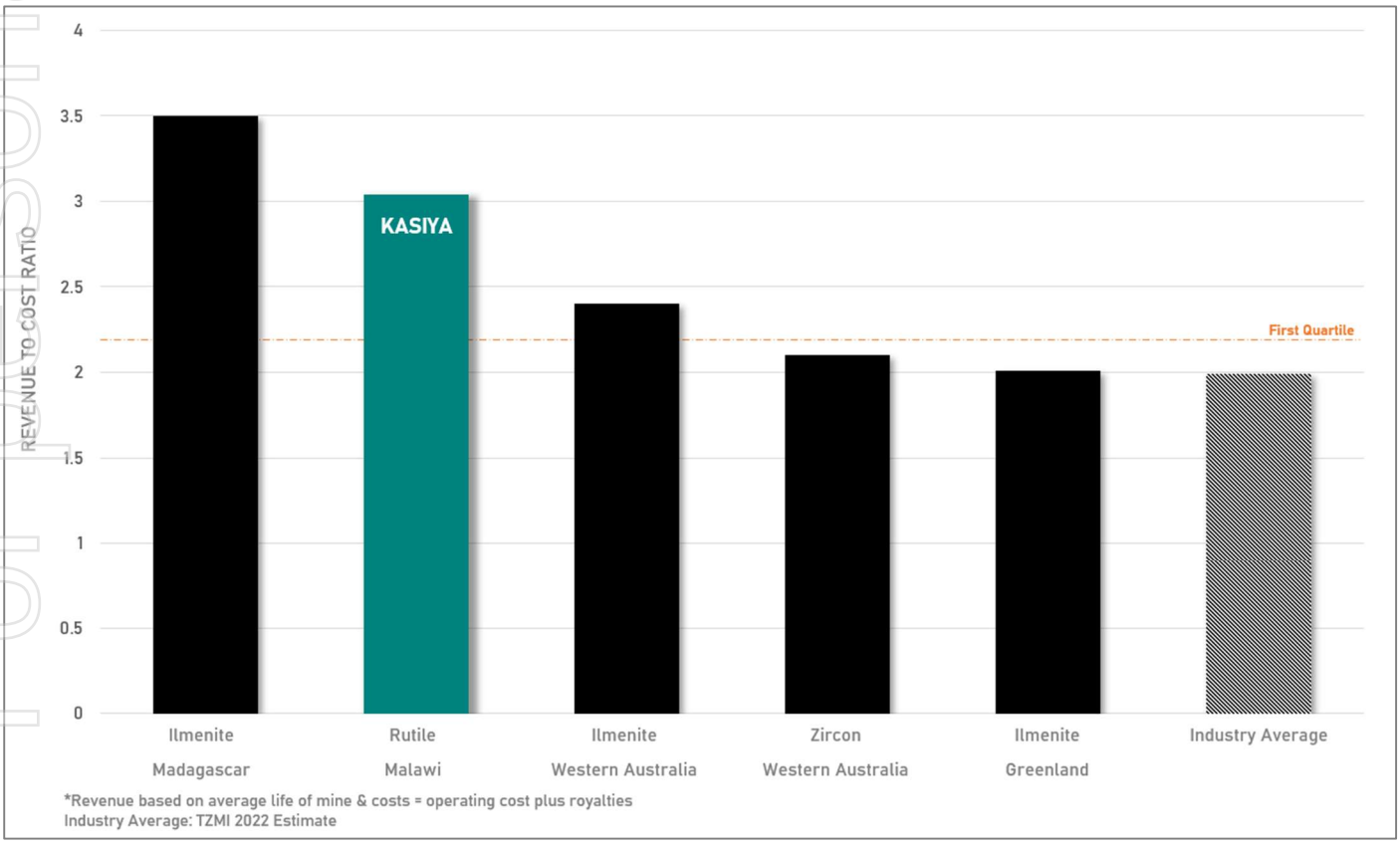


Figure 6: Revenue to cost ratio
(Sources: see Appendix 1)

Lowest Cost Flake Graphite Project in the World

Benchmarking the co-product production cost of graphite from Kasiya based on the Study results against peer flake graphite projects positions Kasiya as the lowest operating cost graphite project in the world. Kasiya has an average life-of-mine FOB (Nacala) operating cost of US$320 per tonne of product (rutile plus graphite). On an incremental cost basis reflecting graphite production as a co-product to primary rutile production, the operating cost is US$140 per tonne of graphite produced (FOB Nacala).

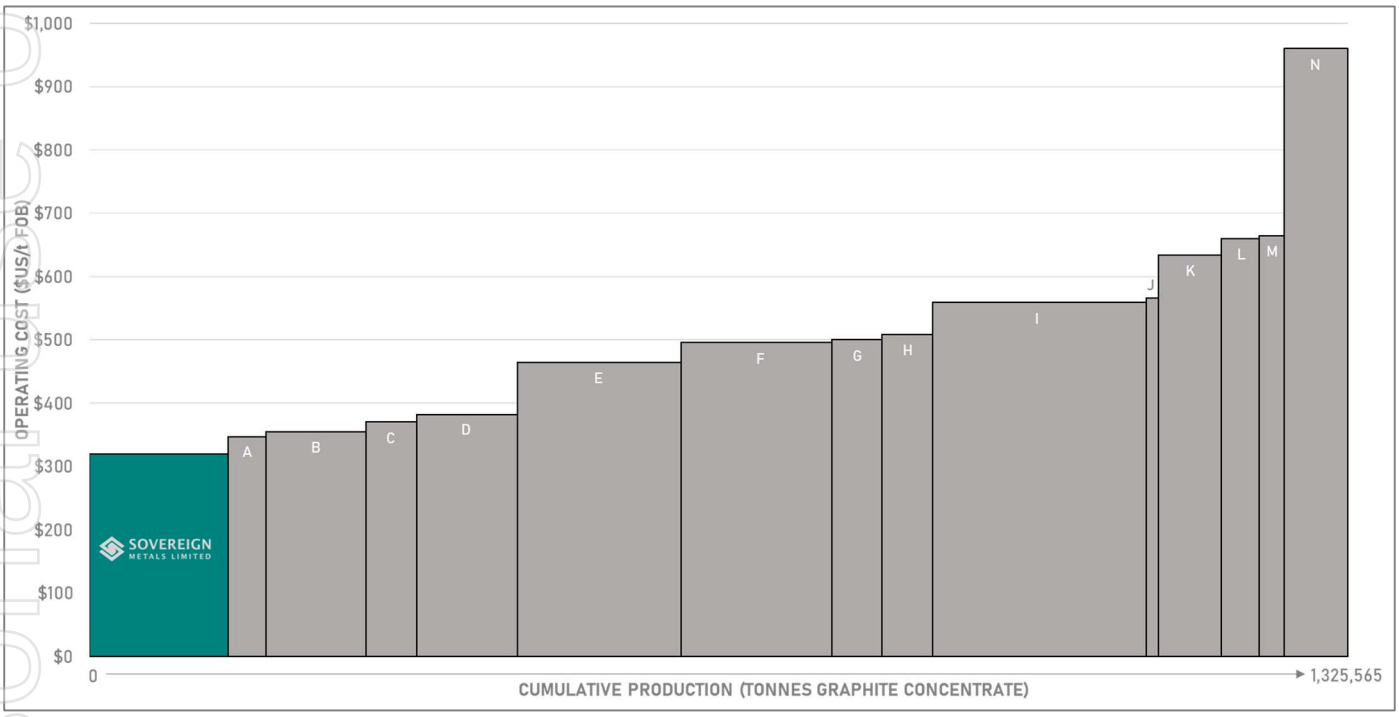


Figure 6: Actual and Forecast Graphite Production (non-Chinese)

(Sources: See Appendix 2; All costs presented as FOB and exclusive of royalties)

*Syrah Resources (E) is the only producer and is presented as US$464 per tonne FOB (Q1 2022 results) with production based on last reported quarter on an annualised basis

**Northern Graphite (L) costs and production include both Phase 1 (Feasibility Study) and Phase 2 (Preliminary Economic Analysis)

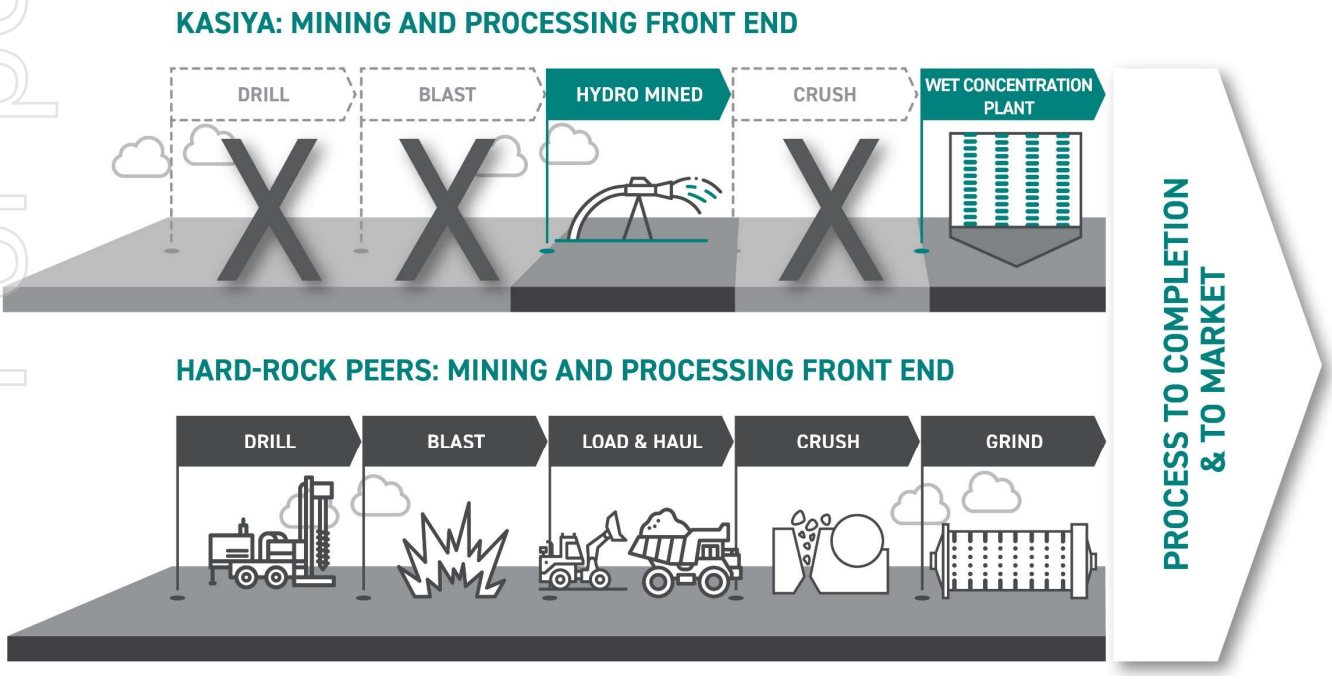


Figure 8: Schematic of Kasiya's co-product graphite mining and processing front end compared to hard-rock peers

CRITICAL RAW MATERIALS

Titanium and natural graphite have been classified as critical raw materials by the US and EU due to a combination of their scarceness and China-controlled supply chains, and requirement for the decarbonisation of the global economy as part of the energy transition.

Figure 9: Supply Risk of Critical Raw Materials for Key Technologies
(Sources: European Commission - Critical Raw Materials for Strategic Technologies and Sectors in the EU: A Foresight Study)

Current sources of natural rutile are in decline as several operations' reserves are depleting concurrently with declining ore grades. These include Iluka Resources' (**Iluka**) Sierra Rutile and Base Resources' Kwale operations in Kenya.

Global rutile supply is projected to decline rapidly beyond 2023, following the scheduled closures of Base Resource's Kwale and Iluka's SRL operations unless mine life extension is approved (TZMI). There are limited new deposits forecast to come online, and hence supply of natural rutile is likely to remain in structural deficit for the long term, even with Kasiya at full production.

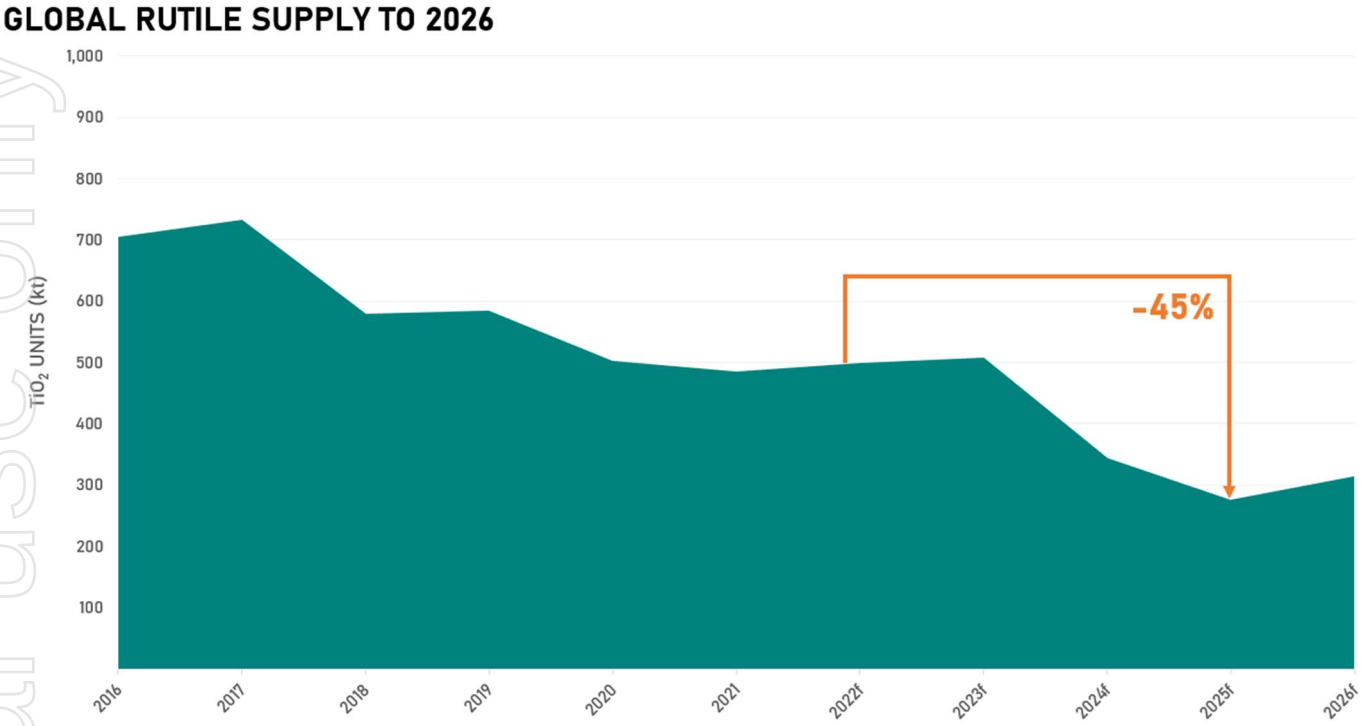


Figure 10: Previous and forecast global natural rutile supply 2015-2026
**Supply profile only reflects existing operations*
(source: TZMI)

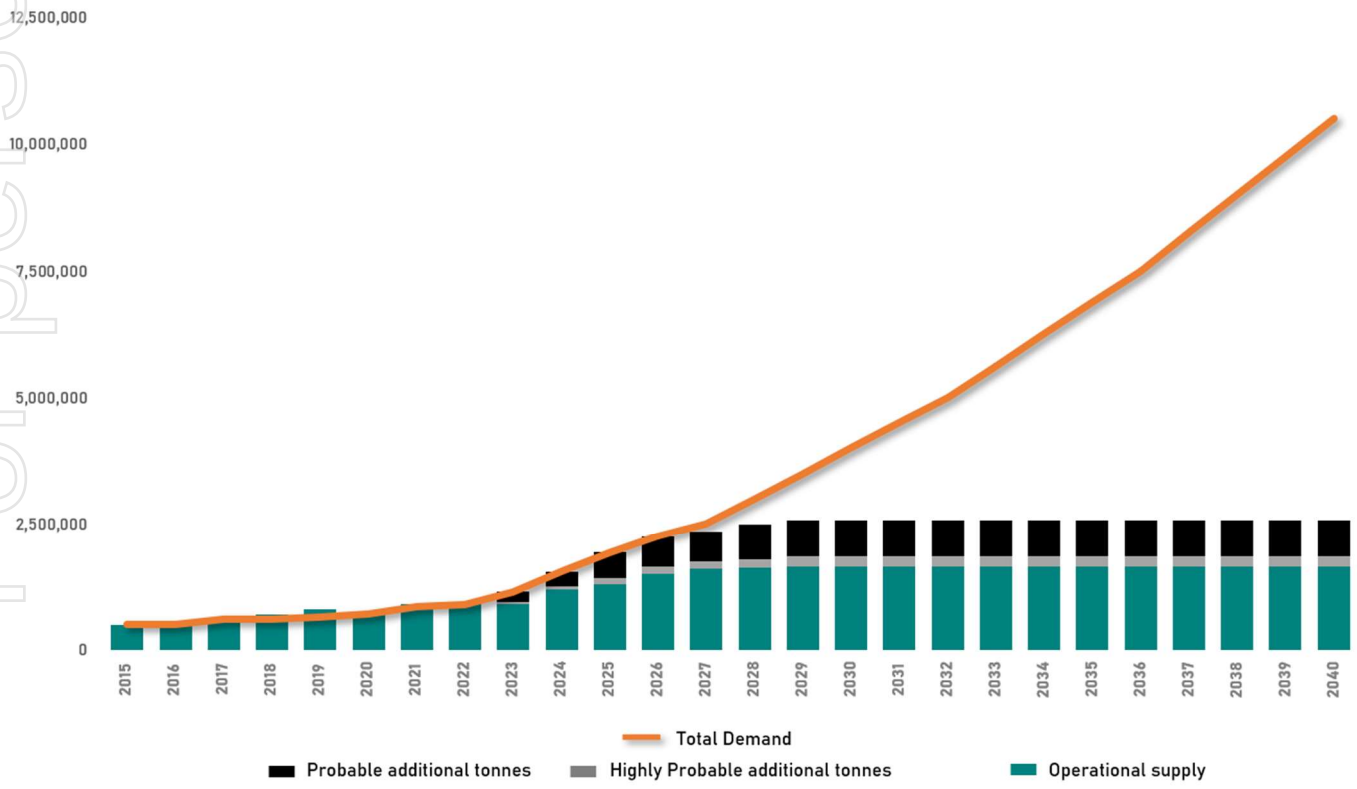


Figure 11: Flake Graphite Demand and Forecast Supply
(Source: Benchmark Mineral Intelligence Flake Graphite Forecasts; April 2020)

SOVEREIGN METALS LIMITED

KASIYA RUTILE PROJECT
EXPANDED SCOPING STUDY

OVERVIEW

Kasiya is a greenfields discovery in central Malawi which is now the largest natural rutile deposit and one of the largest flake graphite deposits in the world. Sovereign is aiming to develop an environmentally and socially sustainable operation to supply the highly sought-after natural rutile and graphite to global markets.

Kasiya will be a simple and conventional operation using traditional and well-developed processes used across the globe on numerous mineral sands and graphite operations.

The proposed large-scale operation will process soft, friable mineralisation that occurs from surface in an area with excellent access and water availability. The Project has high quality surrounding infrastructure including hydro-sourced grid power, bitumen roads and recently upgraded rail lines connecting to the deep water of ports of Nacala and Beira on the Indian Ocean.

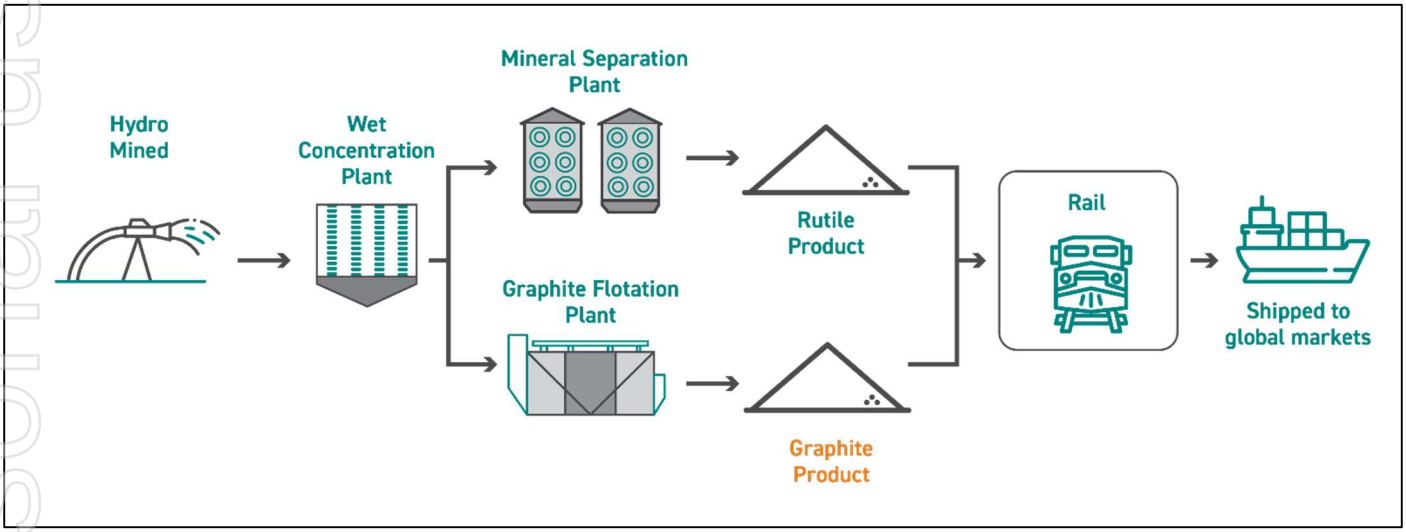


Figure 12: High-level operational schematic of the planned Kasiya project

The Company plans to employ conventional hydro-mining to produce a slurry that will be pumped to a Wet Concentration Plant (**WCP**). A Heavy Mineral Concentrate (**HMC**) will be produced via processing the sand fraction through a series of gravity spirals. The HMC is then transferred to the dry Mineral Separation Plant (**MSP**) where premium quality rutile is produced via electro-static and magnetic separation.

Graphite rich mineral concentrate will be produced from the light fraction of the gravity spiral tails and processed in a separate graphite flotation plant, producing a coarse-flake graphite co-product.

The operation is planned in two stages;

Stage 1 Years 0-5: 12Mt of ore processed per annum to produce approximately 145,000 tonne of natural rutile and 85,000 tonnes of flake graphite per annum

Stage 2 Years 5-25: Add 12Mt capacity for total 24Mt of ore processed per annum to produce approximately 260,000 tonnes of natural rutile and 170,000 tonnes of flake graphite per annum

The rutile and graphite products will be trucked a short distance via existing bitumen roads to the Kanengo rail terminal in Stage 1, where the products will be railed to port on the eastern seaboard of Mozambique. In Stage 2, a 12km rail spur line and loading facility is planned to be constructed with all product to then be loaded on to rail wagons directly at the Kasiya processing plant providing a 100% rail logistics solution to port.

Study Objectives

Sustainability is a vital element of Sovereign's strategy for the development of the world's largest natural rutile mine, and potentially second largest flake graphite mine, at Kasiya. The Company is committed to making informed choices that improve our corporate governance, financial strength, operational efficiency, environmental stewardship, community engagement and resource management.

The Project aims to meet the requirements of international guidelines and standards, including the IFC Performance Standards on Environmental and Social Sustainability (IFC, 2012), the World Bank Group Environmental, Health and Safety Guidelines (WBG, 2007), the Equator Principles (Equator Principles Association, 2020) and the ICMM principles for future studies and development phases of the Kasiya project.

The Kasiya project will be designed considering both the Equator Principles and Scope 1, 2 and 3 emissions under the Green House Gas protocol so that the design meets high standards for ESG from the outset. Access to hydro-generated grid power and the solar power system to be installed on site will ensure low carbon power supply for the project. The use of predominantly rail rather than road transport for rutile and graphite products will further assist in realising a low carbon footprint.

Minerals For a Sustainable World

Sovereign is focused on developing sustainable supplies of critical raw materials to contribute to a low carbon global economy:

- natural rutile is the cleanest, purest form of titanium dioxide (TiO_2) with a far lower carbon footprint that other higher energy and carbon intensive alternative titanium pigment feedstocks such as synthetic rutile or titania slag

- natural graphite from soft saprolite can be mined, beneficiated, and purified with a considerably lower carbon footprint than hard-rock operations or synthetic graphite production, with the product being suitable feedstock for the rapidly expanding lithium-ion battery sector

Figure 13: Water bore installed by Sovereign

STUDY CONSULTANTS

The Scoping Study used information and assumptions provided by a range of independent, internationally recognised industry leading specialists and consultants, including the following who have contributed key components of the Study;

Lead study manager	DRA
Project management	Jem-Met
Mineral Resource Estimate (MRE)	PLACER CONSULTING PL
Mine scheduling and pit optimisation	ORELOGY MINE CONSULTING
Mining method and tailings management	FRASER ALEXANDER
Tailing disposal	epoch resources
Metallurgy – rutile	AML
Metallurgy – graphite	SGS
Environment and social	DHAMANA consulting
Power	JCMPOWER
Marketing – rutile	TZMI
Marketing - graphite	Fastmarkets
Logistics	MORGAN STERLING CONSULTANTS
Life Cycle Assessments	MINVIRO

GEOLOGY & RESOURCE

Rutile mineralisation lies in laterally extensive, near surface, flat "blanket" style bodies in areas where the weathering profile is preserved. The Kasiya deposit continues to confirm widespread, high-grade mineralisation commonly grading 1.2% to 2.0% rutile in the top 3-5m from surface. Moderate grade mineralisation generally grading 0.5% to 1.2% rutile commonly extends from 5m to end of hole where it remains open at depths >10m in numerous drill-defined areas.

