



**SOVEREIGN**  
METALS LIMITED

POSITIONING TO BECOME A GLOBAL MARKET LEADER IN GRAPHITE SUPPLY

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ONE PROJECT | TWO CRITICAL MINERALS | TARGETING NET ZERO

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## COMPETENT PERSONS STATEMENT

The information in this presentation that relates to Production Targets, Ore Reserves, Processing, Infrastructure and Capital Operating Costs, Metallurgy (rutile and graphite) is extracted from the announcement dated 28 September 2023 entitled 'Kasiya Pre-Feasibility Study Results'. Sovereign confirms that: a) it is not aware of any new information or data that materially affects the information included in the original announcement; b) all material assumptions and technical parameters underpinning the Production Target, and related forecast financial information derived from the Production Target included in the original 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 presentation have not been materially modified from the Announcement.

The information in this presentation that relates to the Mineral Resource Estimate is extracted from the announcement entitled 'Kasiya Indicated Resource Increased by over 80%' dated 5 April 2023 and is based on, and fairly represents information compiled by Mr Richard Stockwell, a Competent Person, who is a fellow of the Australian Institute of Geoscientists (AIG). Mr Stockwell is a principal of Placer Consulting Pty Ltd, an independent consulting company. The original announcement is available to view on [www.sovereignmetals.com.au](http://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 original announcement; b) all material assumptions included in the original 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 announcement have not been materially changed from the original announcement.