Table 2: Kasiya Mineral Resource Estimate at 0.7% Rutile Cut-off

Mineral Resource Category	Material Tonnes (millions)	Rutile (%)	Rutile Tonnes (millions)	Total Contained Graphite (TGC) (%)	TGC Tonnes (millions)	RutEq. Grade* (%)
Indicated	662	1.05%	6.9	1.43%	9.5	1.76%
Inferred	1,113	0.99%	11.0	1.26%	14.0	1.61%
Total	**1,775**	**1.01%**	**18.0**	**1.32%**	**23.4**	**1.67%**

* RutEq. Formula: Rutile Grade x Recovery (98%) x Rutile Price (US$1,308/t) + Graphite Grade x Recovery (62%) x Graphite Price (US$1,085/t) / Rutile Price (US$1,308/t). All assumptions are taken from this Study ** Any minor summation inconsistencies are due to rounding

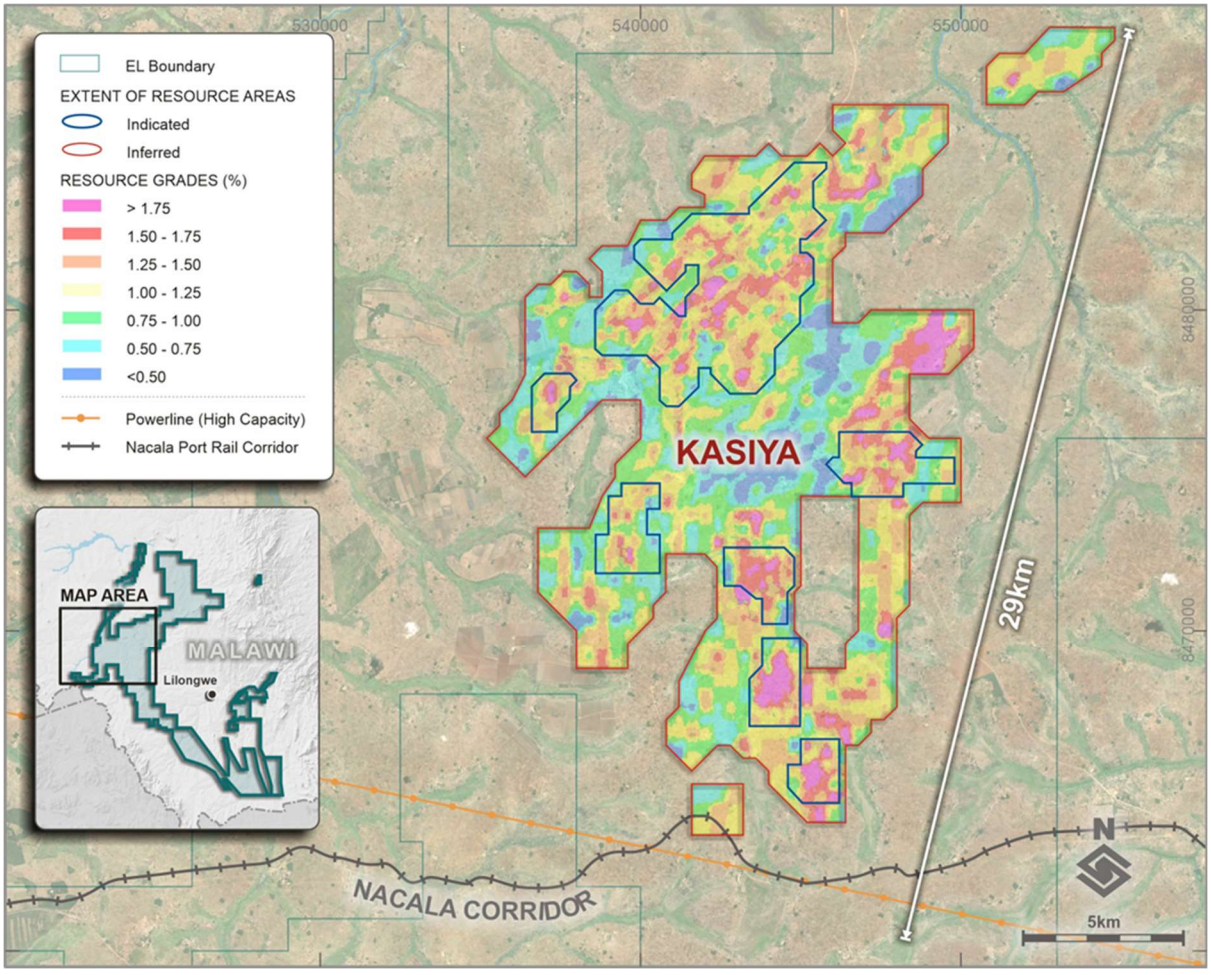


Figure 14: Drill density map over the Kasiya MRE showing rutile grades in the uppermost part of the MRE block model

The updated MRE announced in April 2022 positions Kasiya as the largest rutile deposit in the world with more than double the contained rutile as its nearest rutile peer, Sierra Rutile (Figure 15). Additionally, the graphite co-product MRE at Kasiya places it as one of the largest flake graphite deposits in the world (Figure 16).

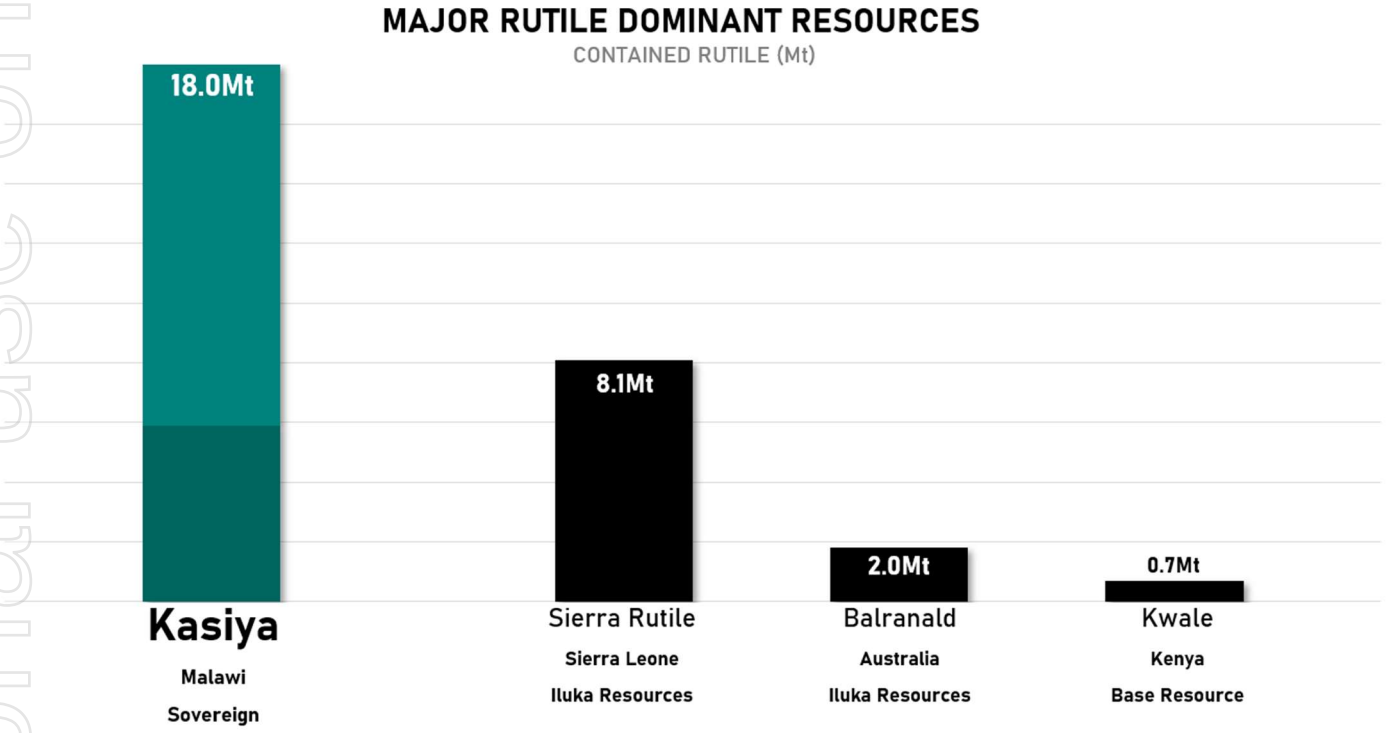


Figure 15: Major rutile dominant resources
(Sources: refer to Appendix 3)

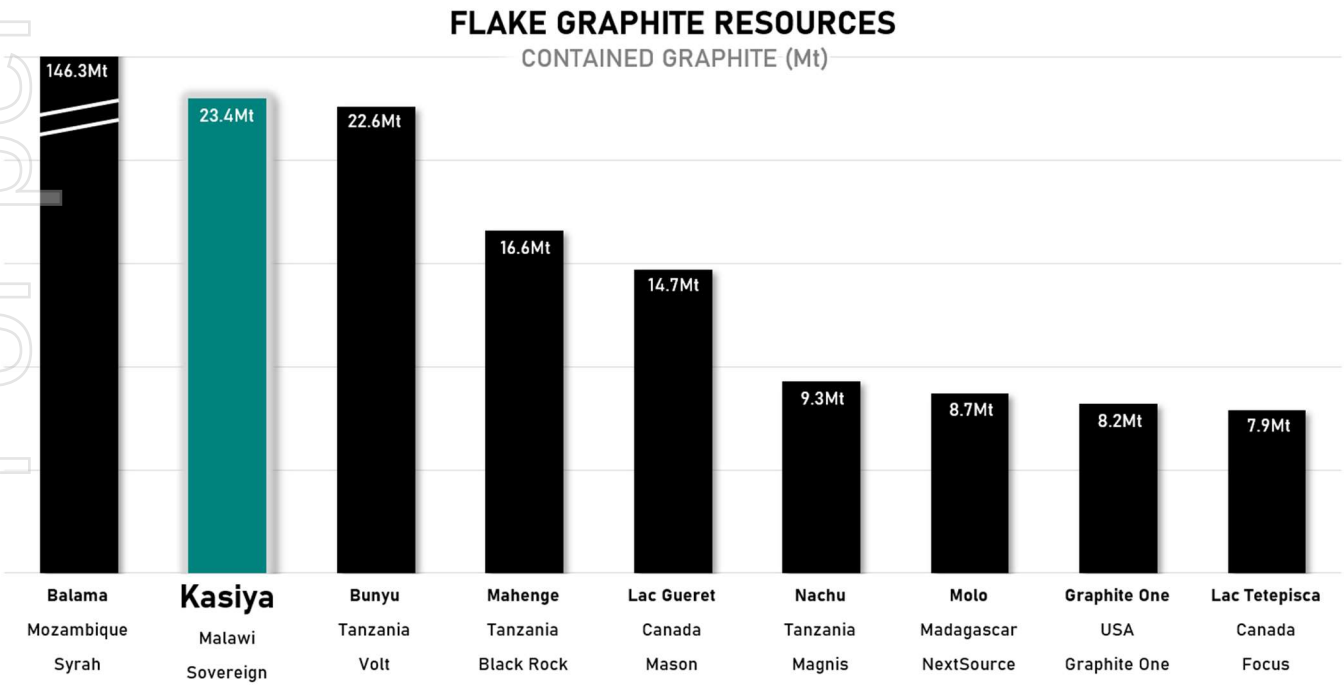


Figure 16: Major listed global flake graphite resources
(Sources: refer to Appendix 4)

Kasiya Deposit Geology

Sovereign's tenure covers 1,892km^2 over an area mainly to the north and west of Malawi's capital city Lilongwe, covering an area known as the Lilongwe Plain. The topography is generally flat to gently undulating and the underlying geology is dominated by paragneiss with pelitic, psammitic and calcareous units.

The high-grade rutile deposit at Kasiya is best described as a residual placer, or otherwise known as an eluvial heavy mineral deposit. It is formed by weathering of the primary host rock and concentration in place of heavy minerals, as opposed to the high-energy transport and concentration of heavy minerals in a traditional placer.

Graphite generally occurs in broad association with rutile. However, it is depleted in the top 3-5m and therefore can often show an inverse grade relationship with rutile in the near-surface zones (Figures 18 & 19). At depths generally greater than 5m, graphite is not depleted, and rutile is not enriched, so a more consistent grade relationship exists.

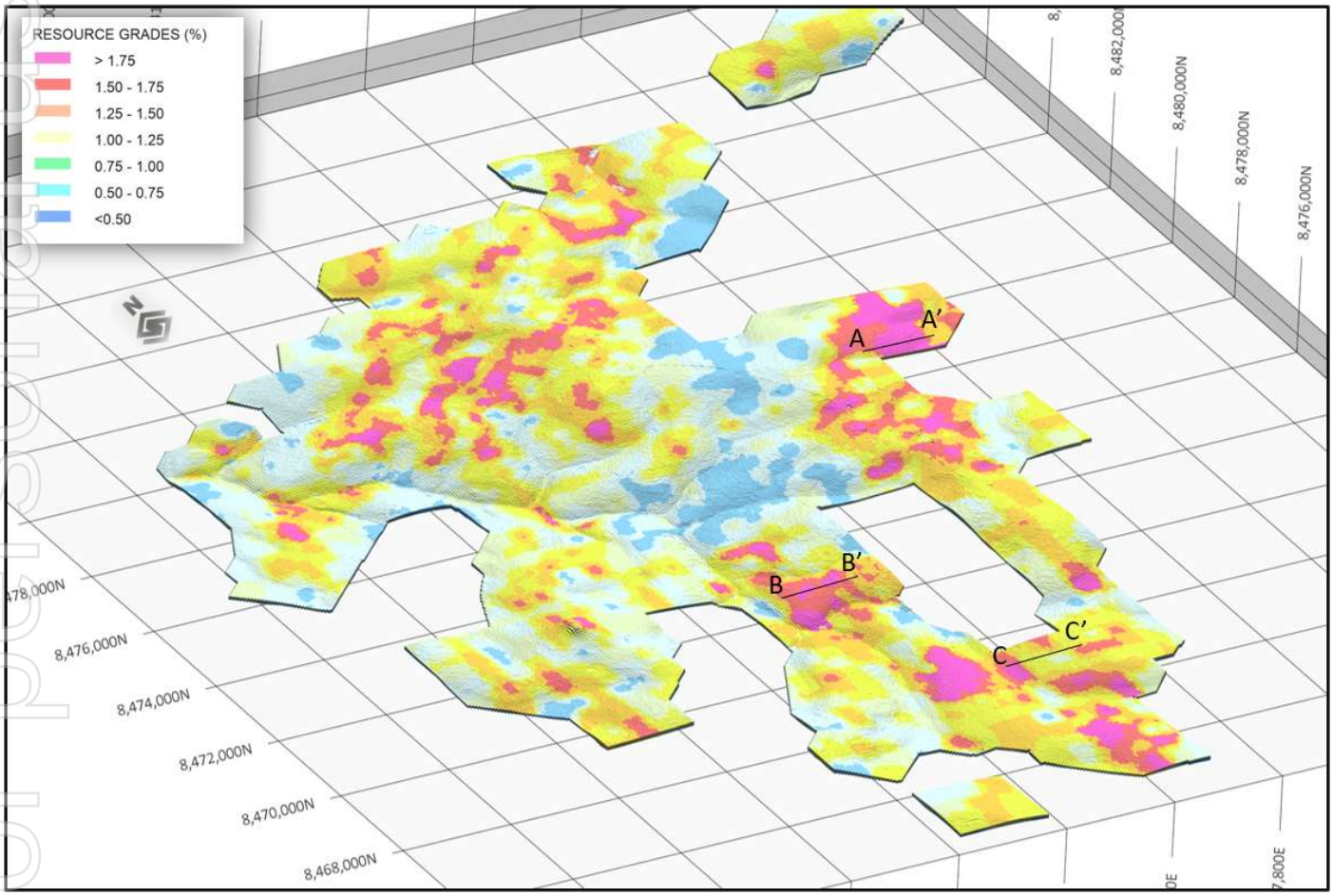


Figure 17: Oblique plan view looking NE over MRE block model with rutile grades shown.

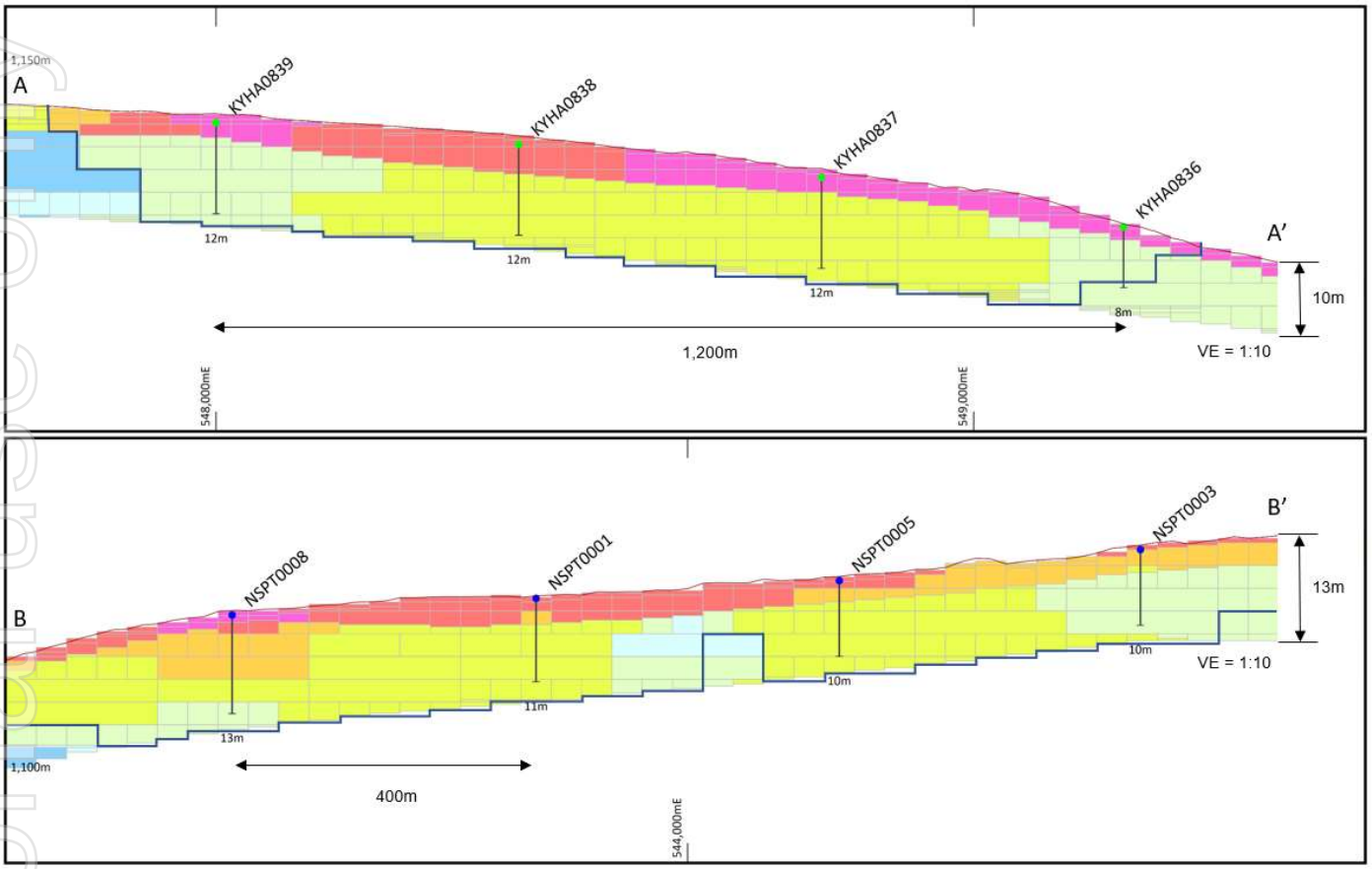


Figure 18: A-A' & B-B' cross-sections from new mineralised zones in the east and southern parts of the MRE block model showing colouring by rutile grade (see Figure 17 for legend)

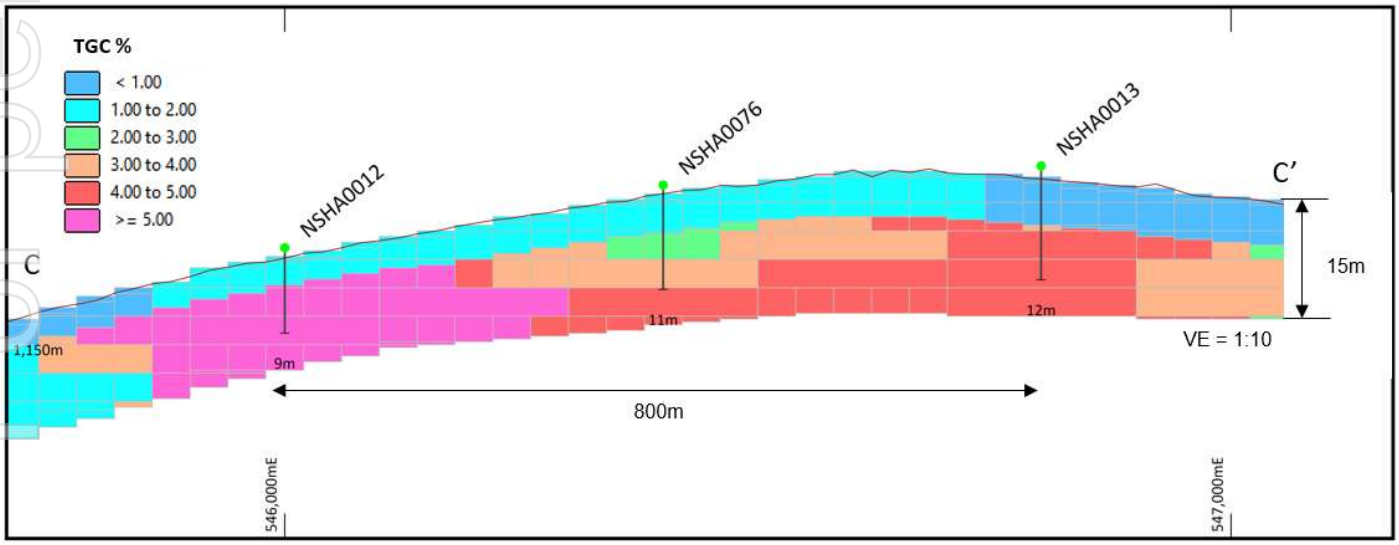


Figure 19: C-C' cross-section from the southern part of the MRE block model in a higher-grade graphite zone showing colouring by graphite grade (TGC)

MINING

Sovereign engaged Fraser Alexander, a highly experienced mining contractor and consultancy specialising in hydro-mining to assess the technical viability of hydro-mining at Kasiya. The outcomes of the work performed resulted in hydro-mining being determined as the optimal method for mining soft, friable pedolith and saprolite of the Kasiya rutile deposit.

Hydro-mining is a proven technique on a wide range of loose, friable materials types and has been successfully applied on heavy mineral sands operations including Base Resources' Kwale project in Kenya and Tronox's Fairbreeze and Hillendale projects in South Africa.

Figure 20: Top-down hydro mining in operation (Source: Fraser Alexander)

Kasiya's mineralisation is largely homogenous and has relatively consistent physical properties throughout the MRE area. The material competence is described as loose and friable, soft and well weathered with no cemented particles or dense clay layers. The particle size distribution (**PSD**) is favourable for hydro-mining due to its high content (~48%) of -45µm fines. The material is conducive to hydro-mining as the fines effectively increase the viscosity of the slurry created, which enhances the slurry's ability to carry sand and heavy mineral particles.

Design

The hydro-mining design criteria is based on the process design criteria (**PDC**), with a process plant feed rate of 12Mtpa respectively for each of the Stage 1 and Stage 2 modules for a total feed rate of 24Mtpa at full production. The system is designed to screen oversize in-pit and then pump slurry to the plant.

The hydro-mining system is designed with pumps and piping for six movable hydro mining units (**HMUs**), with scheduling based on a three-on-three-off basis. Each HMU consists of a high-pressure (**HP**) water pump station where the material is screened (+6mm) and fed to the processing plant.

The system is designed to mine faces between 5m to 23m using a top-down approach for single or double benches (Figure 20). Approximately 5% of the mine inventory occurs in zones of less than 5m total thickness with this material to be pushed short distances by dozer to the nearest HMU.

Figure 21: Kasiya saprolite hosted rutile and graphite mineralisation

Mine Scheduling

The Company engaged Orelogy to prepare a mine schedule based on the Indicated and Inferred MRE (Figure 22). Approximately 61% of the total production target is in the Indicated Mineral Resource category with 39% in the Inferred Mineral Resource category. 100% of the scheduled throughput over the first eight and a half years of production is in the Indicated category.

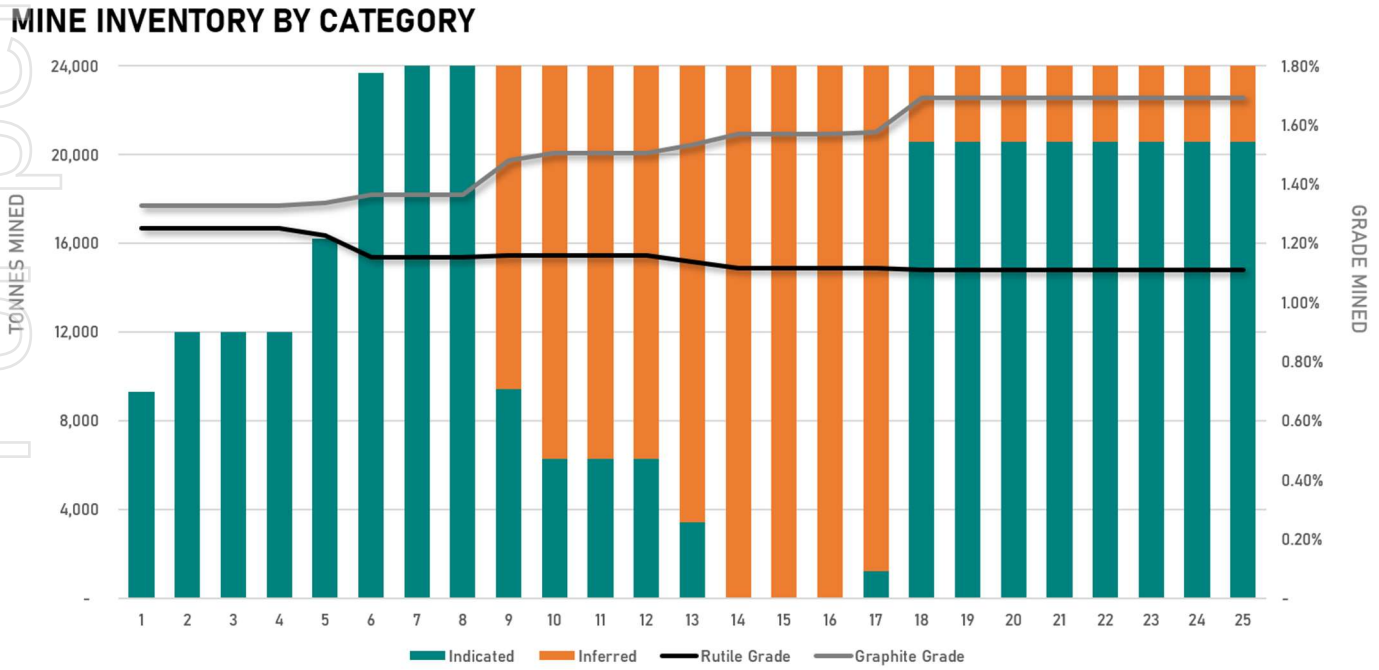


Figure 22: Mine inventory by MRE category type

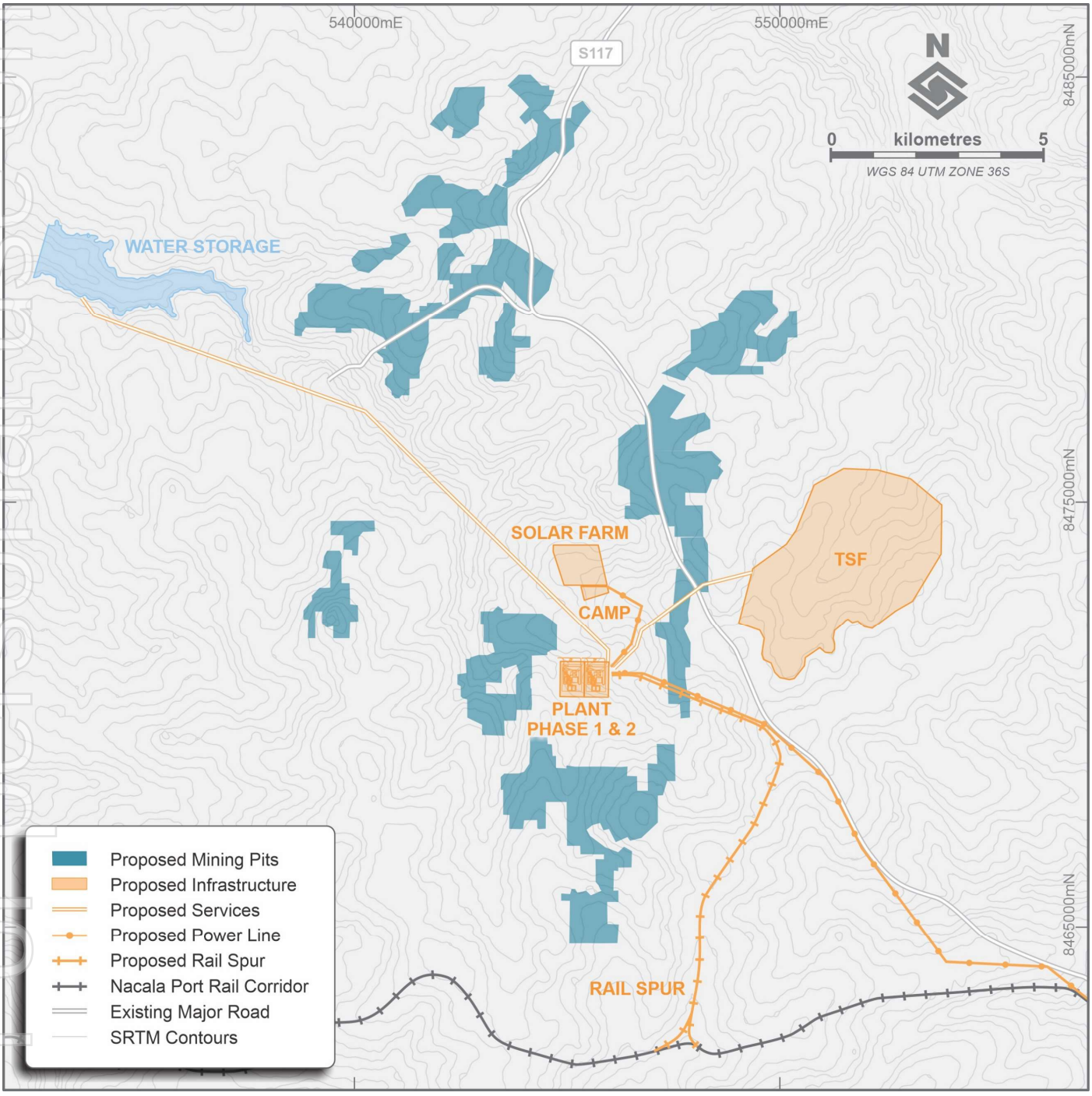


Figure 23: Kasiya site lay-out plan showing mining pits and key existing and proposed infrastructure

METALLURGY AND PROCESS DESIGN

Metallurgical test work was performed at globally recognised laboratories, Allied Minerals Laboratories (**AML**) in Perth for rutile and SGS Lakefield in Canada for graphite. The test work programs were designed to produce a premium rutile product and coarse-flake graphite co-product. Test work has been very successful and has resulted in conventional flowsheets proving highly effective for producing premium quality rutile and graphite products (Figure 24).

World-class rutile product chemical specifications are reported at 96% TiO_2 with low impurities and stand-out metallurgical recoveries over 98% (Table 3).

A graphite gravity pre-concentrate (light mineral concentrate) taken from rutile spiral tails is upgraded into a coarse flake graphite co-product via a conventional flotation flowsheet. A very coarse-flake and high-grade graphite product at 96% TGC is produced. This product has over 60% in the large to super-jumbo fractions (+180µm) with overall graphite recovery from the raw sample to product of 62% (Table 4).

Graphite production is capped at 85,000 tonnes per annum each for Stage 1 and 2 modules for 170,000 tonnes per annum at full production. At times, excess graphite will report to the processing plant but is not recovered for the purposes of this study. Additional graphite production by enlarging the graphite processing modules remains an opportunity to be investigated in future studies.

The process flowsheet developed is described as follows;

Wet Plant and Feed Preparation

- Oversize removal (~8% of mass, rejected in pit +6mm and at WCP -6mm +2mm)
- Isolate -45µm particles using cyclones and up current classifiers (UCC) (~48% of mass)
- Recover HMC to the Mineral Separation Plant (MSP) via UCC and spiral separation
- Isolate light tailings streams to a graphite gravity pre-concentrate suitable as feed to the graphite flotation circuit
- Isolate a -2mm +45µm tails fraction (~42% of mass)

Mineral Separation Plant (Dry Plant)

- Electrostatic separation of the HMC to isolate a conductive concentrate containing rutile
- Magnetic separation to remove minor ilmenite and other magnetic gangue minerals such as iron oxides
- Final rutile product is bagged or placed in bulk containers, depending on its end-use, for sale

Graphite Flotation Plant

- Rougher flotation
- Cleaner flotation and polishing
- Thickening, filtering, drying, sizing and bagging graphite products for sale

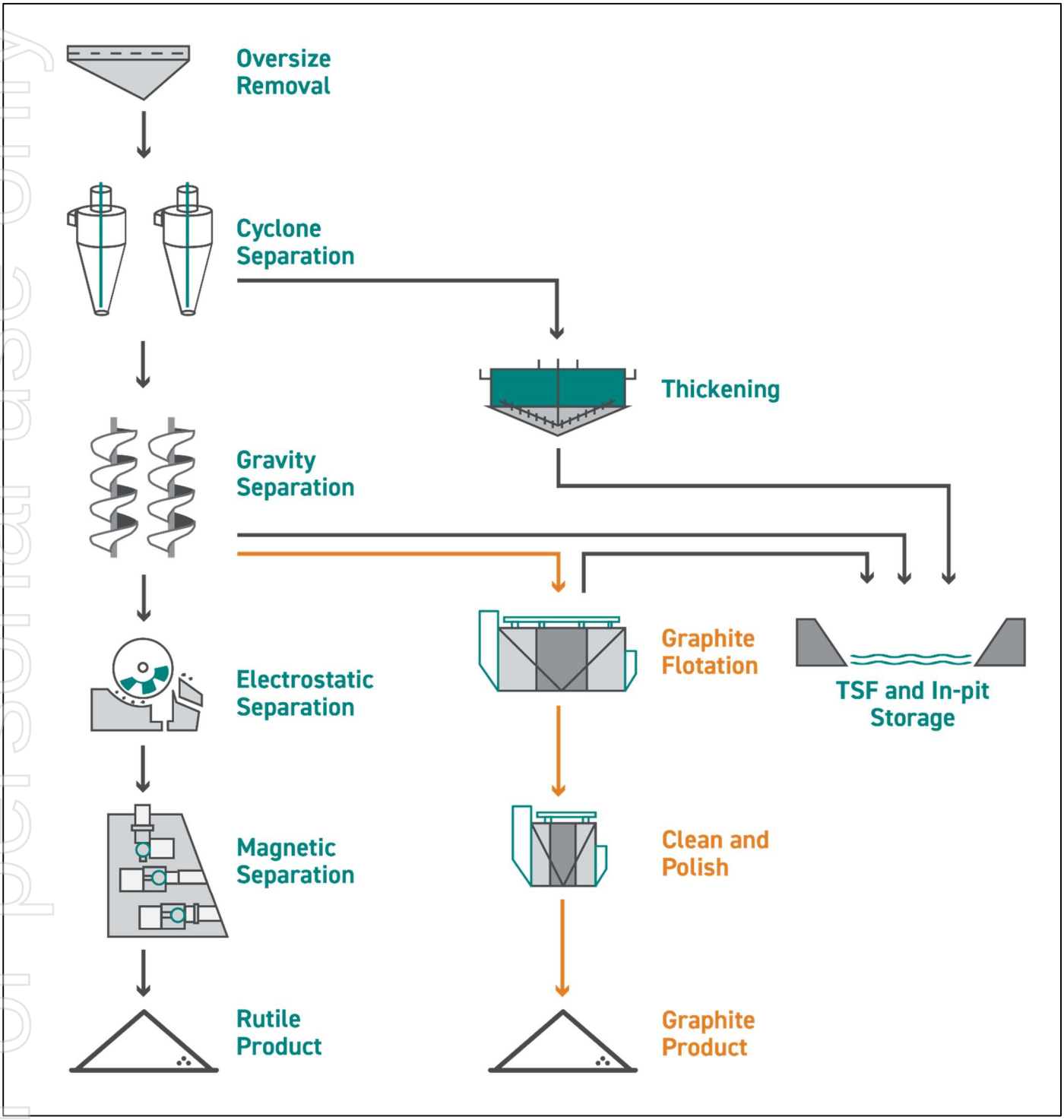


Figure 24: High-level process flowsheet for rutile and graphite production at Kasiya

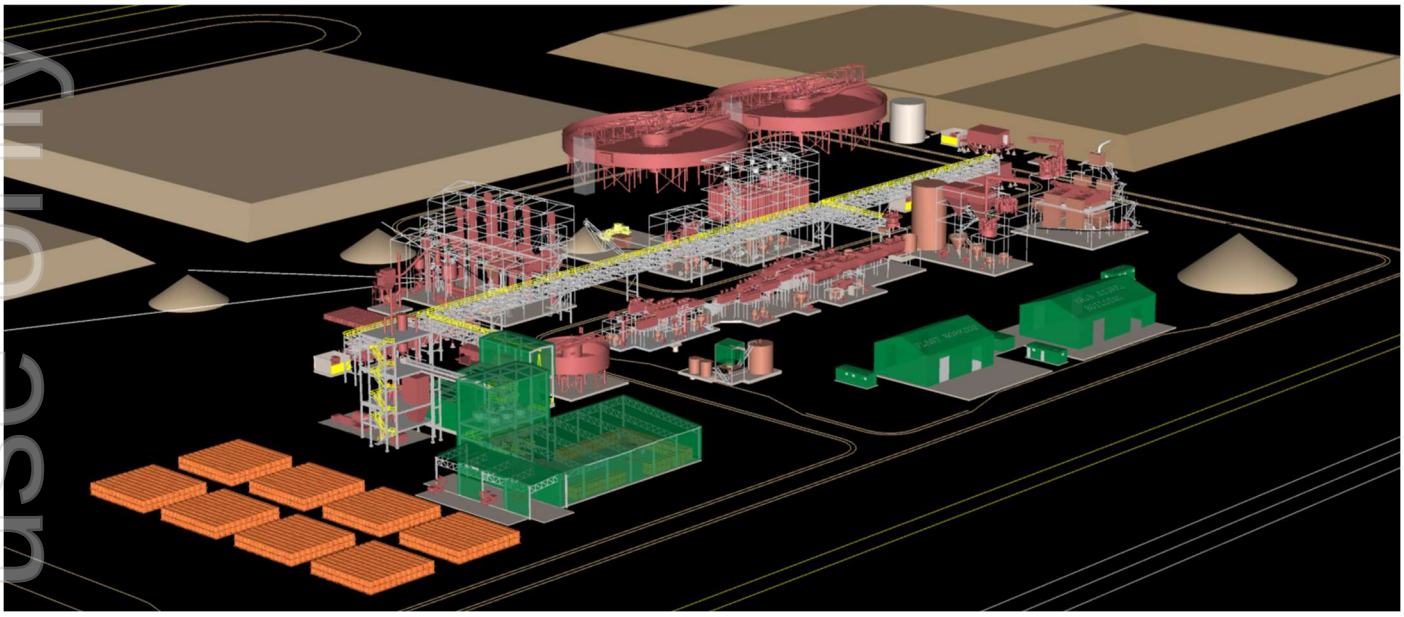


Figure 25: 3D schematic of a potential future Kasiya rutile and graphite processing plant (Stage 1 only).

The rutile and graphite mineralisation at Kasiya is amenable to processing via conventional metallurgical flowsheets using "off the shelf" processing equipment. Overall, the superior metallurgical performance at Kasiya is interpreted to be due to;

- Coarse, highly crystalline rutile grains that are naturally well-liberated and largely free of inclusions or attachments (Figure 26)
- Low chemical impurities in the rutile crystal lattices
- Simple HMC mineralogy with very little difficult to separate or near-density gangue minerals present
- Coarse, highly crystalline graphite being well liberated and pre-concentrating easily in the spiral gravity separation process

Figure 26: Photomicrograph of high purity rutile product

The premium chemical parameters and particle sizing (d_{50} 120µm, 8.6% <75µm) of the rutile produced indicates the products should be suitable for all major natural end-use markets including TiO_2 pigment feedstock, titanium metal and welding sectors.

Table 3: Rutile Specifications

Constituent		Kasiya	Peer Comparisons	
		98% Recovery Product	Sierra Rutile (Iluka)	Base Resources (Kwale)
TiO_2	%	96.0	96.3	96.2
ZrO_2+HfO_2	%	0.21	0.78	0.72
SiO_2	%	0.90	0.62	0.94
Fe_2O_3	%	0.94	0.38	1.25
Al_2O_3	%	0.90	0.31	0.23
Cr_2O_3	%	0.14	0.19	0.17
V_2O_5	%	0.70	0.58	0.52
Nb_2O_5	%	0.40	0.15	-
P_2O_5	%	0.013	0.01	0.00
MnO	%	0.02	0.01	0.03
MgO	%	0.003	0.01	0.10
CaO	%	0.003	0.01	0.04
S	%	0.002	<0.01	-
U+Th	ppm	32	26	53

"Iluka" is Iluka Resources Limited; "Base Resources" is Base Resources Limited. "b/d" is below the analytical level of detection; "-" is not disclosed. Sources: RBM data from World Titanium Resources Ltd TZMI Conference Presentation November 2011 (Updated January 2012); Sierra Rutile, Kwale and Namakwa Sands data from BGR Assessment Manual titled "Heavy Minerals of Economic Importance" 2010.

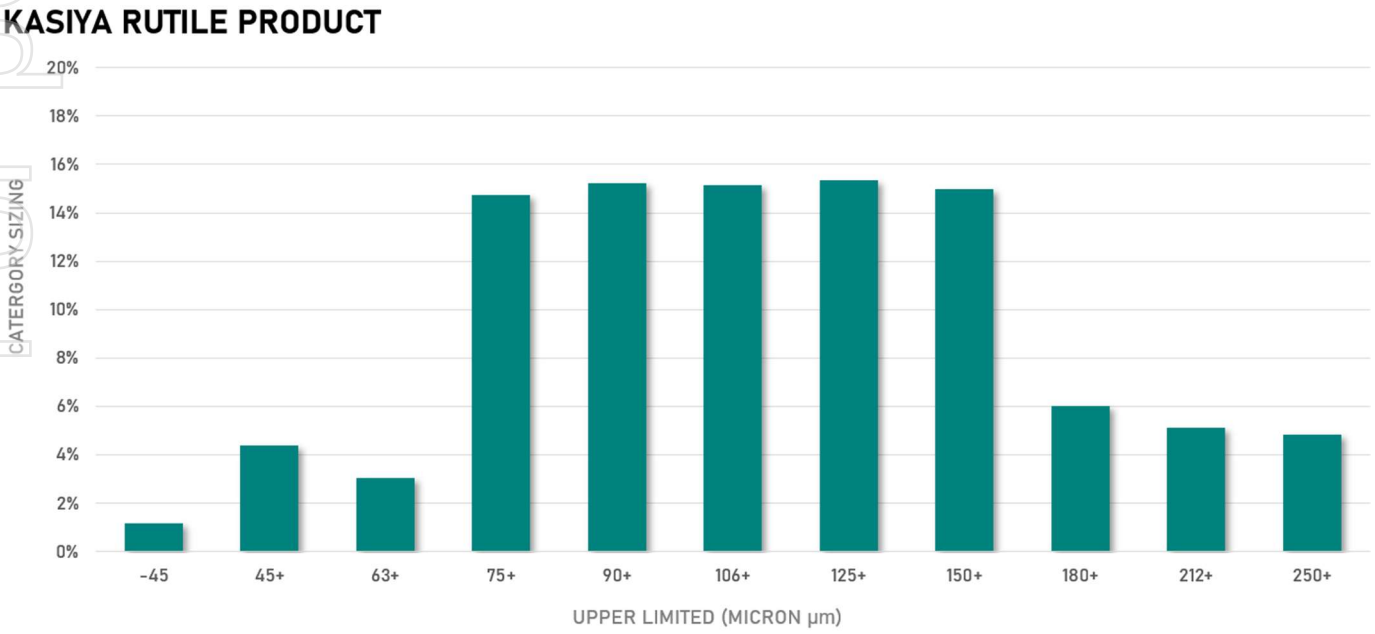
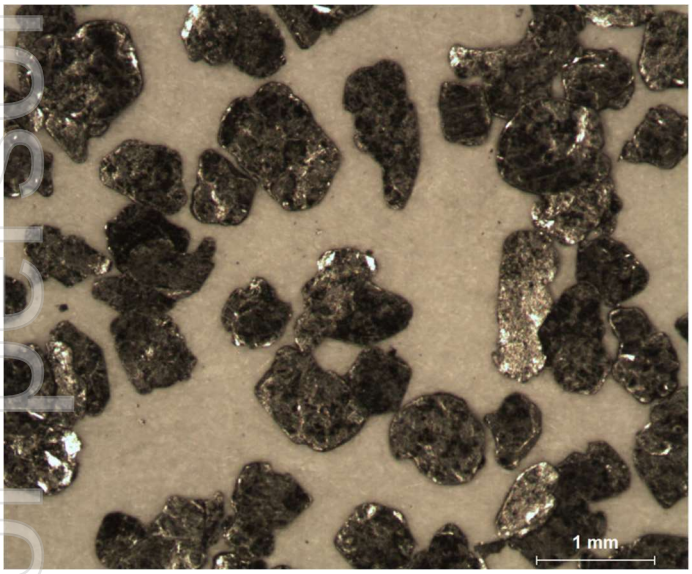


Figure 27: Particle size distribution of Kasiya rutile product

The specifications for the graphite product produced during the test-work are also considered to be premium with the product naturally grading over 96% TGC with more than 60% in the large to super-jumbo fractions (+180µm). The grade and size distribution is shown in Table 5 below.

Table 4: Graphite Specifications

Particle Size		Carbon	Weight Distribution	Flake Category
Tyler Mesh	Micron (µ)	(TGC %)	(% w/w)	
+32	+500	96.0	5.4	Super Jumbo
-32 +48	-500 +300	96.6	25.1	Jumbo
-48 +80	-300 +180	96.7	30.9	Large
-80 +100	-180 +150	96.8	10.9	Medium
-100 +150	-150 +106	96.1	14.4	Small/Medium
-150 +200	-106 +75	95.8	7.5	Small
-200	-75	93.8	5.8	Amorphous
Total		96.3	100	



Figures 28 & 29: Super-jumbo flake graphite product (L), graphite floating on soaking drill sample (R)

TAILINGS

Sovereign appointed Epoch Resources (**Epoch**) to complete an assessment on the tailings management and storage for the Project. The Study considered the following legislation, regulations and standards during the assessment process:

- International Financial Corporation Guidelines
- Canadian Dam Association Guidelines
- Global Industry Standard on Tailings Management (**GISTM**)

The process included an assessment of various potential locations which were analysed against the population at risk, loss of life, environmental and cultural values and infrastructure and economics.

Tailings Management

- Fines (-45µm) material from the cyclones (desliming) is dewatered in a high-compression thickener
- Coarse (+45µm) fraction which flows from the gravity circuit is dewatered using cyclones with the overflow recycled to process water via the high compression thickener
- Desliming cyclone underflow is combined with thickener underflow for co-disposal and pumped to stacking cyclones at the tailings storage facility (**TSF**)

Thickening of tailings in the processing plant before disposal enables process water to be recycled directly back to the plant, reducing water losses and reducing plant raw water demand. High compression thickening recovers sufficient water whilst maintaining a pumpable slurry, optimising plant operability.

Tailings Storage

Tailing disposal will be a combination of in-pit disposal within the void created by mining, and ex-pit disposal in a standalone TSF. The ex-pit TSF will be exclusively used for the first two years of operation as mining void is opened up for in-pit deposition from the third year.

Whether depositing in the ex-pit or in-pit facility, the process tails will be cycloned on the perimeter of the TSF cells to isolate:

- Sands which are suitable for continuously building the dam walls, and thus increasing the capacity of the TSF
- Fines that will exclusively be deposited into the main body of the TSF void

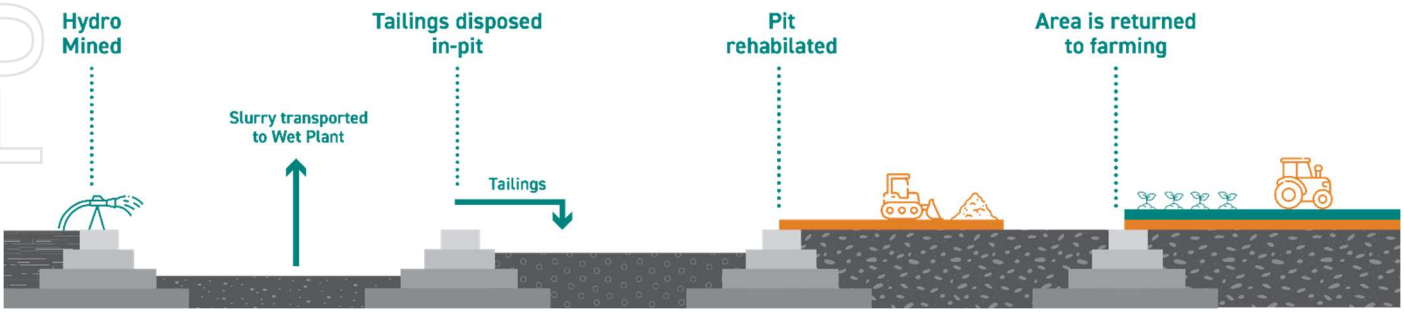


Figure 30: Mining and in-pit disposal schematic

Using in-pit disposal for the majority of the operation will minimise the overall disturbance of land resources, as well as reducing the overall mining footprint over the LOM. In-pit disposal and continual rehabilitation will allow the progressive return of land to communities and assist in a more efficient closure campaign at the end of the mine life. Over the LOM, 70% of tailings will be deposited in-pit, with the remaining 30% deposited in the TSF. Excess water will be recovered from the TSF and returned to the process water storage pond.