# POSITIONING TO BECOME MARKET LEADER IN TWO CRITICAL MINERALS



**#1**

**LARGEST PRODUCTION**

**#1**

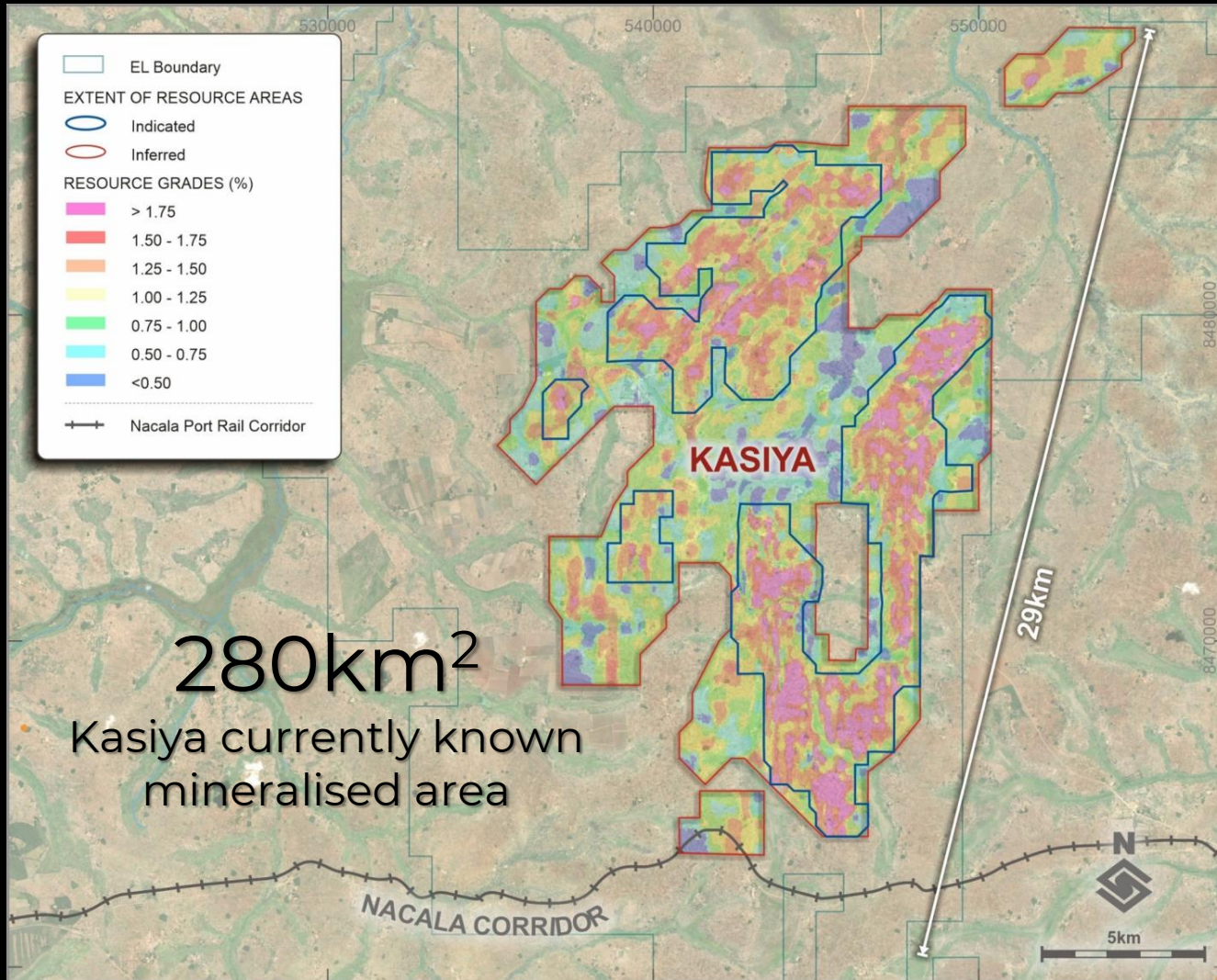
**LOWEST COST**

**#1**

**LOWEST CO<sub>2</sub>-FOOTPRINT**



# KASIYA – A ONCE IN A GENERATION DISCOVERY



World's 2<sup>nd</sup> largest  
flake graphite  
resource

**24.4 Mt**

World's largest  
known rutile  
(Titanium) deposit

**17.9 Mt**



Poised to be the World's Largest  
and lowest cost producer of  
Graphite

**25 yrs**

Modelled Initial Life

**US\$404/t**

Operating Costs  
(FOB Nacala)





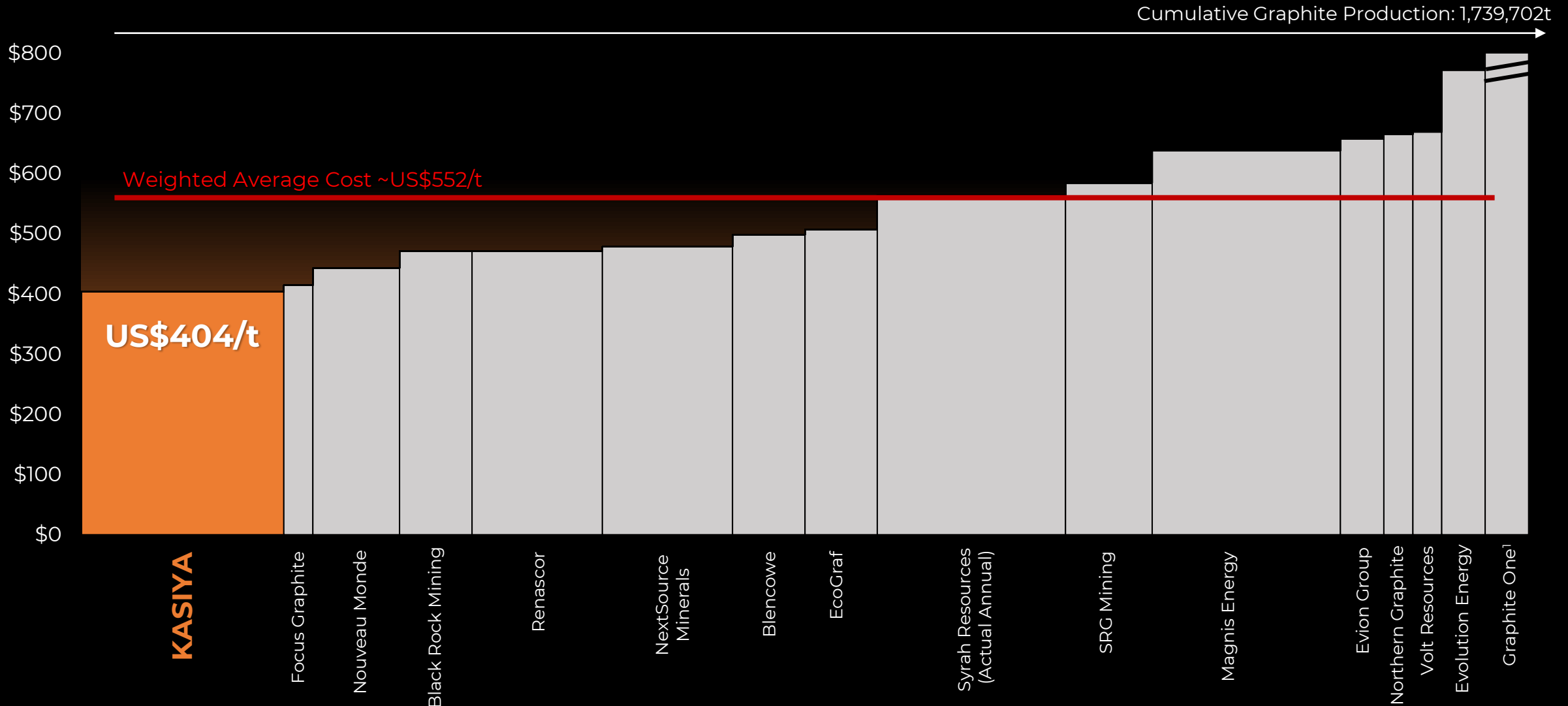
**OPERATING KASIYA FOR 25 YEARS  
WOULD ONLY MINE**

**30%**

**OF THE CURRENTLY KNOWN  
MINERALISATION**

# LOWEST COST GRAPHITE PRODUCER

Graphite cost curve (US\$/t FOB)