Land to be disturbed by mining is almost entirely used for agriculture. Farming of the land is mainly subsistence farming with some areas subject to larger scale commercial farms. Rehabilitation will return land to the original agricultural use, with opportunity potentially available to increase land utilisation with modernised farming techniques. Studies on land rehabilitation post mining, with a focus on agriculture and cropping will be performed as project studies continue through Pre-Feasibility Study (**PFS**) and Definitive Feasibility Study (**DFS**).

Figure 31: Example of progressive rehabilitation of a mineral sands mine
(source: Minerals Council of Australia)

ENVIRONMENTAL & SOCIAL IMPACT

Environmental and Social Setting

A high-level desktop review was undertaken of the environmental and social characteristics of the Kasiya project area. Site reconnaissance surveys by specialist environmental and social consultants were conducted in August 2021 and May 2022 focussing on the following aspects:

- Terrestrial fauna and flora
- Aquatic fauna and flora
- Soil and land capability and land utilisation
- Water resources, including potential surface water and groundwater impact, and the availability of raw water supply for the project
- Communities and potential resettlement

The site visit allowed the group to assess the Project area which will assist in the creation of a work plan for the detailed studies to be undertaken as part of the environmental and social impact assessment (**ESIA**) which is currently in the advanced planning stages.

Surveys will commence to inform the development of a resettlement action plan (**RAP**) which will comply with best practice as advocated by the IFC Performance Standards. These processes will culminate in the development of detailed reports that describe the various anticipated impacts, management measures, and strategies for rehabilitation and mine closure.

The ESIA for the Project will be undertaken in compliance with relevant Malawian legislation, regulations and standards, in particular, the Environmental Management Act (No. 19 of 2017) and Guidelines of Environmental Impact Assessment (DEA, 1997).

Environmental, Social and Governance

The Project aims to meet the requirements of international guidelines and standards, including the IFC Performance Standards on Environmental and Social Sustainability (IFC, 2012), the World Bank Group Environmental, Health and Safety Guidelines (WBG, 2007) and the Equator Principles (Equator Principles Association, 2020).

Decarbonising the global economy and realising the UN Sustainable Development Goals (**SDGs**) requires a sustained demand for metals and minerals over the coming decades. Accordingly, the Company intends to adopt the **ICMM** principles for future studies and development phases of the Kasiya project. The ICMM Principles align with the United Nations Sustainable Development goals and define good practice environmental, social and governance requirements for the mining and metals industry. The Company also intends to adhere to the Task Force on Climate-Related Financial Disclosures (**TCFD**).

The Kasiya project will be designed considering both the Equator Principles and Scope 1, 2 and 3 emissions under the Green House Gas protocol so that the design meets high standards for ESG from the outset. Access to power from the dominantly hydro-electric and solar Malawi power grid, plus a purpose-built Kasiya solar Independent Power Producer (**IPP**) system, will ensure low carbon power supply for the project. The use of rail rather than road transport for rutile and graphite product transport will further assist with a low carbon footprint.

The Study contemplates that the operation will use a closed circuit zero discharge process water circuit and a tailings storage facility designed to store benign tailings during operations which will be rehabilitated progressively.

The current MRE has a very large spatial footprint and therefore it is expected to impact on households and land users. However, the very large MRE has allowed the Company to produce a mine-plan that largely avoids towns, villages, graveyards and important infrastructure in order to minimise impacts wherever possible.

Acquisition of land for the Project may physically and economically displace households and land users. The Company will mitigate and offset these impacts by providing the affected parties with the necessary resettlement assistance under the appropriate Malawian and international laws and guidelines.

The proposed operation will have a positive impact on the local community by providing over 1,200 long term jobs and significant training and upskilling opportunities under an equal opportunity system. Malawian-owned businesses will benefit from the opportunity to provide goods and services to the future mine.

Similar projects in Africa typically witness a flow on effect for employment in local communities. For every person employed directly in the Project it is estimated an additional ten people would be employed in newly created indirect jobs.

The Company intends to develop a comprehensive Community Development Agreement (**CDA**) with the surrounding communities covering investment in local infrastructure, local business support, water provision, healthcare and education.

INFRASTRUCTURE

Power

Sovereign's objective is to develop a sustainable, low carbon and reliable power solution for Kasiya. Access to hydro-generated grid power and favourable conditions for a solar power system allows for a hybrid, low-carbon solution. JCM Power (**JCM**) were appointed to design a preliminary IPP solution for Kasiya.

JCM is a Canada-headquartered IPP which develops, constructs, owns and operates renewable energy and storage projects in emerging markets across the globe. JCM is funded by reputable development finance institutes including FMO, IFU, STOA, FinDev Canada and Swedfund. JCM is currently in the final stages of commissioning the Salima project, a 60MW solar project and is mid-construction of the Golomoti 20MW solar PV and Energy Storage project, both in central Malawi. JCM was involved in the development, management, engineering, procurement and construction for these projects.

Figure 28: 60MW Salima Solar Power Plant in Malawi recently constructed and commissioned by JCM (source: JCM)

JCM have designed a solar photovoltaic (**PV**) array with a supporting Battery Energy Storage Solution (**BESS**) that is capable of supplying 100% of the Project's power requirements (28MW) during the day and evening peak period. During other periods (low peak demand), power will be provided from the hydro-sourced grid via the Electricity Supply Company of Malawi (**ESCOM**). The modelled power source for the operation is 100% renewables with an estimated 41% contribution from solar and the remainder from the grid.

As back-up, a 5.0MW diesel facility will be rented to enable the continued operation of critical drives including thickeners and agitators, lighting etc during grid-outages when the solar / battery supply is depleted and grid unavailable.

To facilitate the grid connection, a new high voltage (**HV**) 132kV power line will need to be constructed to the facility from Lilongwe. The cost of $US12m for this line has been included in the capital estimations. A Build-Own-Operate (**BOOT**) as a Power Purchase Agreement (**PPA**) results in an estimated total power tariff of $US0.117/kWh.

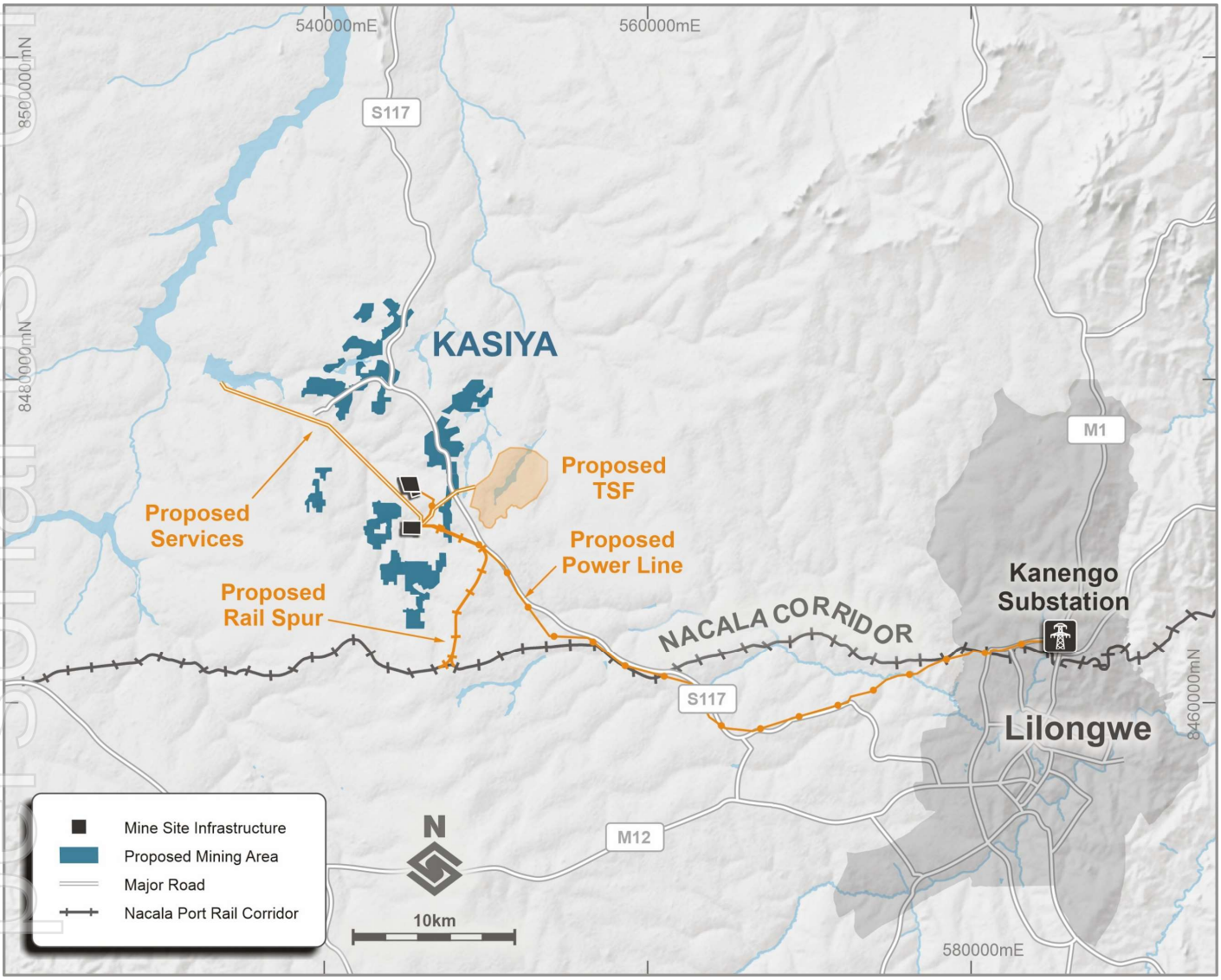


Figure 29: Proposed HV power line to Kasiya connecting to ESCOM grid at Kanengo

Water

The Project is considered to have good water availability. Malawi features a humid sub-tropical climate, with generally dry and mild winters and the majority of rainfall occurring during the summer months of December to March.

Temperatures are moderated by elevation and average 20.3°C with annual precipitation averaging 784mm. Average monthly rainfall peaks in January at 225mm with the minimum rainfall of near zero being encountered in June to September.

Process water to sustain the operation will be supplied from a purpose-built water dam. The dam will be built in a low-lying contour 14km north-west of the processing plant (Figure 23). The dam will capture and store run-off during the wet season, storing sufficient water to sustain the operation for the duration of the dry season.

During mining years 1 to 5 the dam will be filled in an average rainfall year using only the surrounding catchment. In the case of low rainfall events water can be supplemented by pumping from the Bua River just 2km to the west of the dam. Following the increase in mining rate to 24Mt per annum water will be supplemented to the dam from the Bua River and/or groundwater sources when necessary.

At full production of 24Mt of ore per annum the annual water demand for the Kasiya operation is 18.2GL with the dam capacity designed to be 21.1GL.

Figure 30: Upper Bua River intersecting the S117 road north of Kasiya

Human Resources

The proximity to Lilongwe gives the Project a number of benefits, including access to a large pool of professionals and skilled tradespeople. Malawian national employees will be employed dominantly from the Kasiya area and the capital city of Lilongwe. Expatriate and senior out of town employees will be accommodated in a 120-person accommodation village proximate to the processing operation but separate from the township of Kasiya.

During operations, Kasiya will employ over 1,200 staff with the majority working in the plant operations. Similar projects in Africa typically witness a flow on effect for employment in local communities. For every person employed directly in the project a significant multiplier of people will be employed in indirect jobs supporting the project.

Sovereign has structured training and skills transfer programs covering on-the-job training for full-time employees, as well as programs for local graduates and interns. The programs focus on building skills capacity in the surrounding community.

The Company currently has 45 full time employees and is an equal opportunity employer with a gender diverse workforce. Currently, 60% of Sovereign's professional Malawian staff and at least 50% of our regular interns are female.

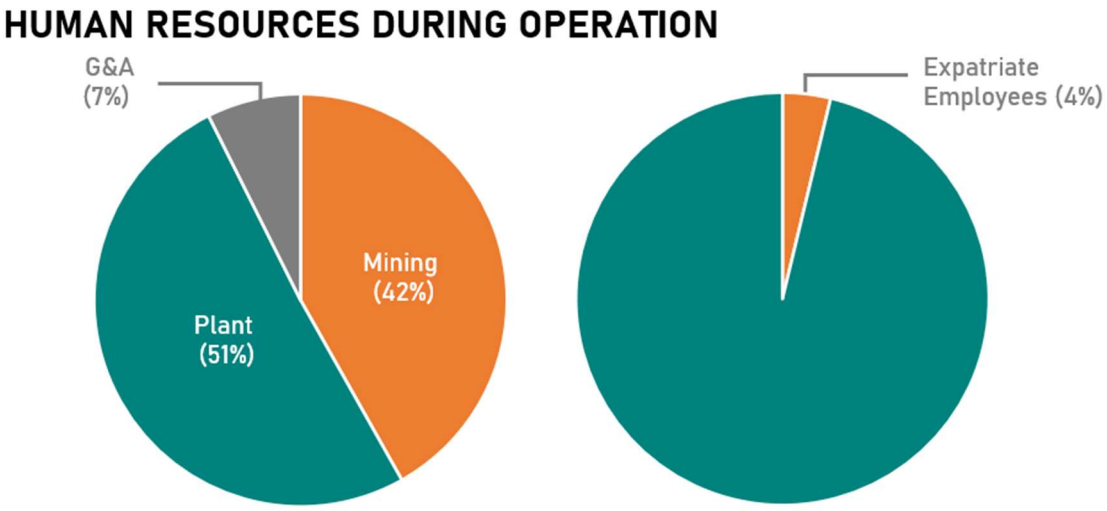


Figure 31: Staff split across operation over the LOM

Figure 32: Sovereign's team members in action at the Company's Lilongwe sample processing and laboratory facility

LOGISTICS

Sovereign directly benefits from the exceptional existing infrastructure in central Malawi. This offers the preferred logistics route to the Indian Ocean-located Nacala deep water port via the NLC for the export of mineral products to global markets and a second viable option via the Sena Rail Line to the deep water port of Beira (Figure 33).

This established operation-ready logistics infrastructure will provide significant capital and operating cost saving to the Project.

Figure 33: Sovereign's project area showing its position in South-East Africa and Nacala and Beira ports

Sovereign appointed independent African logistic consultants, Morgan Sterling Consultants (**MSC**) to assess the options for exporting Kasiya's rutile and graphite products. MSC confirmed the preferred logistics routes to global markets are via the NLC via the deep-water port of Nacala and a second viable option via the Sena Rail Line to the deep water port of Beira.

The logistics cost for transporting product rutile and graphite products from Kasiya to free-on-board (**FOB**) Nacala was estimated by MSC to be US$45.15 per tonne.

In late 2021, Vale divested its coal assets in Mozambique to an Indian steel conglomerate Jindal. Jindal have operated the Chirodzi coal mine in Mozambique for several years.

Following completion of their purchase of Vale's Moatize coal mine and their share in the NLC, Jindal have announced their intention to consolidate all their exports from Mozambique via the Nacala coal terminal. This is favourable for Sovereign's operation as by increasing investment in the underutilised NLC, also opening up additional capacity on the Sena Line and the Beira Coal Terminal. The NLC network is significantly underutilised with only 15% of the rail freight capacity currently in use with the deep-water port only 41% currently utilised (MSC).

As part of the Stage 2 development of Kasiya, the Company will extend a 12km rail spur to the plant location (Figure 23). This extension of the rail line will provide a significant reduction to road traffic and efficiencies for handling and controlling inventory.

By adopting the rail logistics solution with almost all overland distance on rail, Sovereign has the potential to reduce environmental impact and carbon footprint of Kasiya significantly compared to all-road alternatives.

Sealed Road Network

The Kasiya deposit is located just 40km north west of Lilongwe, Malawi's capital. This provides the Company with excellent access to sealed roads and short road haulage distances to the railway.

Kasiya is perfectly located to utilise this Class-1 bitumen road network which directly accesses the deposit area. In 2015, The Roads Authority of Malawi completed an upgrade of the 95km long, Lilongwe Old Airport-Kwanyanda-Santhe (S117) and Kasiya spur (T342) road projects. These upgrades resulted in Class-1 bitumen standard roads to 6.8m carriageway with 1.5m single sealed shoulders. Sovereign will be able to take advantage of this underutilised road network for inbound and outbound logistics.

Figure 34: Example of the road network available to Sovereign

Rail Corridors

The NLC is a 912km rail line for the purpose of transporting coal from mines in western Mozambique to the port of Nacala via Malawi. For Malawi, the NLC provides the shortest and most direct access to the sea and global commodity markets. The Corridor stretches from Moatize, Mozambique and Chipata, Zambia and passes through Lilongwe in Malawi to the Port of Nacala on the Indian Ocean.

Figure 35: Nacala Logistics Corridor passing through Sovereign's project area

The Sena rail line connects the Tete province in Mozambique to the port of Beira and has been in continuous operation over recent years transporting fuel into the mines, and coal from the Jindal owned Chirodzi mine into the Beira Coal Terminal. In March 2021, rehabilitation work has begun on the spur line which connects Mutarara on the Sena line with Malawi to the north.

International Deep Water Ports

The landlocked country of Malawi has traditionally been served by two deep water ocean ports on the Eastern seaboard of Africa – Nacala and Beira. Both harbours have been connected by direct road and rail routes for over a century as trade has developed into the main urban centres of Blantyre and Lilongwe in Malawi.

Figure 36: Beira Port's container facility in southern Mozambique

Sovereign's preferred logistics route for exporting mineral products to global markets is through the Nacala deep water port via the Nacala Corridor with a second option being via the Sena railway line to the port of Beira. Sovereign will assess these options in future studies.

RUTILE MARKET

Natural rutile is the purest, highest-grade natural form of TiO_2 mineral and is the preferred feedstock in manufacturing titanium pigment and producing titanium metal. Titanium pigments are used in paints, coatings and plastics. Titanium minerals are also used in specialty applications including welding, aerospace and military.

The global titanium feedstock market is over 7.7Mt of TiO_2 with the majority of this consumed by the pigment industry. Natural rutile's high purity classifies it as a high-grade titanium feedstock. The high-grade titanium feedstock market consumes approximately 2.8Mt of contained TiO_2 with strong demand driven from the pigment, welding and metal industries.

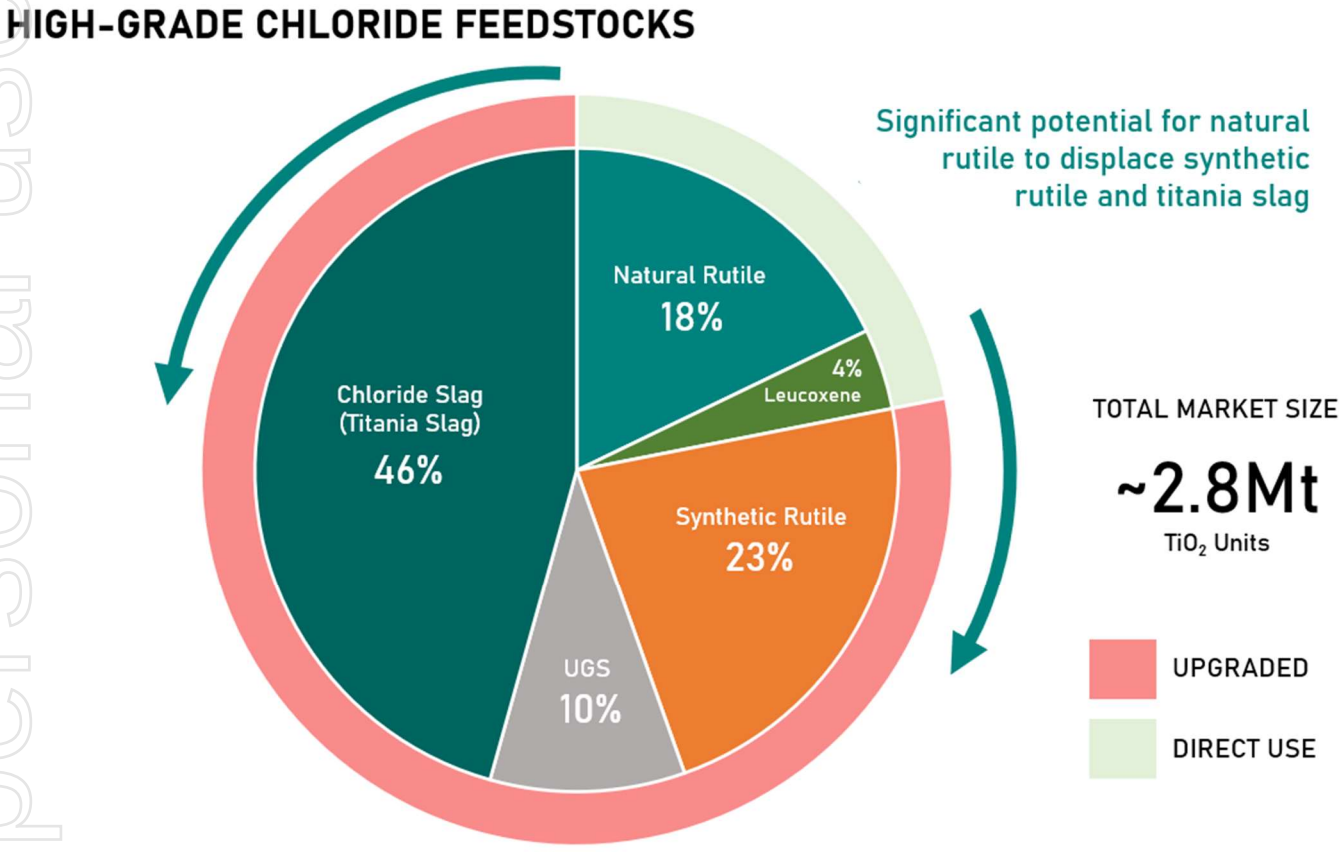


Figure 37: High-grade titanium feedstocks (+80% TiO2) by supply type
(Source: TZMI/Iluka, based on 2020 data)

Natural rutile is a genuinely scarce commodity with no other large rutile dominant deposits having been discovered in the last half century.

Global rutile supply is projected to decline rapidly beyond 2023, following the scheduled closures of Base Resource's Kwale and Iluka's SRL operations unless mine life extension is approved (TZMI). There are limited new deposits forecast to come online, and hence supply of natural rutile is likely to remain in structural deficit for the long term, even with Kasiya at full production.

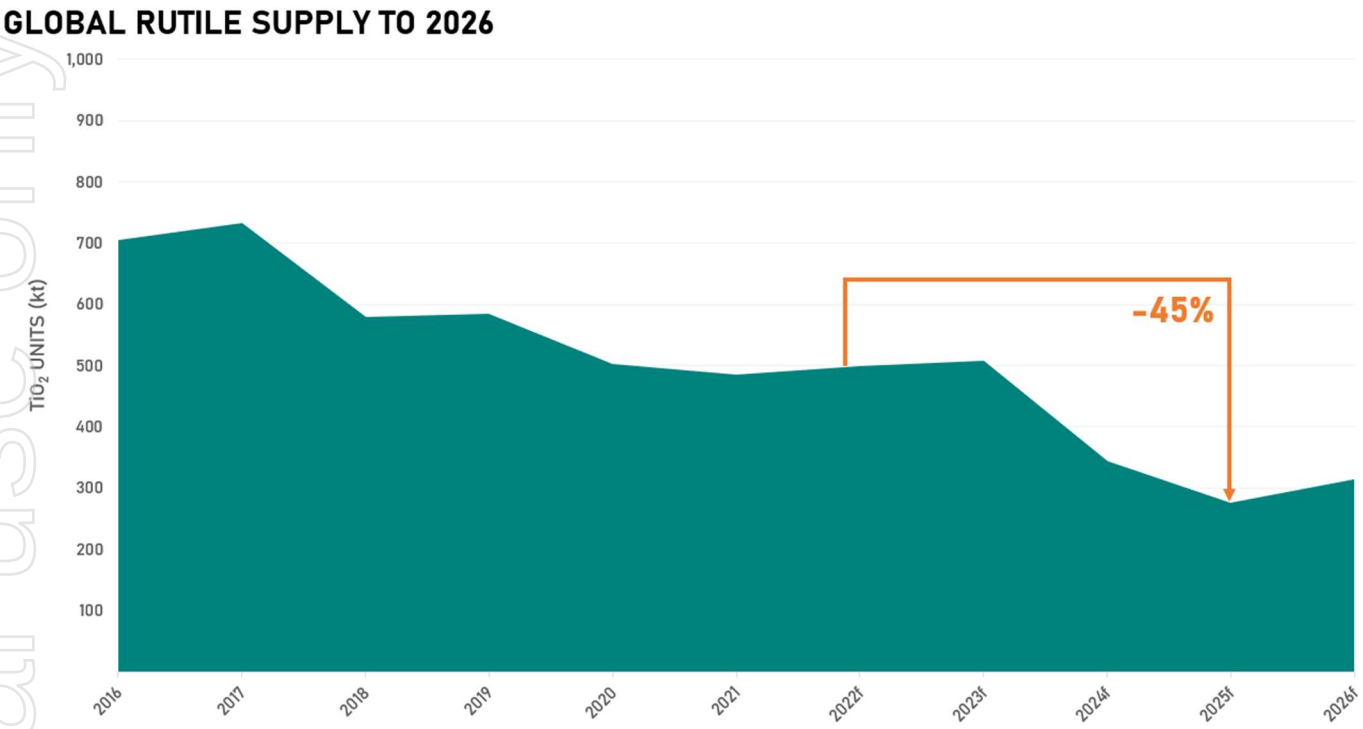


Figure 38: Previous and forecast global natural rutile supply 2015-2026
**Supply profile only reflects existing operations*
(source: TZMI)

The rutile market fundamentals continue to be robust with current and forecast pricing remaining very strong. In 2021, the market rebounded strongly with pigment plant utilisation rates returning to pre-pandemic levels. Major producers have noted that very strong demand in the welding market is outstripping supply.

The natural rutile market can be divided is two discrete sectors;

- Bulk rutile mostly sold on contract to chloride pigment and titanium sponge (metal) producers
- Bagged rutile sold to welding and other industrial sectors

Titanium market consultancy TZMI expect new bulk rutile contracts for 2022 to be priced at US$1,350-1,450 per tonne FOB with bulk rutile spot sales priced at US$1,500-1,600 per tonne FOB.

Bagged rutile sales into the welding and other sectors achieve better pricing outcomes, often with 25%+ premiums to bulk rutile pricing. Consequently, TZMI expects bagged rutile sales to fetch US$500-600 per tonne price premiums over the bulk market in 2022. TZMI understands that some bagged rutile sales for Q1 of 2022 were sold at US$2,100-2,200 per tonne cost, insurance, and freight (**CIF**). TZMI also expects bagged rutile sales to lead pricing growth because the welding end-use sector has limited alternatives to rutile feedstock input.

The rutile pricing scheme for the two Stages of the Kasiya Scoping Study were as follows; Stage 1 is based on 60% of volume allocated to bulk rutile sales with pricing based on TZMI's long term inducement price, and the remaining 40% as bagged rutile sales with pricing based on the long-term inducement price plus 25%. For Stage 2, the volume sold into the premium sectors was reduced to 25% of production volume. Refer to Table 5 below for the price used across the mine life.

Table 5: Rutile Prices (Source: TZMI)	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	Long term
TZMI Forecast Price – Base (real)	$1,336	$1,334	$1,314	$1,336	$1,328	$1,311	$1,287	$1,255	$1,221	$1,180	$1,180
Bulk sales (pigment inducement price)	$1,336	$1,334	$1,314	$1,336	$1,328	$1,311	$1,287	$1,255	$1,221	$1,180	$1,180
Bagged sales (25% premium)	$1,670	$1,667	$1,642	$1,670	$1,660	$1,639	$1,609	$1,569	$1,526	$1,475	$1,475
Stage 1 Production (60%:40%)	**$1,470**	**$1,467**	**$1,445**	**$1,470**	**$1,461**	**$1,442**	**$1,416**	**$1,381**	**$1,343**	**$1,298**	**$1,298**
Full Production (75%:25%)	-	-	-	-	-	**$1,393**	**$1,367**	**$1,334**	**$1,297**	**$1,254**	**$1,254**
LoM Average											$1,308

Marketing Strategy

The Company engaged market leading TZMI to provide a bespoke marketing report to support the Scoping Study. TZMI is a global, independent consulting and publishing company which specialises in technical, strategic and commercial analyses of the opaque (non-terminal market) mineral, chemical and metal sectors.

TZMI's assessment has confirmed that, based upon their high-level view on global demand and supply forecasts for natural rutile, and with reference to the specific attributes of Kasiya, there is a reasonable expectation that the product will be able to be sold into existing and future rutile markets.

In March 2022, Sovereign entered into a non-binding Memorandum of Understanding (**MoU**) with Hascor International Group™ (**Hascor**) for potential supply of 25,000 tonnes of natural rutile per annum from the Company's Kasiya Rutile Project (**Kasiya**) in Malawi to Hascor's processing plants and clients across five continents.

The MoU with Hascor contemplates a supply agreement to cover an initial five-year period from commencement of nameplate production for potential 25,000 tonnes per annum of natural rutile to Hascor and their existing clients. Volumes may be varied up or down by mutual agreement. Pricing at commencement will reference market prices to the welding sector subject to agreed price variations through the supply term. Hascor is a multinational ferroalloy and metal powder supplier. The group is a key processor and global distributor of natural rutile products for the welding industry with production and distribution centres across five continents.

This maiden MoU is part of Sovereign's product marketing strategy as the demand and pricing for natural rutile are both very strong as the global structural deficit in supply continues to widen. The premium chemical parameters of Kasiya's natural rutile produced indicates the product is suitable for all major end-use markets including welding, TiO_2 pigment feedstock and titanium metal.

The Company has engaged and is in advanced discussions with a number of additional potential off-takers and end-users across the various sectors (pigment, welding and titanium metal). The Company plans to advance these discussions with these parties and others with a view of securing sales and off-take agreements for the future sale of its product and establishing long-term project partners.

LOW CARBON ADVANTAGE

Kasiya has the potential to provide two products that both have very favourable low carbon in-use advantages. Benchmark Life Cycle Assessment (**LCA**) studies for natural rutile and graphite produced from Kasiya have the potential for a **substantially reduced carbon footprint** compared to other titanium feedstocks and natural graphite products in the market.

Like many other industries globally, the titanium pigment industry is targeting reduced carbon emissions, reduced energy consumption and a move toward renewable energy and waste minimisation.

Natural rutile (~95% TiO_2) is the cleanest, purest natural mineral form of TiO_2 with the other major source being ilmenite (~50% TiO_2). The genuine scarcity of natural rutile prompted the titanium industry to develop upgraded titanium feedstock products from ilmenite that can be used as substitutes for natural rutile (i.e. synthetic rutile and titania slag).

Two energy and carbon intensive processes are used by major market participants to produce the upgraded synthetic rutile and titania slag. Both methods use ilmenite (~$FeTiO_3$) as the raw source material and are essentially processes for the removal of iron oxide. The downstream pigment production process relies heavily on the use of these upgraded titanium feedstocks, each having an associated substantial environmental impact.

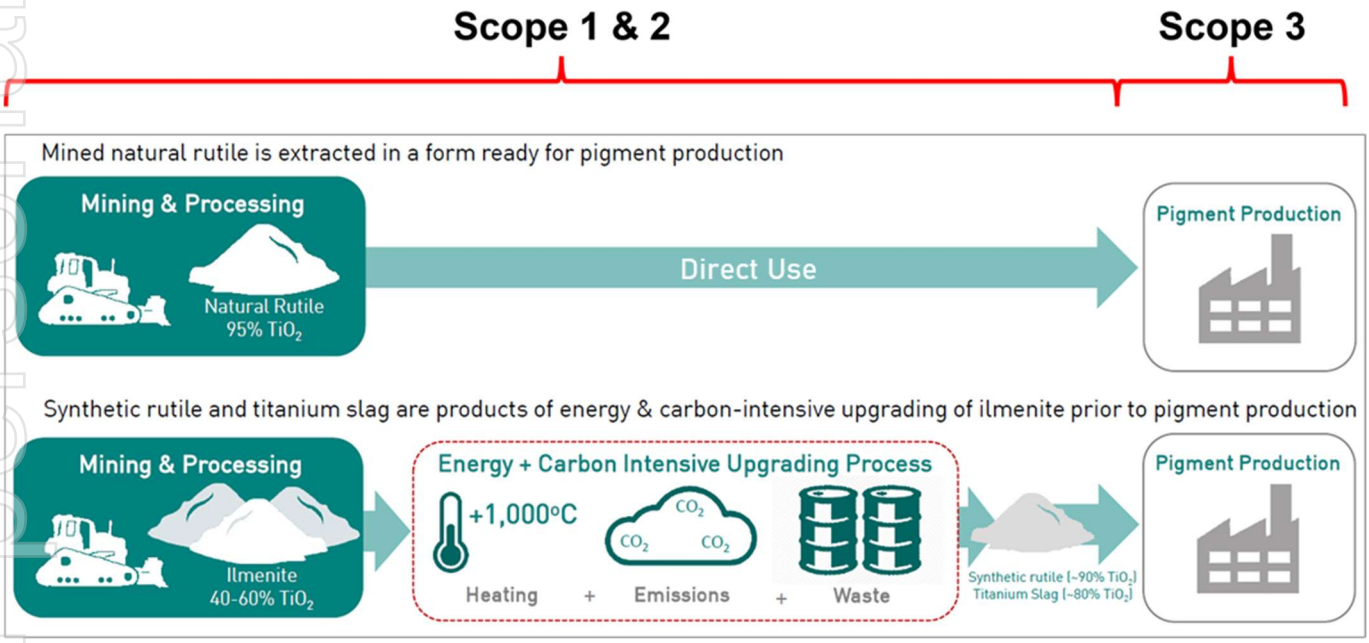


Figure 39: Natural rutile is a direct use titanium pigment feedstock

For downstream pigment producers focused on lowering their carbon footprint, natural rutile presents a technically preferred feedstock over higher energy and carbon-intensive upgraded titanium feedstocks synthetic rutile and titania slag.

In line with its ESG Strategy, Sovereign appointed UK-based consultancy, Minviro Ltd. To carry out gate-to-gate LCAs for the production of upgraded titanium feedstocks, namely:

- **Titania slag** (85% TiO_2) produced from ilmenite via smelting in electric furnaces in South Africa
- **Synthetic rutile** (88-95% TiO_2) produced from ilmenite via the Becher Process in Australia

These alternatives were chosen as comparison points as they are two of the largest production routes for titanium feedstocks. South African titania slag operations account for a significant proportion of global titania slag production, and the majority of the synthetic rutile is produced via the Becher process.

Titanium Feedstock Production – Scope 1 & 2 Emissions

Natural rutile produced at Kasiya has a fraction of the GWP of the alternative feedstocks. The GWP for natural rutile concentrate from Kasiya (0.1 t CO_2e per tonne) is significantly lower than producing titania slag in South Africa (2.0 t CO_2e per tonne) and producing synthetic rutile via the Becher process in Australia (3.3 t CO_2e per tonne).

The Scope 1 and 2 emissions comparing the carbon footprint of these three production routes are shown in Figure 40. The higher result for synthetic rutile is mainly due to the use of coal and other reagents for the upgrading of lower grade ilmenite to the final synthetic rutile feedstock product.

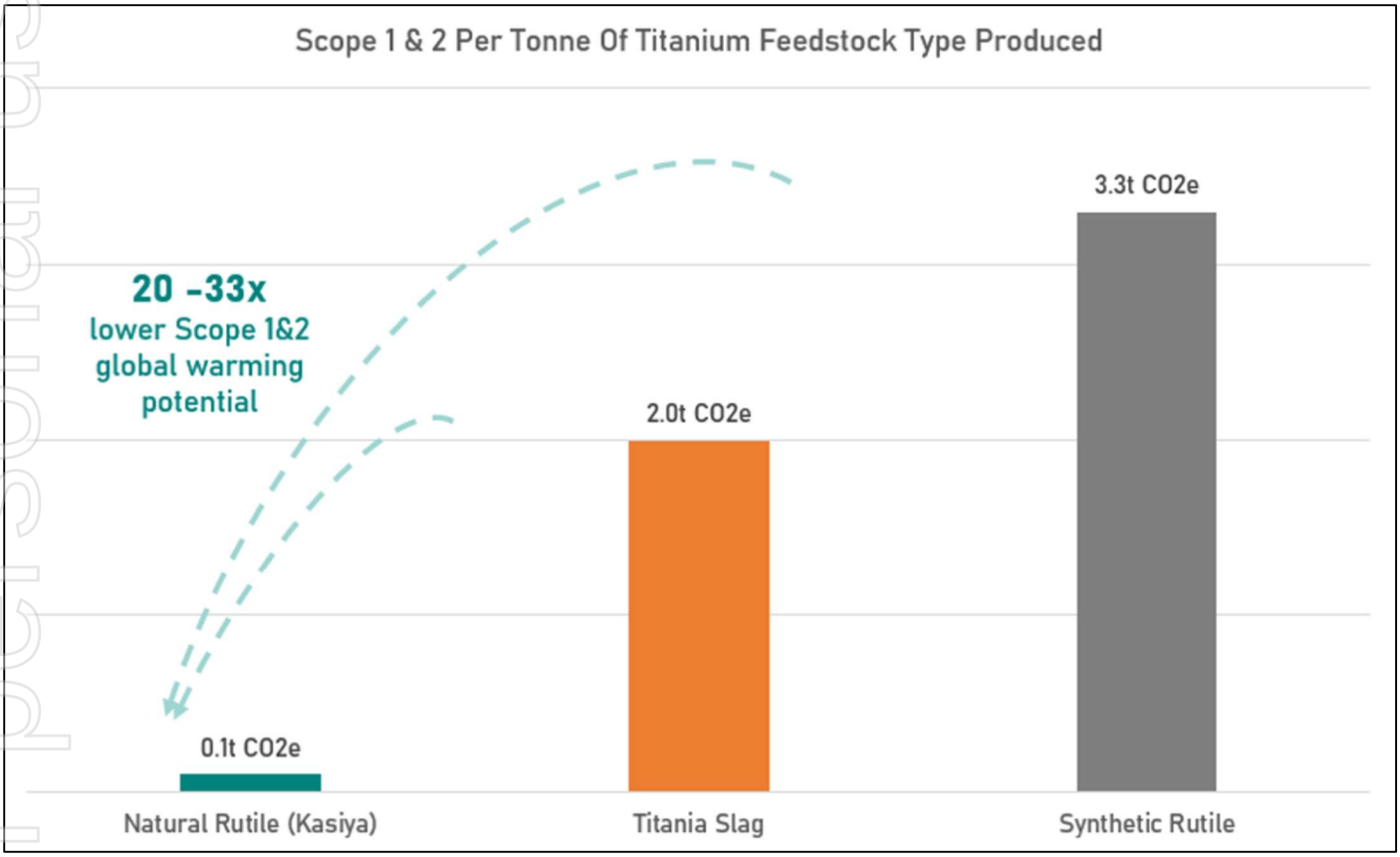


Figure 40: GWP impact of natural rutile production from Kasiya as a titanium feedstock vs. alternatives
(Source: Minviro)

Titanium Dioxide Pigment Production Benchmarking – Scope 3 Emissions

Using Sovereign's natural rutile as feedstock for producing TiO_2 pigment via the well-established chloride route provides a lower GWP for the production of one tonne of TiO_2 pigment compared to using either titania slag or synthetic rutile (Figure 41).

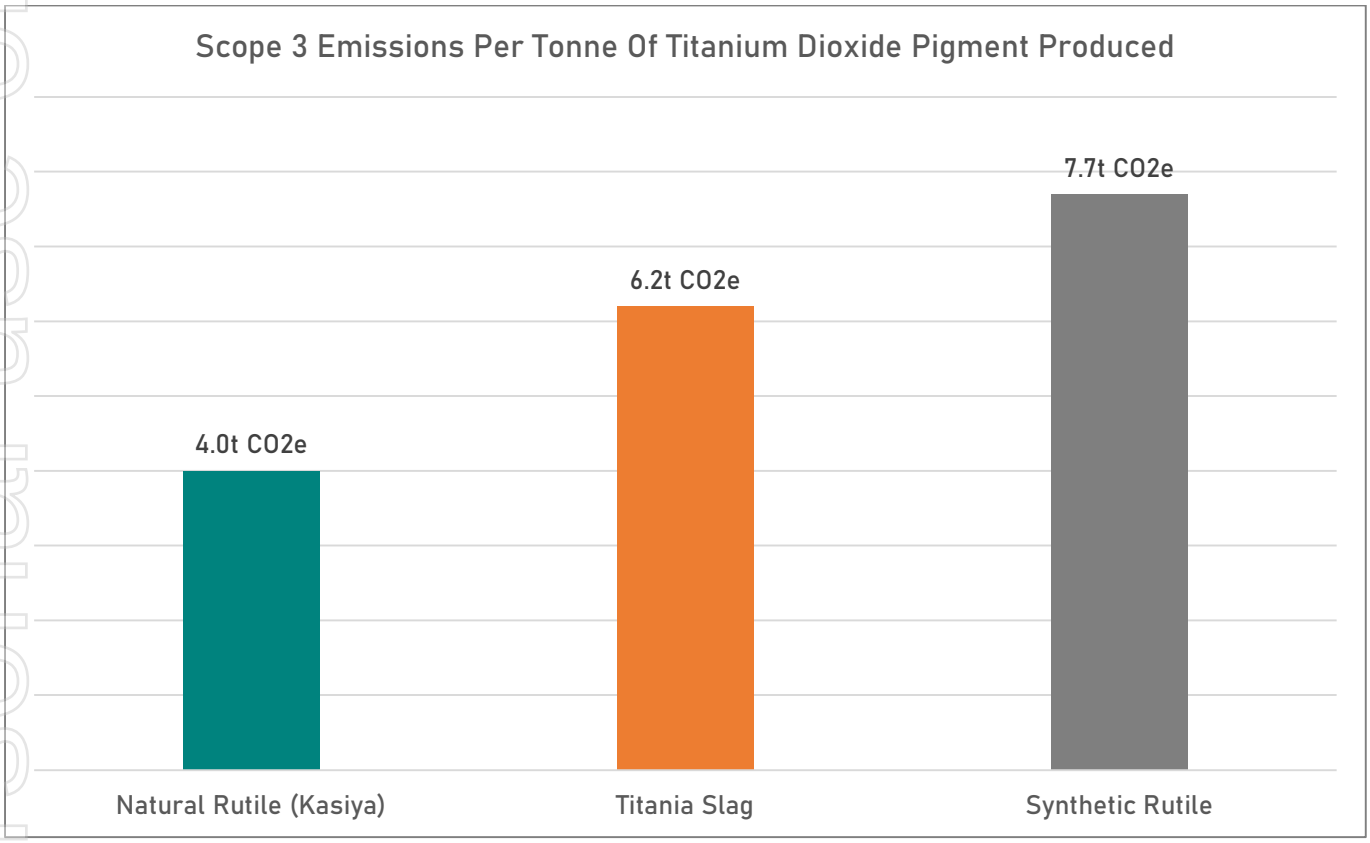


Figure 41: GWP impact of producing titanium dioxide pigment from different titanium feedstocks
(Source: Minviro)

The pigment production was assumed to be located in the European Union. The transport of the feedstocks from the site of production to the TiO_2 pigment production plant is included in the comparison. For Sovereign's natural rutile, this was Kasiya; the production of synthetic rutile was assumed at a plant in Australia; the production of titania slag was assumed at a plant in South Africa.

Higher scope 3 GWP of the ilmenite derived titanium feedstocks led to higher results for the use of synthetic rutile or titania slag in producing pigment. Using Sovereign Metal's natural rutile instead of the titania slag would give a scope 3 GWP reduction of 2.2 t CO_2e per tonne of TiO_2 pigment. Furthermore, using Sovereign's natural rutile concentrate instead of the synthetic rutile would give a scope 3 GWP reduction of 3.7 t CO_2e per tonne TiO_2 pigment.

Scope 3 emissions usually account for the highest proportion of greenhouse gases from the mining industry, with estimates as high as 95% of total mining sector emissions. The average scope 3 emissions of the five largest diversified miners are 26 times their scopes 1 and 2 emissions combined (source – company disclosures).

Paint Production Benchmarking

Minviro evaluated how using different titanium feedstocks affects the GWP of paint production. Using Sovereign's natural rutile provides the lowest GWP, at 3.3 t CO_2e per tonne of alkyd paint (Figure 42), which represents up to a 35% reduction in carbon footprint compared to paint produced from synthetic rutile.

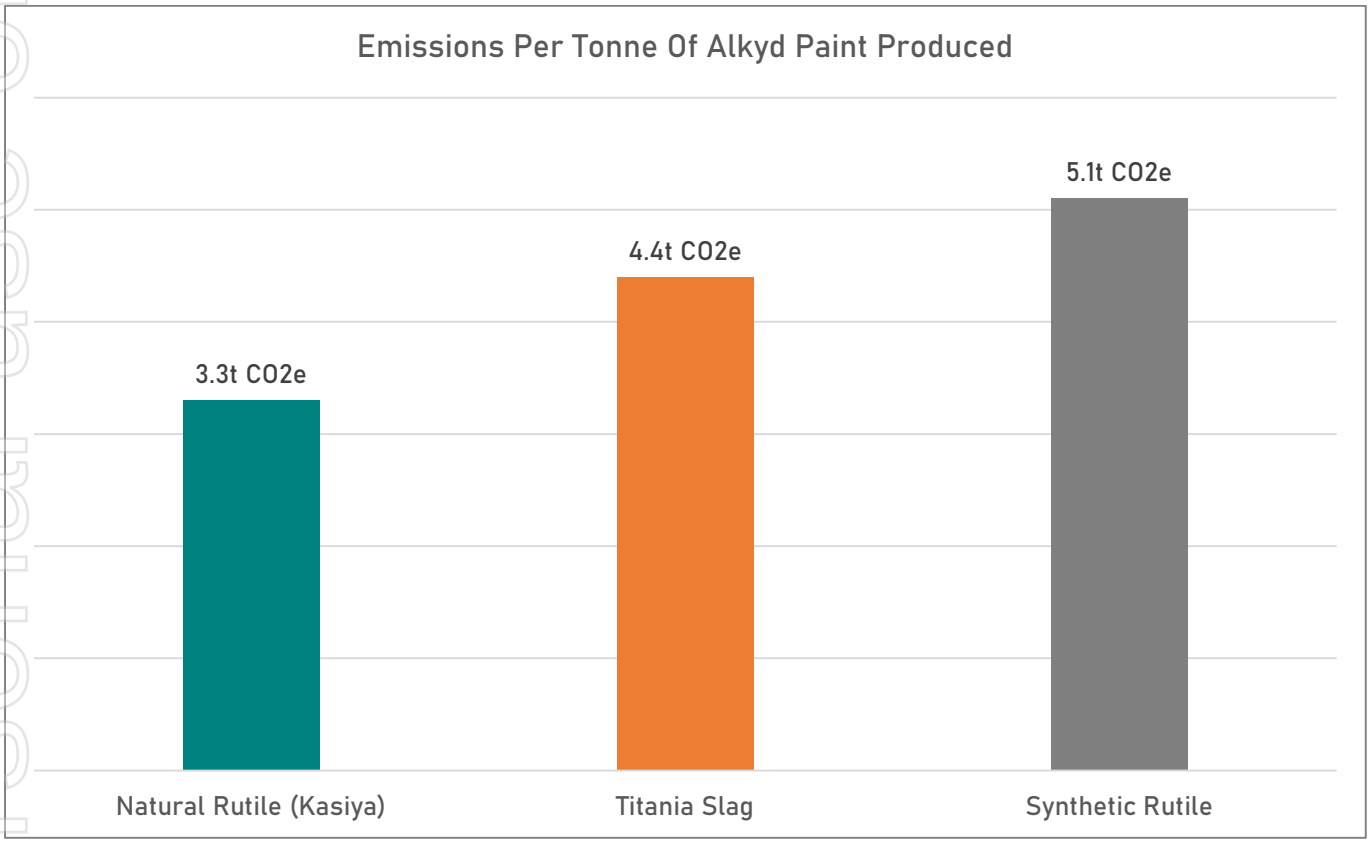


Figure 42: GWP impact of producing alkyd paint from titanium dioxide pigment produced from different titanium feedstocks (Source: Minviro)

Benchmarking Kasiya Natural Graphite GWP

The LCA study benchmarked the Global Warming Potential (**GWP**) of Sovereign's natural flake graphite product versus natural flake graphite concentrate produced in the Heilongjiang Province, China (Figure 43). This benchmark was chosen as a comparison point as it is one of the largest global production centres for natural flake graphite.

The LCA study made efforts to ensure maximum comparability for the benchmarking exercise meaning that the LCA study focused on graphite produced at site and does not include transportation. The LCA study concluded that Sovereign's natural flake graphite concentrate has significantly lower greenhouse gas emissions than the Chinese produced natural flake graphite concentrate from the Heilongjiang Province.

Each tonne of Sovereign's natural graphite is estimated to have a GWP of 0.2 tonnes CO_2e (**carbon dioxide equivalent**) – 5x lower than producing natural flake graphite concentrate in the Heilongjiang Province, China which is estimated to have a GWP of 1.1 tonnes CO_2e for each tonne produced.

In addition to the results of the LCA study, the Company's research noted a report published in the Journal of Industrial Ecology estimating the GWP of synthetic graphite. Synthetic graphite is manufactured by high-temperature treatment of by-products of hydrocarbon refining such as petroleum coke and coal tar pitch. Currently, the highest purity synthetic graphite is produced from petroleum needle coke which is a complex, emission and energy intensive process.

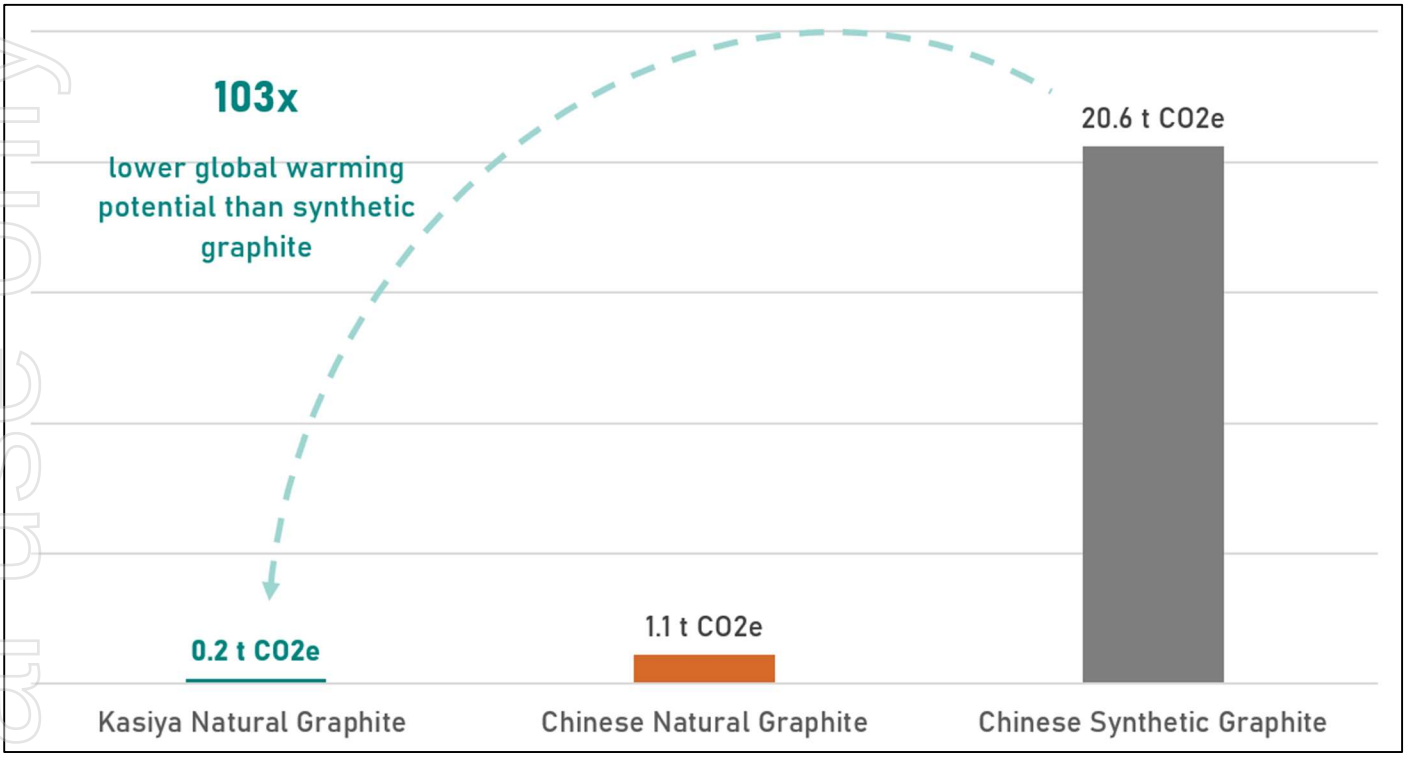


Figure 43: Global Warming Potential of Kasiya's natural graphite vs. natural graphite produced in Heilongjiang Province, China and synthetic graphite produced in China
(Sources: Minviro Ltd; Journal of Industrial Ecology)

GRAPHITE MARKET

The current primary end-market for natural flake graphite is the refractory, foundries and crucible sectors which consumed approximately 77% (900,000 tonnes) of flake graphite production in 2020. The refractory industry is the volume driver for flake graphite, with foundries and crucibles offering smaller markets for higher purity graphite products. The major product flake graphite is consumed in is magnesia-carbon bricks, a mainstream refractory brick which is used in the steel industry.

The lithium-ion battery sector is the main emerging market for flake graphite (Figure 44). Greater capacity batteries, such as those required for EVs, are expected to drive significant demand for graphite over the coming years. It is forecast the battery sector will become the largest graphite market segment by 2028.

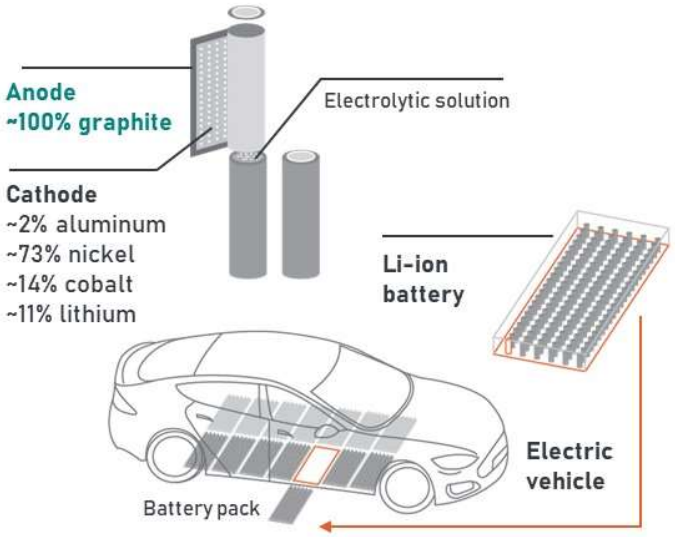


Figure 44: As the anode material, graphite can account for up to 50% of the composition of a lithium-ion battery used in an EV

Currently, China is the world's largest supplier of natural flake graphite. In 2020, leading data provider and market intelligence publisher Benchmark Mineral Intelligence reported that China produced 86% of all lithium-ion battery anodes from natural and synthetic graphite and 100% of all the world's natural graphite anodes.

Industry's interaction with supply chain participants indicates the progression towards higher proportions of natural graphite used in battery anodes will be supported by its lower cost and superior environmental credentials. Environmental footprint of EVs will become increasingly important as EV penetration of the overall automobile market accelerates.

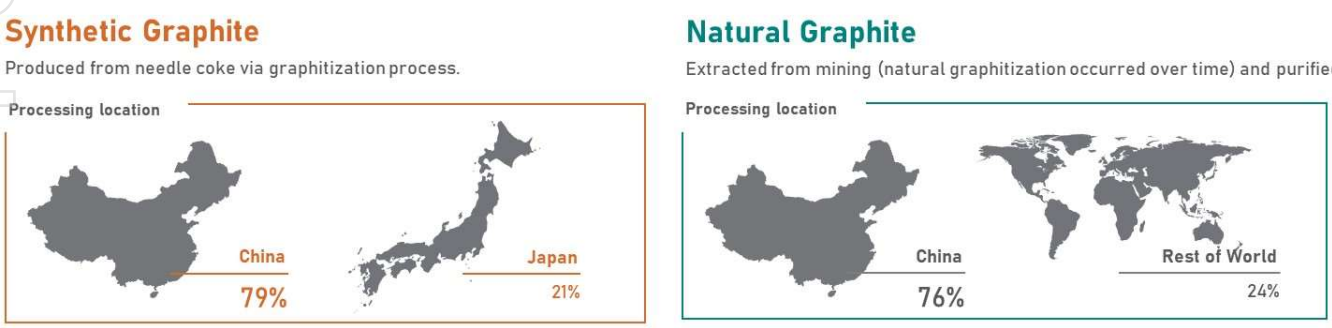


Figure 45: Synthetic and natural graphite production
(Sources: Morgan Stanley Equity Research "Better Anode, Safer Batteries", June 2019; Deutsche Rohstoffagentur "Supply and Demand of Natural Graphite", July 2020)

Electric Vehicles will Drive new demand for graphite

The next two decades years will bring significant changes as electrification of vehicles reshapes the automotive and freight markets globally. To power this energy transition, it is estimated that the world will need 20-25 TWh of annual growth in capacity for the next 15 years.[1]

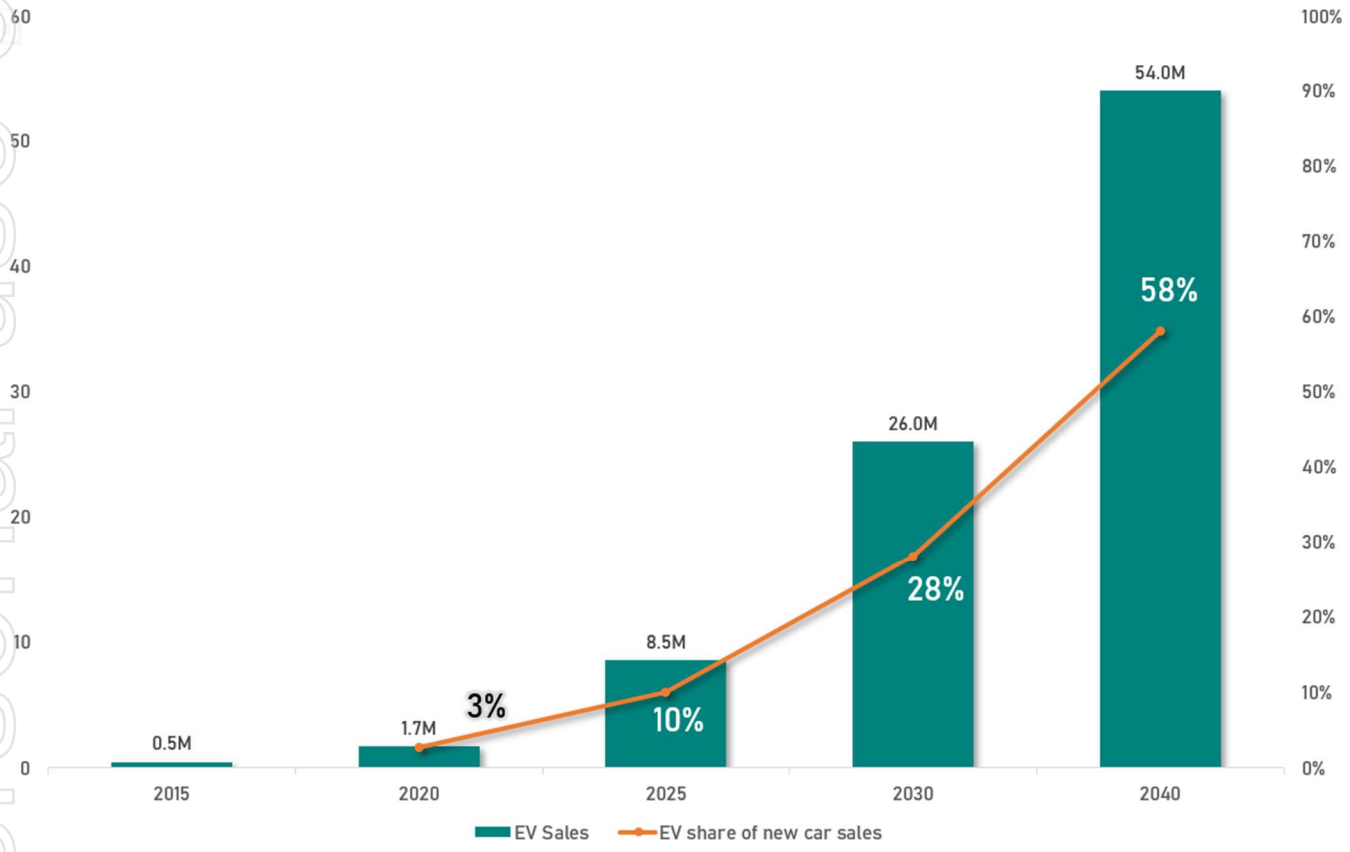


Figure 46: Global EV Sales
(Source: Bloomberg NEF Electric Vehicle Outlook 2020)

There are now over 7 million passenger EVs on the road and electrification is spreading to other segments of road transport. Automakers are accelerating their EV launch plans, partly to comply with increasingly stringent regulations in Europe and China.

The long-term outlook for EVs remains bright, as fundamental cost and technology improvements outweigh the short-term impacts of the Covid-19 pandemic. Some near-term EV model launches will be delayed, but manufacturers are committed to long-term electrification and by 2022 there will be over 500 different EV models available globally.

Bloomberg estimates that by 2025, EVs hit 10% of global passenger vehicle sales, rising to 28% in 2030 and 58% in 2040.

Sources: 1. Nouveau Monde Graphite (TSXV:NOU) – Corporate Presentation (January 2021)

Exceptional European Demand Growth Expected Driven by Regulation

Europe is the fastest growing market in the world for Li-ion batteries and currently sources all its anode materials from Asia. According to Deloitte, Europe will represent 27% of the global EV market by 2030 as policies adopted by the UK and European Union to regulate vehicle emissions and restrict new internal combustion vehicle sales come into force. By 2030, 42% of all new car sales in Europe are forecast to be EV sales.

To meet this demand, European mega-factory capacity is expected to grow by 228%, representing close to 20% of the world's mega-factory capacity by 2029[2].

Figure 47: European Battery Makers
(Source: After Roland Zenn)

Sources:
2. Benchmark Mineral Intelligence (September 2020)

Graphite is the Major Active Material in Li-ion Batteries

Strategic mineral supplies from sustainable sources are vital to OEMs' capacity to produce batteries, cars and energy storage systems[1]. With up to ten times more graphite by volume than lithium in a Li-ion battery (Figure 48), to meet demand for batteries, approximately 3.5 million tonnes graphite anode is required by 2029, up from 600,000 tonnes today[2] (Figure 49).

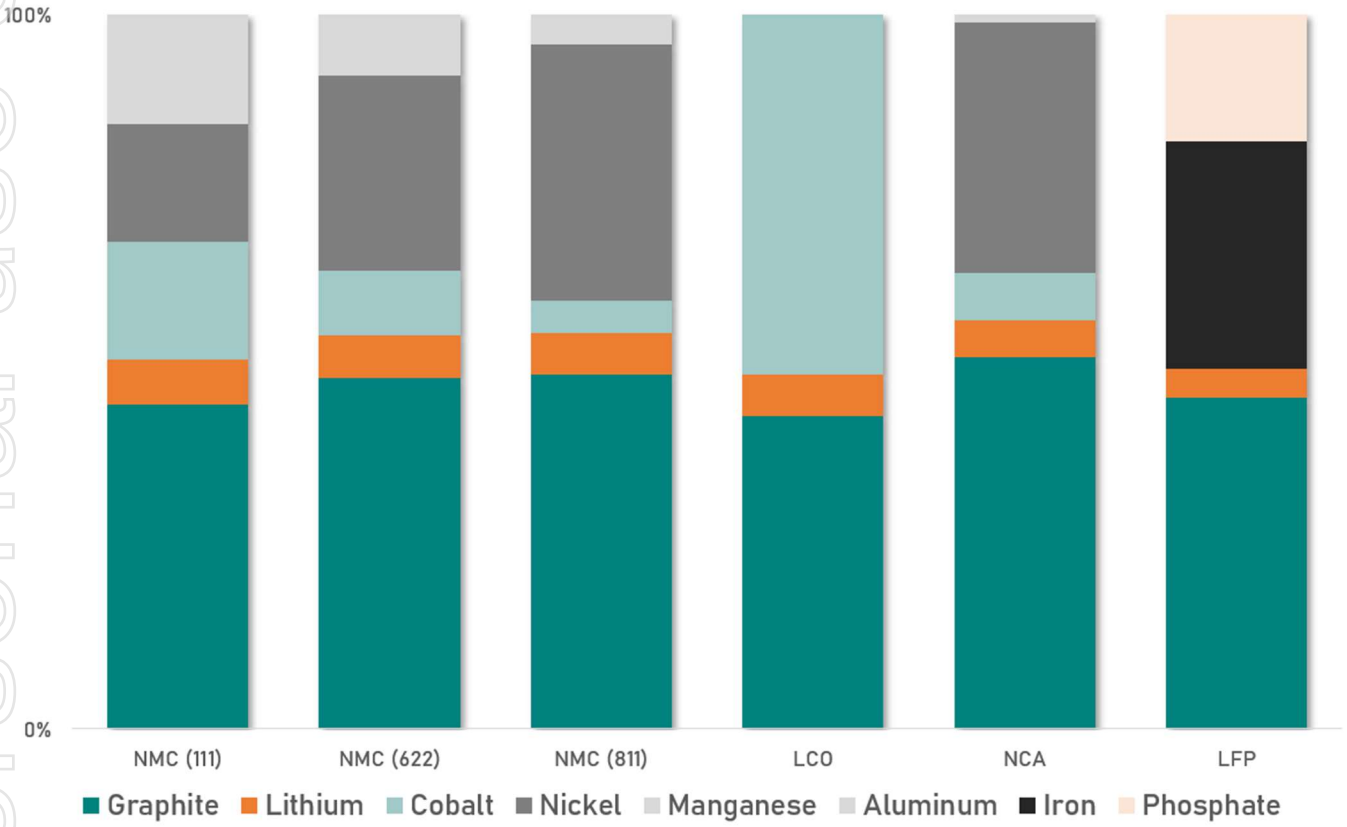


Figure 48: Composition of Major Li-ion Cathode Types
(Source: MRS Energy & Sustainability: A Review Journal)

Supply

China continues to be the world's leading producer of natural flake graphite, supplying approximately 62% of the market in 2020. Brazil, India, Canada, Mozambique, Madagascar and North Korea were major contributors of the remaining 38% of global production.

The supply-demand balance in the graphite market is forecast to remain in balance for an extended period. However, a significant supply deficit is anticipated by 2024 as demand is forecast to strengthen putting the market into deficit. Demand is expected to exceed global supply by 400,000 tonnes as early as 2026 expanding to over 8,000,000 tonnes by 2040. New production is needed to come online to meet the strong growth market.

Sources:
1. Nouveau Monde Graphite (TSXV:NOU) – Corporate Presentation (January 2021)
2. Talga Group Limited (ASX:TLG) – Investor Presentation (15 December 2020)

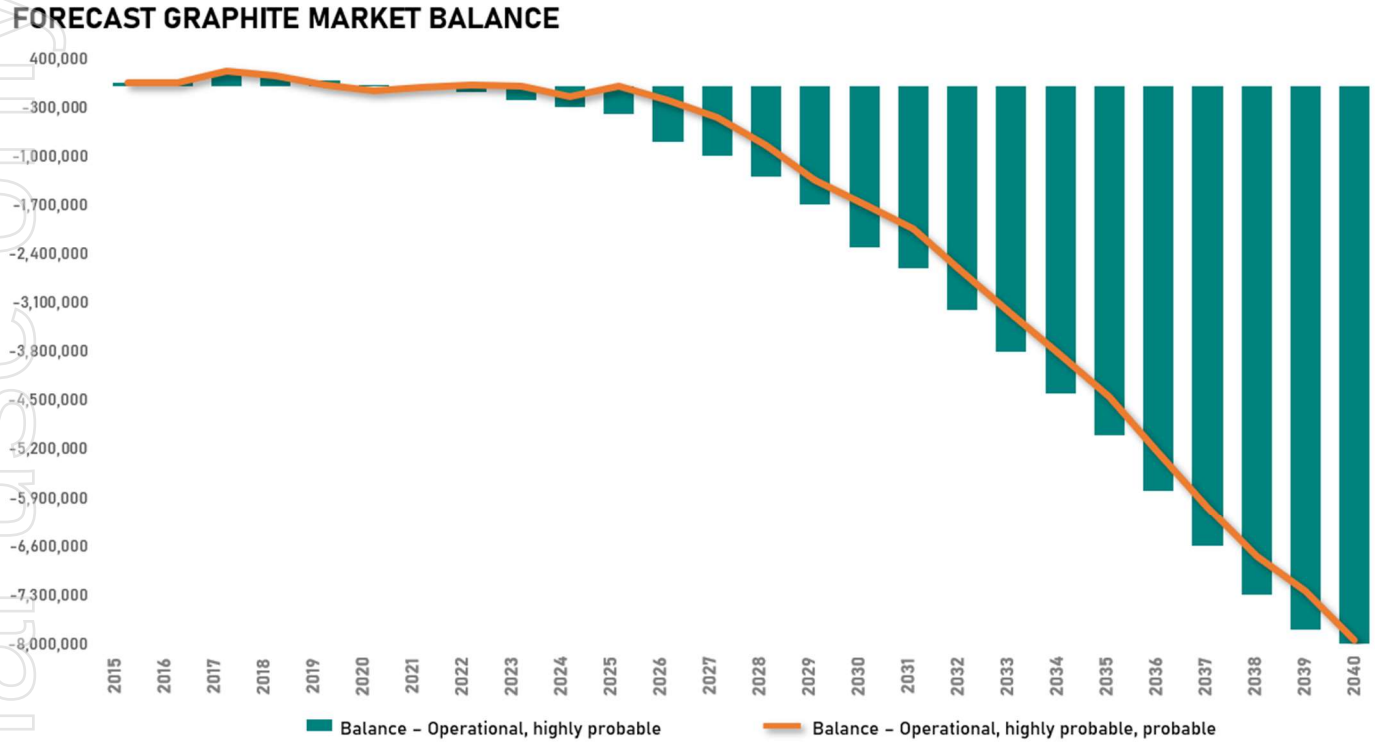


Figure 49: Flake Graphite Market Balance
(Source: Benchmark Mineral Intelligence Flake Graphite Forecasts; April 2020)

Marketing Strategy

Sovereign's market strategy is focused on initial entry into existing primary end-markets, including the refractory, foundry and expandable graphite sectors. The very low graphite production costs should allow Sovereign to compete aggressively on price point in global graphite markets.

The Company through its PFS level Malingunde graphite project has built a strong understanding of the graphite market and developed a number of well-established relationships with off-takers and customers.

Industry participants confirm that the highest value graphite concentrates remain the large, jumbo and super-jumbo flake fractions, primarily used in industrial applications such as refractories, foundries and expandable products. These sectors currently make up the significant majority of total global natural flake graphite market by value.

Sovereign engaged Fastmarkets, a specialist international publisher and information provider for the global steel, non-ferrous and industrial minerals markets, to assess the marketability of Sovereign's graphite product.

Fastmarket's assessment has confirmed that, based upon their high-level view on global demand and supply forecasts for natural flake graphite, and with reference to the specific attributes of Sovereign's graphite, there is a reasonable expectation that the product will be able to be sold into existing and future graphite markets. Given the extremely low-cost profile and high-quality product, it is expected that output from Kasiya will be able to fill new demand or displace existing lower quality / higher cost supply.

Industry's interaction with supply chain participants indicates the progression towards higher proportions of natural graphite used in battery anodes will be supported by its lower cost and superior environmental credentials. Environmental footprint of EVs will become increasingly important as EV penetration accelerates, noting that synthetic graphite is made from the by-product of energy intensive coking and oil refinery processes.

Price Forecast

The Company has taken a deliberately conservative view for its base-case Scoping Study scenario on graphite pricing.

The basket price used for the Study was based on current pricing sourced from independent consultant, Fastmarkets, and verified against published off-take agreement information in the market. The prices reported are in line with reported prices being received by other graphite producers with prices discounted by Sovereign to incorporate market establishment and agent fees.

Based on other guidance and other companies' reported basket prices the equivalent basket price for Kasiya is over US$2,000. However, Sovereign has adopted a conservative average basket price of US$1,085 across the LOM of the operation, a very substantial reduction from the forecast provided by Fastmarkets.

Table 6: Graphite Price Assumption

Flake Category	Micron (µm)	Distribution (% w/w)	Forecast Price US$/t	Contribution US$/t
Super Jumbo	+500	5.4	$2,100	$114
Jumbo	-500 +300	25.1	$1,600	$402
Large	-300 +180	30.9	$1,085	$335
Medium	-180 +150	10.9	$775	$86
Medium/Small	-150 +106	14.4	$605	$87
Small	-106 +75	7.5	$515	$38
Amorphous	-75	5.8	$425	$24
Total		**100**	**-**	**$1,085**

Totals that do not sum exactly are due to rounding

Figure 50: Sample de-sliming at the Company's laboratory facility in Malawi

COST ESTIMATIONS

Kasiya's low-cost profile is achieved through size, grade, location and infrastructure. Central Malawi boasts excellent existing infrastructure including hydro-power and an extensive sealed road network. Kasiya is strategically located in close proximity to the capital city of Lilongwe, providing access to a skilled workforce and industrial services.

The existing quality logistics route to the Indian Ocean deep water ports of Nacala and Beira for the export of products to global markets provides significant capital cost savings compared to other undeveloped projects.

The high-grade mineralisation occurring from surface results in no waste stripping and the amenability to hydro-mining means the mining cost component is relatively low.

Capital Costs

Capital estimates for the process plant have been prepared by DRA Global Ltd, together with input from the Company, using a combination of cost estimates from suppliers, historical data, benchmarks and other independent sources. The intended accuracy of the capital cost estimate for the Project is ±30%. A summary of the capital cost breakdown is presented in Table 7 below.

Table 7: Capital Cost Estimate

Description	Stage 1 US$m	Stage 2 US$m
Direct		
Mining	$2.4	$2.4
Plant – Rutile	$93.6	$93.6
Plant - Graphite	$34.1	$34.1
Infrastructure	$98.8	$98.7
Total Directs	$228.9	$228.8
Indirects		
Engineering, Procurement and Construction Management (**EPCM**)	$28.3	$22.9
Owner's Costs	$16.3	$2.8
Miscellaneous	$12.9	$4.6
Contingency (Stage 1: 30% & Stage 2: 20%)	$85.9	$51.8
Total Indirects	$143.4	$82.1
Total Start-up Capital	$372.3	$310.9

The Stage 1 capital cost estimate to first production in the Table 7 above is based on the same engineering and cost inputs as the December 2021 Scoping Study, with an increase to contingency allowance (21% to 30%) to account for escalation of capital costs due to inflation since the 2021 Scoping Study. The contingency for Stage 2 has been estimated at 20% of direct and indirect costs reflecting a lower risk profile as it is considered the knowledge derived from the operation of Stage 1 process plant should present opportunities for capital cost reductions due to process plant design optimization and utilization of some of the Stage 1 process plant facilities, utilities and infrastructure in Stage 2.

Mining is estimated on a contractor basis for the LOM. The capital costs estimated for mining in Table 7 above are the costs to establish the Company's own infrastructure. The estimates for the two plants are based on the flowsheets and mass balanced established during test work programs and outlined in the Metallurgy and Process section above.

Infrastructure costs cover the operational infrastructure to support the Project. For Stage 1, these include the grid power line to connect to the hydropower, access road, water storage dam, supporting pumping and pipeline, the construction costs for the initial TSF and the mobile fleet to service the operation. For Stage 2, the majority of the infrastructure costs estimated include provision for additional pumping and pipelines to service the second plant.

EPCM is an applied factor to the estimated plant and infrastructure direct costs. These costs include provisions for expatriate flight and travel costs during the construction period.

Due to the scale of the operation, an initial estimate for Corporate social responsibility (**CSR**) of US$80m has been included in this Study, with US$10m accounted for as capital under Owner's Costs with the remainder in sustaining capital.

Working capital requirements of US$34m (including contingency) for plant commissioning and full ramp-up are not included in the development capital estimate but are included in the financial model and reflected in the discounted cash flow (**DCF**) model.

Operating Costs

The operating costs for the production of rutile and graphite at Kasiya over the LOM is presented in Table 8 below.

Table 8: Operating Estimate (LOM)

Description	US$/t Mined Tonne	US$/t Product	US$/t Rutile (incremental)	US$/t Graphite (incremental)
Mining	$1.76	$96	$157	-
Processing – Rutile	$1.98	$108	$178	-
Processing - Graphite	$0.68	$37	-	$95
General & Administration	$0.62	$34	$56	-
Total Mine Gate	**$5.04**	**$275**	**$390**	**$95**
Logistics	$0.82	$45	$45	$45
Total Operating Costs	**$5.86**	**$320**	**$435**	**$140**

Mining costs have been estimated by Fraser Alexander, a regional leader in hydro-mining and materials handling. Mining costs have been built up from first principles based on equipment, vendor, and contractor quotations, local unit cost rates, and benchmarked costs. It has been assumed mining will be on an all-in contractor basis for the life of mine.

Processing costs include all the processing and tailings management operating costs for each of the two plants. All consumables and reagents (including flocculant) are included in these costs but the 5% Government royalty is excluded.

Labor costs have been developed based on a first-principles build-up of staffing requirements with labor rates from benchmarks for Malawi and expatriates from South Africa and other countries. Staffing costs for each domain have been allocated accordingly. Logistics costs were estimated by independent consultancy, Morgan Sterling.

It is estimated the operation will require US$239m of sustaining capital over the life of mine. Key items include US$30m for the transition from TSF disposal to in-pit disposal with US$15m in year 3 for Stage 1 and a further US$15m in year 5 for Stage 2.

Lowest on the Graphite Global Cost Curve

Sovereign undertook a benchmarking exercise comparing the co-product production cost of graphite from Kasiya to peer flake graphite projects. If flake graphite production is considered incremental to primary rutile production then the operating cost is US$140/t (FOB) of graphite produced.

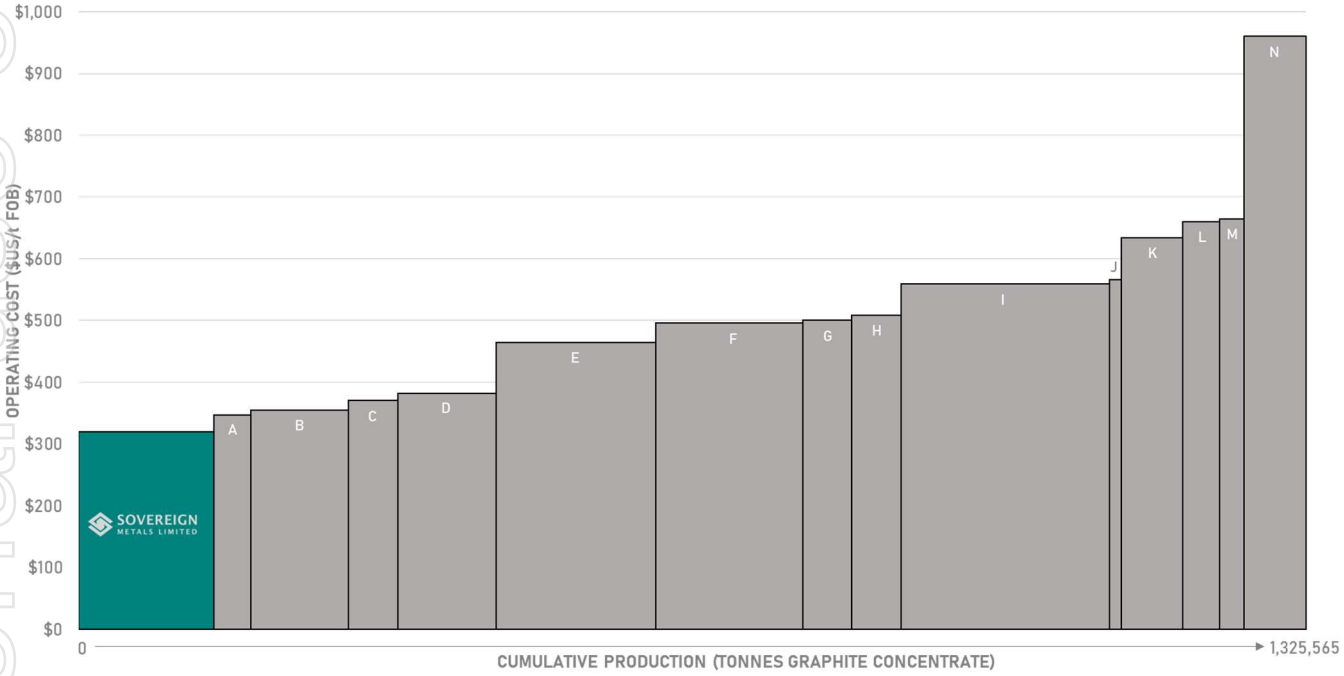


Figure 51: Actual and Forecast Graphite Production (non-Chinese)

(Sources: See Appendix 2; All costs presented as FOB and exclusive of royalties)*Syrah Resources (E) is the only producer and is presented as US$464 per tonne FOB (Q1 2022 results) with production based on last reported quarter on an annualised basis **Northern Graphite (L) costs and production include both Phase 1 (Feasibility Study) and Phase 2 (Preliminary Economic Analysis)

Such low flake graphite production costs at Kasiya, apart from the significant benefit of existing infrastructure, can be attributed to several factors including:

- The uniqueness of Kasiya in that flake graphite will be produced as a co-product, whereas typically natural graphite mines produce graphite as the primary product with little or no co- or by-products
- Proposed large-scale operation that will process soft, friable saprolite-hosted mineralisation mined from surface using low-cost hydro-mining methods. The significant cost savings, compared to hard-rock graphite peers are realised by Kasiya having no requirement for drilling, blasting, digging, trucking or primary crushing or grinding in the processing plant (Figure 52)

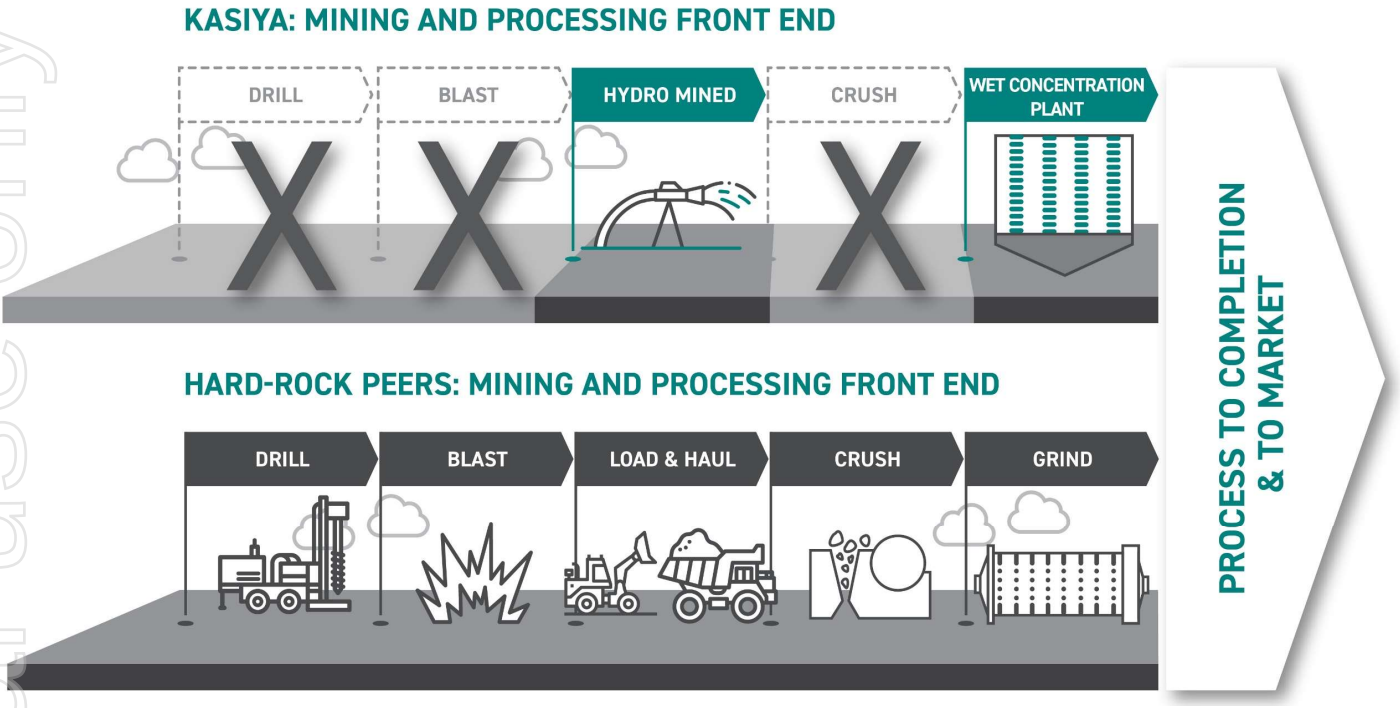


Figure 52: Schematic of Kasiya's co-product graphite mining and processing front end compared to hard-rock peers

FINANCIAL & ECONOMIC ANALYSIS

Modelling Assumptions

A detailed project economic model was prepared by the Company as part of the Study. The economics include the following key assumptions

- Capital and operating costs are in accordance with the technical study outcomes
- Construction is 24-months each for Stages 1 and 2
- Ramp-up is based on a 9-month time frame to nameplate production for each Stage
- Financial modelling has been completed on an annual basis
- Pricing information is as detailed in this announcement
- Corporate tax rate of 30%
- 5% royalty
- A 0.45% royalty for the community development fund.
- 2% vendor gross profit royalty

Table 9: Key Scoping Study Outcomes		
Outcome	**Unit**	**Kasiya Rutile Project**
NPV_8 (real post-tax)	US$	$1,538m
NPV_{10} (real post-tax)	US$	$1,185m
IRR (post-tax)	%	36%
NPV_8 (real pre-tax)	US$	$2,201m
NPV_{10} (real pre-tax)	US$	$1,706m
IRR (pre-tax)	%	41%
Total Revenue	US$	$12,038m
EBITDA (average LoM)	US$/y	$323m
Payback – from start of production	years	2.6 years
Payback – from start of construction	years	3.7 years
Government Royalties	US$	$602m
Corporate Taxes	US$	$2,138m

Sensitivity Analysis

The Study has been designed to a Scoping Study level with capital and operating cost accuracy of +/- 30%. Key inputs into the Study have been tested by capital cost, operating costs and price sensitivities.

Table 10: Post-Tax NPV Sensitivity			
NPV – Post tax			
6%	**8%**	**10%**	**12%**
$2,105m	$1,537m	$1,185m	$921m

Table 11: Pre-Tax NPV Sensitivity			
NPV – Pre tax			
6%	**8%**	**10%**	**12%**
$2,876m	$2,201m	$1,706m	$1,337m

Table 12: Post Tax NPV Sensitivity against Key Inputs

	Unfavourable change				Favourable change		
	-30%	-20%	-10%	Base	+10%	+20%	+30%
Product Prices	$683	$967	$1,252	$1,537	$1,821	$2,106	$2,390
Rutile Price	$974	$1,161	$1,349	$1,537	$1,724	$1,912	$2,100
Graphite Price	$1,246	$1,343	$1,440	$1,537	$1,634	$1,730	$1,827
Operating Cost	$1,304	$1,381	$1,459	$1,537	$1,615	$1,692	$1,770
Capital Cost	$1,398	$1,444	$1,491	$1,537	$1,583	$1,629	$1,675

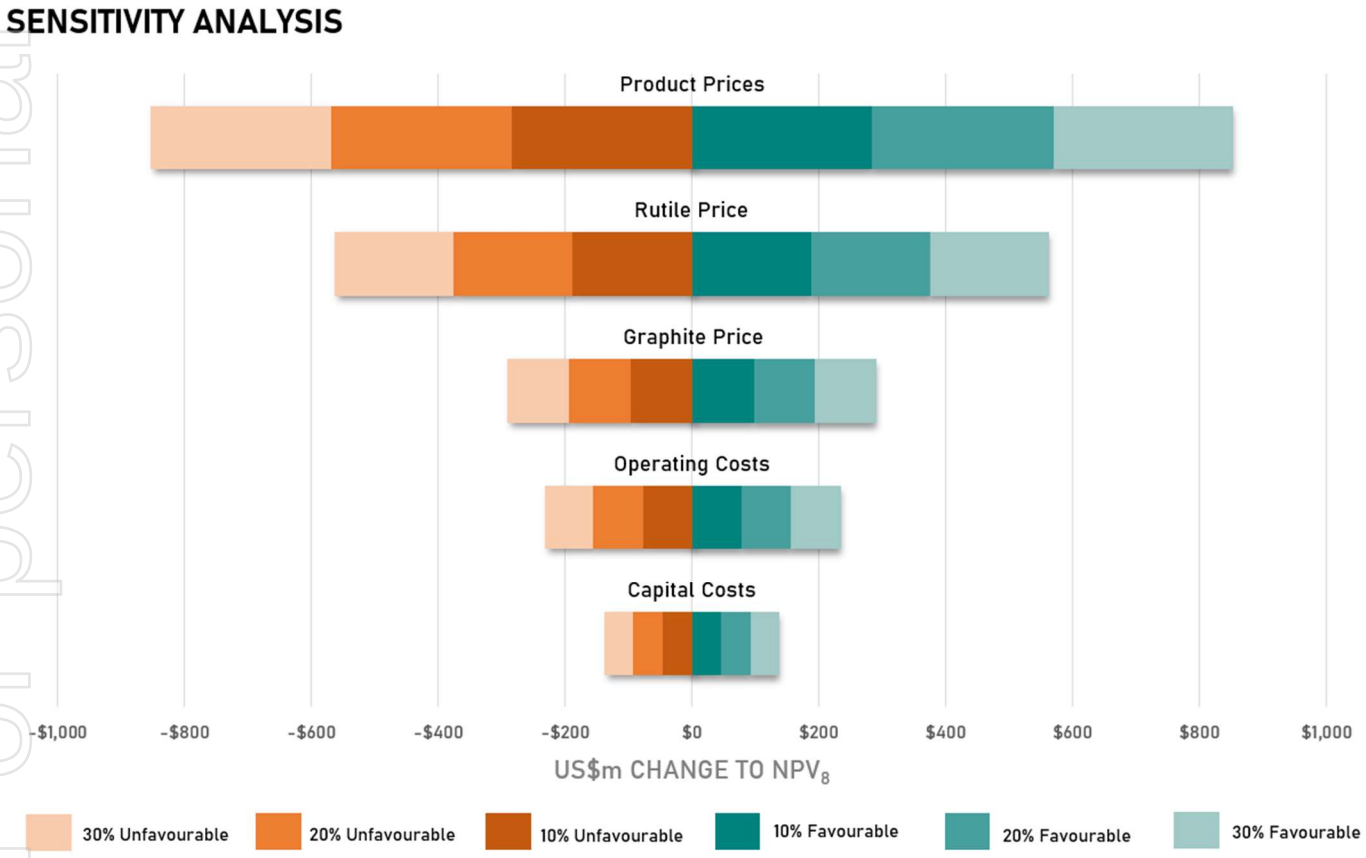


Figure 53: Sensitivity analysis of key inputs

PERMITTING

Sovereign is conducting exploration across its large ground package of over 2,682km^2. Sovereign's ground package is made up of eight Exploration Licences (**EL**) and one Retention Licence (**RL**) as summarised in Table 13. The ELs and RLs are held through SVM's wholly owned Malawian subsidiaries, Sovereign Services Limited (**SSL**) and McCourt Mining Limited (**MML**). The Kasiya Rutile Project is situated on EL0609.

Table 13: Tenement Summary

Licence	Holding Entity	Interest	Type	Licence Renewal Date	Expiry Term Date[1]	Licence Area (km^2)	Status
EL0609	MML	100%	Exploration	25/09/2024	25/09/2028	440.5	Granted
EL0582	SSL	100%	Exploration	15/09/2023	15/09/2027	285.0	Granted
EL0372	SSL	100%	Exploration	N/A	13/03/2022[2]	729.2	Granted
EL0492	SSL	100%	Exploration	29/01/2023	29/01/2025	935.4	Granted
EL0528	SSL	100%	Exploration	27/11/2021[3]	27/11/2025	16.2	Granted
EL0545	SSL	100%	Exploration	12/05/2022[3]	12/05/2026	53.2	Granted
EL0561	SSL	100%	Exploration	15/09/2023	15/09/2027	124.0	Granted
EL0574	SSL	100%	Exploration	15/09/2023	15/09/2027	292.0	Granted[4]
RL0012	SSL	100%	Retention	N/A	26/07/2026	6.0	Granted

Notes:

[1] An EL covering a preliminary period in accordance with the Malawi Mines and Minerals Act (2019) (**Mines Act**) is granted for a period not exceeding three (3) years. Thereafter two successive periods of renewal may be granted, but each must not exceed two (2) years. This means that an EL has a potential life span of seven (7) years. ELs that have come to the end of their term can be converted by the EL holder into a RL for a term of up to 5 years subject to meeting certain criteria.

[2] Prior to expiry of EL0372, the Company applied for the grant of a mining licence (**ML**) and a RL over separate parts of EL0372. Under the Mines Act, an EL term automatically extends until the ML application has been processed and/or granted.

[3] EL0528 and EL0545 currently under application for renewal.

[4] Relinquishment report submitted.

Subject to further successful exploration and achieving positive technical studies, Sovereign proposes to apply for a ML to secure mineral deposits for mining at Kasiya. Under the Mines Act there are certain requirements, milestones and approvals required in order to submit a ML application. At this point of Kasiya's development, the Company notes no known or material issues in this respect.

Under the Mines Act, The Government of Malawi shall have the right, but not the obligation, to acquire, directly or through a Government nominee, without cost, a free equity ownership interest of up to ten percent (10%) in any mining project that will be subject to a large-scale mining licence (>5Mt mined per annum or >US$250m Capex).

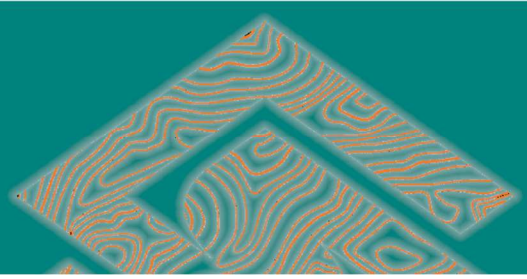
NEXT STEPS

The Company is targeting a number of significant milestones over the next two quarters which include;

- Continued product marketing and agreements regarding potential offtake
- Commencement of ESIA field data collection and continuation of community and stakeholder engagement activities
- Commencement of the Kasiya PFS with critical appointments to the owner's team and PFS consultants
- Infill drilling at Kasiya to increase MRE confidence in order to produce an Ore Reserve for the PFS
- Sovereign has commenced a comprehensive bulk scale metallurgy and downstream test work program to confirm the commercial potential of the graphite co-product from Kasiya.
- Commencement of discussion with the Government of Malawi on early stage permitting, social, environmental and fiscal aspects of the project

SOVEREIGN METALS LIMITED

DISCLOSURES, DISCLAIMERS, MODIFYING FACTORS & SOURCES



DISCLOSURES & DISCLAIMERS

Competent Person Statements

The information in this announcement that relates to Production Targets is based on and fairly represents information provided by Mr Ryan Locke, a Competent Person, who is a Member of The Australasian Institute of Mining and Metallurgy. Mr Locke is employed by Orelogy Group Pty Ltd, an independent consulting company. Mr Locke has sufficient experience, which is relevant to the style of mineralisation and type of deposit under consideration, and to the activity he is undertaking, to qualify as a Competent Person as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Mr Locke consents to the inclusion in the Announcement of the matters based on his information in the form and context in which it appears.

The information in this announcement that relates to Processing, Infrastructure and Capital and Operating Costs is based on and fairly represents information compiled or reviewed by Mr Matthew Langridge, a Competent Person, who is a Fellow Member of The Australasian Institute of Mining and Metallurgy. Mr Langridge is employed by DRA Global Ltd, an independent consulting company. Mr Langridge has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activities undertaken. Mr Langridge, consents to the inclusion in the Announcement of the matters based on his information in the form and context in which it appears.

The information in this announcement that relates to Metallurgy - rutile is based on and fairly represents information compiled or reviewed by Mr Paul Marcos, a Competent Person, who is a Fellow Member of The Australasian Institute of Mining and Metallurgy. Mr Marcos is an employee of Sovereign and a holder of shares and performance rights in Sovereign. Mr Marcos has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken, to qualify as a Competent Person as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Mr Marcos consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.

The information in this announcement that relates to Metallurgy - graphite is based on and fairly represents information compiled or reviewed by Mr Russell Bradford, a Competent Person, who is a Fellow Member of The Australasian Institute of Mining and Metallurgy. Mr Bradford is employed by Jem-Met Pty Ltd, an independent consulting company. Mr Bradford is a holder of shares and performance rights in Sovereign. Mr Bradford has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activities undertaken. Mr Bradford consents to the inclusion in the Announcement of the matters based on his information in the form and context in which it appears.

The information in this announcement that relates to the Mineral Resource Estimate is extracted from the announcement dated 5 April 2022. The announcement is available to view on www.sovereignmetals.com.au. Sovereign confirms that a) it is not aware of any new information or data that materially affects the information included in the announcement; b) all material assumptions included in the announcement continue to apply and have not materially changed; and c) the form and context in which the relevant Competent Persons' findings are presented in this report have not been materially changed from the announcement.

Forward Looking Statement

This release may include forward-looking statements, which may be identified by words such as "expects", "anticipates", "believes", "projects", "plans", and similar expressions. These forward-looking statements are based on Sovereign's expectations and beliefs concerning future events. Forward looking statements are necessarily subject to risks, uncertainties and other factors, many of which are outside the control of Sovereign, which could cause actual results to differ materially from such statements. There can be no assurance that forward-looking statements will prove to be correct. Sovereign makes no undertaking to subsequently update or revise the forward-looking statements made in this release, to reflect the circumstances or events after the date of that release.

This ASX Announcement has been approved and authorised for release by the Board of Directors.

Further Important Information for this Announcement

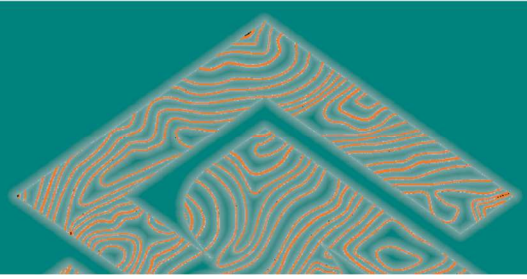
This Study has been prepared and reported in accordance with the requirements of the JORC Code (2012) and relevant ASX Listing Rules.

The Study has been prepared to an accuracy level of ±30%. The primary purpose of the Study is to establish whether or not to proceed to the next stage of feasibility studies. The Study results should not be considered a profit forecast or production forecast. As defined by the JORC Code, a "Scoping Study is an order of magnitude technical and economic study of the potential viability of Mineral Resources. It includes appropriate assessments of realistic assumed Modifying Factors together with any other relevant operational factors that are necessary to demonstrate at the time of reporting that progress to a Pre-Feasibility Study can be justified."

The Modifying Factors included in the JORC Code have been assessed as part of the Study, including mining, processing, infrastructure, economic, marketing, legal, environmental, social and government factors. The Company has received advice from appropriate experts when assessing each Modifying Factor.

Following an assessment of the results of the Study, the Company has formed the view that the next stage of feasibility studies is justified for Kasiya. Feasibility Studies will provide the Company with far more comprehensive assessment of a range of options for the technical and economic viability of Kasiya which by international standards should be sufficient detail for project development financers to base an investment decision.

The Company has concluded it has a reasonable basis for providing any of the forward-looking statements included in this announcement and believes that it has a reasonable basis to expect that the Company will be able to fund its stated objective of completing feasibility studies for Kasiya. All material assumptions on which the forecast financial information is based are set out in this announcement.



SUMMARY OF MATERIAL ASSUMPTIONS

Material assumptions used in the estimation of the production target and associated financial information are set out in the following table.

Table XX: Assumptions

Assumption	Input
Maximum accuracy variation - Capital costs	+30%/-30%
Maximum accuracy variation - Operating costs	±30%
Minimum LoM	25 years
Annual average throughput (tonnes) – Stage 1	12,000,000
Annual average throughput (tonnes) – Stage 2	24,000,000
Annual throughput (tonnes) – LoM average	21,600,000
Head grade – rutile	1.14%
Recovery – rutile	98%
Product grade (TiO_2) - rutile	95%
Head grade – graphite	1.52%
Recovery – graphite	62%
Product grade (TGC) - graphite	96%
Annual production (average LoM) – rutile (tonnes)	242,000
Annual production (average LoM) – graphite (tonnes)	155,000
USD:AUD	0.73
USD:MWK	0.0012
USD:ZAR	0.0690
Sales Price – rutile (average LoM)	US$1,308/t
Sales Price – graphite (average LoM)	US$1,085/t
Government Royalty	5% of net sales revenue
Vendor Royalty	2% of gross profit
Community Development Fund	0.45% of net sales revenue
Stage 1 Capital	US$372m
Stage 2 Capital	US$311m
Working Capital	US$34m
Sustaining Capital	US$239m
Operating Costs including royalties (LoM) – FOB Nacala	US$320/t
Corporate Tax Rate	30%
Discount Rate	8%

MODIFYING FACTORS

The Modifying Factors included in the JORC Code (2012) have been assessed as part of the Expanded Scoping Study, including mining, processing, metallurgical, infrastructure, economic, marketing, legal, environmental, social and government factors. The Company has received advice from appropriate experts when assessing each Modifying Factor.

A summary assessment of each relevant Modifying Factor is provided below.

***Mining** – refer to section entitled 'Mining' in the Announcement.*

The Company engaged independent consultants Orelogy Mining Consultants Pty Ltd and Fraser Alexander to carry out the pit optimisations, mine design, scheduling and mining cost estimation for the Kasiya Scoping Study. The proposed mining method is hydro mining with minor dozer assistance. This is considered appropriate for this style of shallow, saprolite-hosted rutile and graphite mineralisation. This methodology is used across numerous mineral sands operations, particularly in Africa, and is well suited for this style of mineralisation.

61% of the total production target is in the Indicated resource category with 39% in the Inferred resource category. 100% of the scheduled throughput over the first eight and a half years of production is in the Indicated category, with 0% in the Inferred category- the payback period for the Project is 2.6 years from the start of operations. The Company has concluded that it has reasonable grounds for disclosing a production target which includes a modest amount of Inferred material. However, there is a low level of geological confidence associated with Inferred mineral resources and there is no certainty that further exploration work (including infill drilling) on the Kasiya deposit will result in the determination of additional Indicated mineral resources or that the production target itself will be realised.

***Metallurgy and Processing** – refer to section entitled 'Metallurgy and Process Design' in the Announcement.*

Rutile

The Company completed bulk rutile test-work programs at the globally recognised Allied Mineral Laboratories (**AML**) in Perth, Australia. The latest program was supervised by Sovereign's Head of Development, Paul Marcos. Mr Marcos is a metallurgist and process engineer and a mineral sands industry veteran. Bulk test-work programs have confirmed premium grade rutile can be produced via a simple and conventional process flow sheet.

Processing engineering was completed by DRA Global who developed the process plant design and associated cost estimate for the Scoping Study. An average product grade of 96% TiO_2 and average recovery of 98% for rutile has been applied in the Scoping Study.

Graphite

The Company engaged veteran graphite metallurgist Oliver Peters, MSc, P.Eng., MBA (Consulting Metallurgist for SGS and Principal Metallurgist of Metpro Management Inc.) to complete initial test-work for graphite recovery. Mr Peters has over 25 years' experience in metallurgy on graphite and other commodities. He has operated numerous graphite pilot plants and commissioned a number of full-scale processing facilities. Mr Peters has developed the process flowsheet employed for the Malingunde PFS which has been largely adopted for this Study. DRA's Senior Engineer, Stewart Calder considers this appropriate based on the similarities of the material and the early stage of the project.

Processing engineering was completed by DRA Global who developed the process plant design and associated cost estimates for the Scoping Study. Overall average graphite recovery applied was 62% with gravity tails recovery being 74% and flotation plant recovery being 84%. Overall concentrate grades average 96% C(t) with 60% of the graphite flake product being larger than 180µm.

Rutile & Graphite

It is acknowledged that laboratory scale test-work will not always represent actual results achieved from a production plant in terms of grade, chemistry, sizing and recovery. Further test-work will be required to gain additional confidence of specifications and recoveries that will be achieved at full-scale production.

Overall, the process flow-sheet is conventional for both rutile and graphite with no novel features or equipment incorporated.

***Infrastructure** – refer to section entitled 'Infrastructure' in the Announcement.*

Kasiya is located approximately 40km north west of Lilongwe, Malawi's capital, and boasts excellent access to services and infrastructure. The site is serviced by a dual lane, sealed bitumen road that links to Lilongwe and the underutilised operational intermodal rail siding at Kanengo.

The proximity to Lilongwe gives the project a number of benefits, including access to a large pool of professionals and skilled tradespeople, as well as industrial services.

The Company appointed JCM Power (**JCM**) to design a preliminary Independent Power Producer (**IPP**) solution for Kasiya. JCM is a Canada-headquartered IPP which develops, constructs, owns and operates renewable energy and storage projects in emerging markets across the globe. JCM provided an estimated, levelized cost of energy (**LOCE**) on a Power Purchase Agreement (**PPA**).

Transport cost estimates were provided by Morgan Sterling Consultants (**MSC**) based on market data, suppliers' quotations, industry databases, industry contacts and MSC's existing knowledge of southern African transport infrastructure and freight markets. MSC is an independent consultant with substantial experience in the management of transport logistics studies in southern Africa.

***Marketing** – refer to sections entitled 'Marketing Strategy' in the Announcement.*

Rutile

The Company engaged market leading TZMI to provide a bespoke marketing report to support the Scoping Study. TZMI is a global, independent consulting and publishing company which specialises in technical, strategic and commercial analyses of the opaque (non-terminal market) mineral, chemical and metal sectors.

TZMI's assessment has confirmed that, based upon their high-level view on global demand and supply forecasts for natural rutile, and with reference to the specific attributes of Kasiya, there is a reasonable expectation that the product will be able to be sold into existing and future rutile markets.

Given the premium specifications of Kasiya's natural rutile, the product should be suitable for all major natural end-use markets including TiO_2 pigment feedstock, titanium metal and welding sectors.

Graphite

The Company engaged Fastmarkets, a specialist international publisher and information provider for the global steel, non-ferrous and industrial minerals markets, to prepare a marketing report for graphite.

Fastmarkets' assessment has confirmed that based upon their high-level view on global demand and supply forecasts for natural flake graphite, and with reference to the specific attributes of Sovereign's projects, there is a reasonable expectation that the product from Sovereign's projects will be able to be sold into existing and future graphite markets. Given the extremely low-cost profile and high-quality product, it is expected that output from Kasiya will be able to fill new demand or substitute existing lower quality / higher cost supply.

Project considerations taken by Fastmarkets in forming an opinion about the marketability of product include:

- Modest production target
- Low capital costs (incremental)
- Low operating costs
- High quality concentrate specifications

Industry participants confirm that the highest value graphite concentrates remain the large, jumbo and super-jumbo flake fractions, primarily used in industrial applications such as refractories, foundries and expandable products. These sectors currently make up the significant majority of total global natural flake graphite market by value.

Fastmarkets have formed their opinion based solely upon project information provided by Sovereign Metals to Fastmarkets and have not conducted any independent analysis or due diligence on the information provided.

***Economic** – also refer to sections entitled 'Cost Estimations' and 'Financial & Economic Analysis' in the Announcement.*

Capital estimates for the procress plant have been prepared by DRA, together with input from the Company and other contributing consultants using combinations of cost estimates from suppliers, historical data, benchmarks and other independent sources. The intended accuracy of the initial capital cost estimate for the Project is ±30%.

Capital costs include the cost of all services, direct costs, contractor indirects, EPCM expenses, non-process infrastructure, sustaining capital and other facilities used for the mine. Capital costs make provision for mitigation expenses and mine closure and environmental costs.

Working capital requirements of US$34m (including contingency) for plant commissioning and full ramp-up have been excluded in the headline capital estimate but included in the financial modelling.

Mining costs have been estimated by Fraser Alexander, a regional leader in hydro-mining and materials handling. Mining costs have been built up from first principles based on equipment, vendor, and contractor quotations, local unit cost rates, and benchmarked costs.

Labor costs have been developed based on a first-principles build-up of staffing requirements with labor rates benchmarked in Malawi and expatriate rates benchmarked for professionals from South Africa and other jurisdictions.

A Government royalty of 5% (applied to revenue) and a vendor profit share of 2% (applied to gross profit) has been included in all project economics. A 0.45% royalty (applied to revenue) has been applied for the community development fund.

Rehabilitation and mine closure costs are included within the reported operating cost and sustaining capital figures.

A detailed financial model and discounted cash flow (**DCF**) analysis has been prepared by the Company in order to demonstrate the economic viability of the Project. The financial model and DCF were modelled with conservative inputs to provide management with a baseline valuation of the Project.

The DCF analysis demonstrated compelling economics of the prospective Project, with an NPV (ungeared, after-tax, at an 8% discount rate) of US$1,537 million, and an (ungeared) IRR of 36%.

Sensitivity analysis was performed on all key assumptions used. The robust project economics insulate the Kasiya Project from variation in market pricing, capital expense, or operating expenses. With a rutile and graphite concentrate price 30% lower than the Scoping Study prices the Project still displays a positive NPV (ungeared, after-tax, at an 8% discount rate) of US$683 million and IRR of 22%.

Payback period for the Project is 2.6 years from the start of production. The payback period is based on free-cash flow, after taxes.

Sovereign estimates the total capital cost to construct the mine to be US$372m (which includes a contingency of 30% of direct and indirect costs).

Key parameters are disclosed in the body of the announcement, and include:

- Life of Mine: 25 years
- Discount rate: 8%
- Tax rate: 30%
- Resource Rent Tax (RRT) of 15% after tax profit is currently legislated in the Taxation Act. It is understood that it is not currently being applied to mining projects in Malawi and it is uncertain if it would apply to Sovereign's projects in the future. The Company has not applied RRT in any of its financial analysis.
- Royalty rate: 5% royalty (Government), 2% of gross profit (Original Project Vendor) and 0.45% Community Development Fund.
- Pricing: Rutile average price of US$1,308 per tonne and Graphite average basket price of US$1,085 per tonne

The financial model has been prepared internally by the Company using inputs from the various expert consultants and has been reviewed by BDO an independent leading accountancy, tax and advisory services firm to validate the functionality and accuracy of the model.

The Company engaged the services of advisory firm, Argonaut, with regards to project economics. Argonaut is a financial advisory firm which specialises in multiple sectors, including metals and oil & gas. Argonaut is well regarded as a specialist capital markets service provider and has raised project development funding for companies across a range of commodities including the industrial and speciality minerals sector. Following the assessment of a number of key criteria, Argonaut has confirmed that, on the basis that a DFS arrives at a result that is not materially negatively different than the Scoping Study as noted above, all in-country government and regulatory approvals are received, commercial offtake agreements are in place for the majority of Rutile and Graphite production for at least the first five years of mine life, and that there has not been any material adverse change in financial condition, results of operations, business or prospects of the Company/or political and business environment in Malawi and/or financial or capital markets in general, Sovereign should be able to raise sufficient funding to develop the Project.

An assessment of various funding alternatives available to Sovereign has been made based on precedent transactions that have occurred in the mining industry, including an assessment of alternatives available to companies that operate in industrial and specialty minerals sector. The assessment and advice from Argonaut Capital (referred to above) indicates that financing for industrial mineral companies often involves a broader mix of funding sources than just traditional debt and equity. Argonaut Capital considers that given the nature of the Project, funding is likely to involve specialist funds, with potential funding sources including, but not limited to, traditional equity and debt, royalty financing and off-take agreements, at either the corporate or project level. It is important to note that no funding arrangements have yet been put in place as these discussions continue to take place. The composition of the funding arrangements ultimately put in place may also vary, so it is not possible at this stage to provide any further information about the composition of potential funding arrangement.

Since initial exploration of the Kasiya Project in November 2019, the Company has completed extensive drilling, sampling, metallurgical test-work, geological modelling and defined an Indicated and Inferred Mineral Resource Estimate. Over this period, with these key milestones being attained and the Project de-risked, the Company's market capitalisation has increased from approximately A$18m to over A$210m. As the Project continues to achieve key milestones, which can also be significant de-risking events, the Company's share price could be anticipated to increase.

The Company is debt free and is in a strong financial position, with approximately A$20m cash on hand (31 May 2022). The current financial position means the Company is soundly funded to continue into a PFS phase to further develop the Project.

The Company's shares are listed on the ASX and AIM which are premier markets for growth companies and provides increased access to capital from institutional and retailed investors in Australia and the UK.

Sovereign has an experienced and high-quality Board and management team comprising highly respected resource executives with extensive technical, financial, commercial and capital markets experience. The directors have previously raised more than A$1.75bn from capital markets for a number of exploration and development companies.

As a result, the Board has a high level of confidence that the Project will be able to secure funding in due course, having particular regard to:

1. Required capital expenditure;
2. Sovereign's market capitalisation;
3. Recent funding activities by directors in respect of other resource projects;
4. Recently completed funding arrangements for similar or larger scale development projects;
5. The range of potential funding options available;
6. The favourable key metrics generated by the Kasiya Project;
7. Ongoing discussions for potential offtake agreements; and
8. Investor interest to date.

Environmental, Social, Legal and Governmental *– refer to section entitled 'Environmental & Social Impact' in the Announcement.*

Sovereign is committed to conduct its activities in full compliance to the requirements of national regulations, its obligations under international conventions and treaties and giving due consideration to international best practices and policies. The Company has appointed an experienced environmental consultant to manage the ESIA process, and environmental and social baseline studies have commenced with appropriately qualified independent experts. The Company has also completed a high-level risk assessment to identify major environmental and social risks which could affect the development of the Project, along with mitigating strategies to allow identified risks to be addressed early in the project design phase.

The Company has embarked on several community engagement exercises in the area and there is a general positive acceptance of the Project. Social responsibility costs of US$80m have been included in this Study, as well as a 0.45% revenue royalty for the community development fund. This figure will be further assessed as part of the overall ESIA for the Project as it advances to PFS and DFS.

Based on the current assessments and commenced ESIA, the Company believes there are no environmental issues currently identified that cannot be appropriately mitigated in accordance with standard practices adopted for the development of mining projects.

Subject to further successful exploration and achieving positive technical studies, Sovereign endeavours to apply for a ML to secure mineral deposits for mining. Under the Mines Act there are certain requirements, milestones and approvals required prior to submission of a ML application. At this point of Kasiya's development, the Company notes no known issues or impediments obtaining a ML under normal coarse of business.

Under the Mines Act, The Government of Malawi shall have the right, but not the obligation, to acquire, directly or through a Government nominee, without cost, a free equity ownership interest of up to ten percent (**10%**) in any mining project that will be subject to a large-scale mining licence (>5Mt mined per annum or >US$250m Capex).

SOURCES

APPENDIX 1 – MINERAL SANDS PEER INFORMATION

Reference	Company	Project	Stage of Development	Revenue to Cost ratio	Source
Ilmenite -Madagascar	Base Resources	Toliara	FS Complete	3.5	ASX Announcement: https://wcsecure.weblink.com.au/pdf/BSE/02426235.pdf
Ilmentie – Western Australia	Strandline	Coburn	Construction	2.4	Investor Presentation: https://www.strandline.com.au/irm/PDF/35d74951-750a-4bdf-8234-62e58a2d10a9/InvestorPresentation
Zircon – Western Australia	Sheffield Resources	Thunderbird	FS Complete	2.1	ASX Announcement: https://www.sheffieldresources.com.au/site/PDF/1b39388b-3a10-4733-9976-167a3d4a2333/BFSUpdateMateriallyImprovesProjectEconomics
Ilmenite – Greenland	Bluejay Mining	Dundas	FS Complete	2.0	Investor Presentation: https://bluejaymining.com/wp-content/uploads/2021/09/Jay-Corporate-September-2021-1.pdf

APPENDIX 2 – GRAPHITE PEERS INFORMATION

	Company	Project	Stage of Development	Operating Costs (FOB) *US$/t*	Steady State Production *tpa*	Current Production *tpa*	Source
A	Walkabout Resources	Lindi	Construction	347	40,000	n/a	ASX Announcement: Updated DFS Confirms Standout Graphite Project (7 Mar 2019)
B	Renascor	Siviour	DFS Complete	355	105,000	n/a	ASX Announcement: Siviour Definitive Feasibility Study (11 Nov 2019)
C	Mason Graphite[1]	Lac Gueret	FS Complete	370	51,865	n/a	SEDAR FILING: NI 43-101 Technical Report: Feasibility Study Update of the Lac Gueret Graphite Project (12 Dec 2018)
D	Nouveau Monde[1]	Matawinie	Construction	382	100,000	n/a	SEDAR FILING: NI 43-101 Technical Feasibility Study Report for the Matawinie Graphite Project (10 Dec 2018)
E	Syrah Resources[2]	Balama	Production	464	184,000	46,000	ASX Announcement: Q1 2022 Quarterly Activities Report (27 Apr 2022)
F	NextSource Materials	(Molo Phase 2)	PEA Complete	496	150,000	n/a	Press Release: MD&A March 2022 (16 May 2022)
G	Ecograf	Epanko	BFS Complete	500	60,000	n/a	ASX Announcement: Positive Response to Proposed US$60m Epanko Debt Financing (10 Mar 2019)
H	SRG Mining	Lola	FS Complete	508	55,000	n/a	SEDAR FILING: Lola Graphite Project NI 43-101 Technical Report - Feasibility Study (16 Aug 2019)
I	Magnis Energy	Nachu	BFS Complete	559	220,000	n/a	ASX Announcement: Nachu Bankable Feasibility Study Finalised (31 Mar 2016)
J	NextSource Materials	(Molo Phase 1)	Construction	566	17,000	n/a	SEDAR Filing: 2021 Annual Information Form (28 Sep 2021)
K	Triton Minerals	Ancuabe	DFS Complete	634	60,000	n/a	COMPANY PRESENTATION: Developing the World Class Ancuabe Graphite Project (16 Feb 2022)
L	Northern Graphite[3]	Bisset Creek	FS & PEA	660	44,000	n/a	COMPANY PRESENTATION: Building the leading public graphite company (May 2022)
M	Volt Resources	Bunyu (Stage 1)	FS Complete	664	23,700	n/a	ASX Announcement: Positive Stage 1 Feasibility Study For Bunyu Graphite Project, Tanzania (30 Jul 2018)
N	Graphite One	Graphite One	PEA Complete	960	60,000	n/a	NI 43-101 Preliminary Economic Analysis On the Graphite One Project (30 Jun 2017)

1. Canadian dollar (CAD) costs converted to US$ at CAD1.307 / US$
2. Operating costs shown are actual C1 cash costs for Q1 2022; Steady State Production is last quarter natural graphite production annualised
3. Includes Phase 1 (Feasibility Study Stage) and Phase 2 (PEA Stage)

APPENDIX 3 – RUTILE MINERAL RESOURCES INFORMATION

Ref	Company	Project	Status	Source
1	Iluka Resources	Sierra Rutile	Production & Development	Iluka Resources Limited's 2021 Annual Report (released on ASX 24/02/2022)
2	Iluka Resources	Balranald	Development	Iluka Resources Limited Annual Ore Reserve and Resources as at 31 December 2021: https://iluka.com/CMSPages/GetFile.aspx?guid=213396d8-1630-49ff-8d1b-fe4b1ee71e7e
3	Base Resources	Kwale	Production	Updated Kwale North Dune and maiden Bumamani Mineral Resource Estimate (released on ASX 19/02/2021)

Detailed Mineral Resources by Category

1. Iluka Resources – Sierra Rutile			
	Mt	**Rutile Grade***	**In-situ Rutile**
Measured	178	1.4%	2.4
Indicated	309	1.0%	3.1
Inferred	265	1.0%	2.6
Total	**752**	**1.1%**	**8.1**
2. Iluka Resources - Balranald			
	Mt	**Rutile Grade***	**In-situ Rutile**
Measured	12	3.8%	0.5
Indicated	28	4.3%	1.2
Inferred	13	3.0%	0.4
Total	**53**	**3.7%**	**2.0**
3. Base Resources - Kwale			
	Mt	**Rutile Grade***	**In-situ Rutile**
Measured	160	0.3%	0.3
Indicated	91	0.2%	0.2
Inferred	13	0.2%	0.2
Total	**254**	**0.2%**	**0.7**

* Rutile grade calculated as HM% times rutile % of assemblage

APPENDIX 4 – GRAPHITE RESOURCE INFORMATION

Ref	Company	Project	Project Status	Source
1	Syrah Resources	Balama	Production	Syrah Resources Limited's 2021 Annual Report (released on ASX 24/02/2022)
2	Volt Resources	Bunyu	FS Complete	Volt Resources Limited's 2021 Annual Report (released on ASX 29/09/2021)
3	Black Rock Mining	Mahenge	FS Complete	ASX Announcement: Black Rock Mining confirms 25% increase in Measured Mineral Resource, now the largest in class globally (released 3/02/2022)
4	Mason Graphite	Lac Gueret	FS Complete	Mason Graphite's Corporate Presentation released July 2021
5	Magnis Energy	Nachu	BFS Complete	Magnis' Corporate Presentation released February 2022
6	NextSource Materials	Molo	PEA Complete	https://www.nextsourcematerials.com/graphite/molo-graphite-project/
7	Graphite One	Graphite One	PEA Complete	https://www.graphiteoneinc.com/graphite-one-increases-tonnage-grade-and-contained-graphite-of-measured-and-indicated-and-inferred-resources-in-updated-mineral-resource-estimate/
8	Focus Graphite	Lac Tetepisca	Resource	https://focusgraphite.com/focus-graphite-reports-major-maiden-mineral-resource-estimate-at-lac-tetepisca-quebec/

Detailed Mineral Resources by Category

1. Syrah Resources – Balama			
	Mt	**TGC (%)**	**In-situ TGC**
Measured	23	17.5%	4.0
Indicated	378	11.2%	42.3
Inferred	1,020	9.8%	100.0
Total	**1,421**	**10.3%**	**146.3**
2. Volt Resources - Bunyu			
	Mt	**TGC (%)**	**In-situ TGC**
Measured	20	5.3%	1.1
Indicated	155	5.0%	7.8
Inferred	286	4.9%	14.0
Total	**461**	**4.9%**	**22.6**
3. Black Rock Mining – Mahenge			
	Mt	**TGC (%)**	**In-situ TGC**
Measured	32	8.6%	2.7
Indicated	85	7.8%	6.6
Inferred	97	7.4%	7.2
Total	**213**	**7.8%**	**16.6**
4. Mason – Lac Gueret			
	Mt	**TGC (%)**	**In-situ TGC**
Measured	19.0	17.9%	3.4
Indicated	46.5	16.9%	7.9
Inferred	17.6	17.3%	3.4
Total	**83.2**	**17.6%**	**14.7**

5. Magnis - Nachu			
	Mt	**TGC (%)**	**In-situ TGC**
Measured	63	4.7%	3.0
Indicated	61	5.7%	3.5
Inferred	50	5.8%	2.9
Total	**174**	**5.4%**	**9.3**
6. NextSource - Molo			
	Mt	**TGC (%)**	**In-situ TGC**
Measured	160	0.3%	0.3
Indicated	91	0.2%	0.2
Inferred	13	0.2%	0.2
Total	**254**	**0.2%**	**0.7**
7. Graphite One – Graphite One			
	Mt	**TGC (%)**	**In-situ TGC**
Measured	2	8.0%	0.1
Indicated	9	7.7%	0.7
Inferred	92	8.0%	7.3
Total	**103**	**8.0%**	**8.2**
8. Focus – Lac Tetepisca			
	Mt	**TGC (%)**	**In-situ TGC**
Measured	-	-%	-
Indicated	59	10.6%	6.3
Inferred	15	11.1%	1.6
Total	**74**	**10.6%**	**7.9**