Source: Company Disclosures; refer to Appendix 11

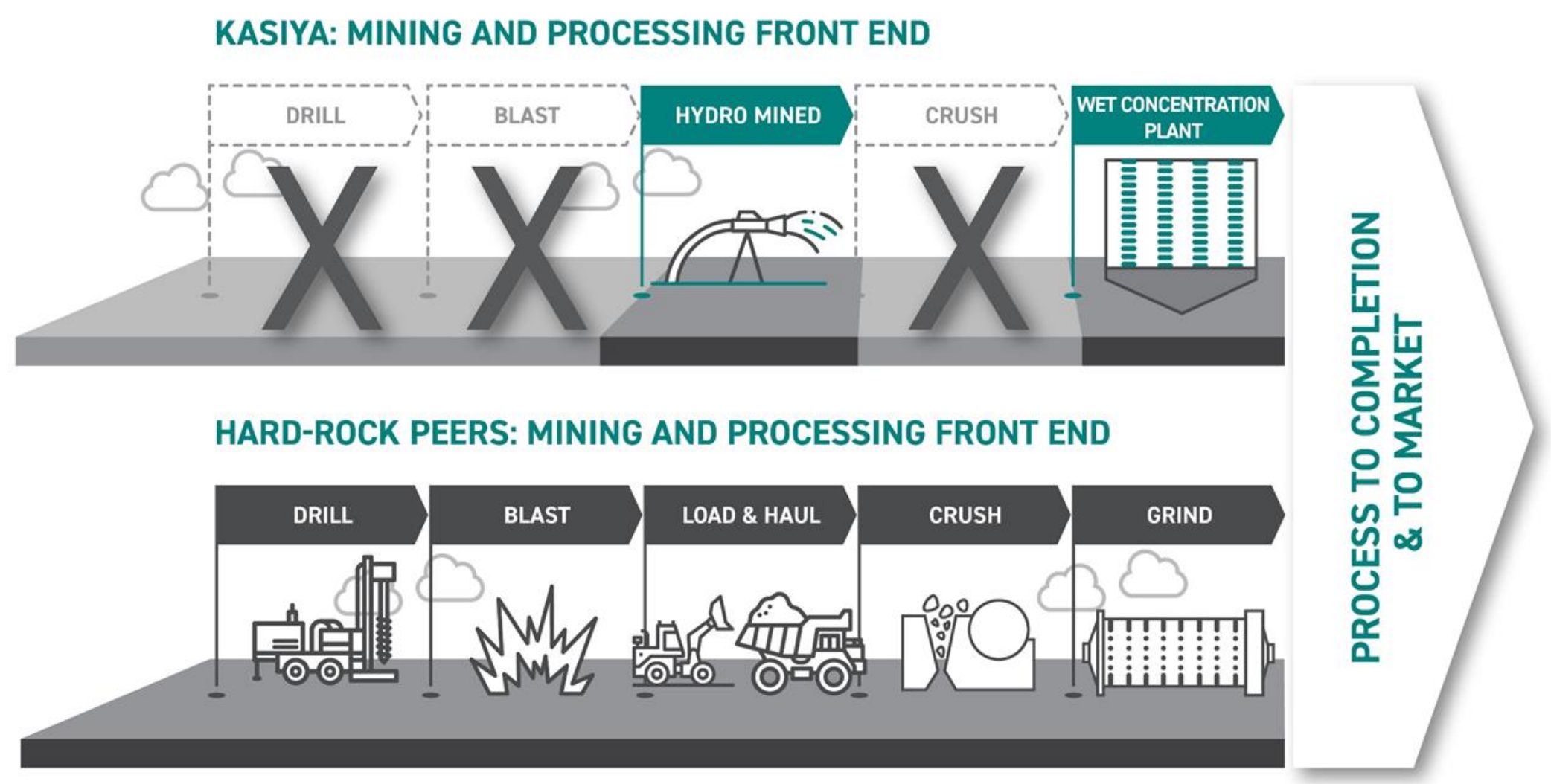
1. Graphite One operating cost of US\$1,394/t



# SOFT, FRIABLE (EASILY CRUMBLLED) ORE



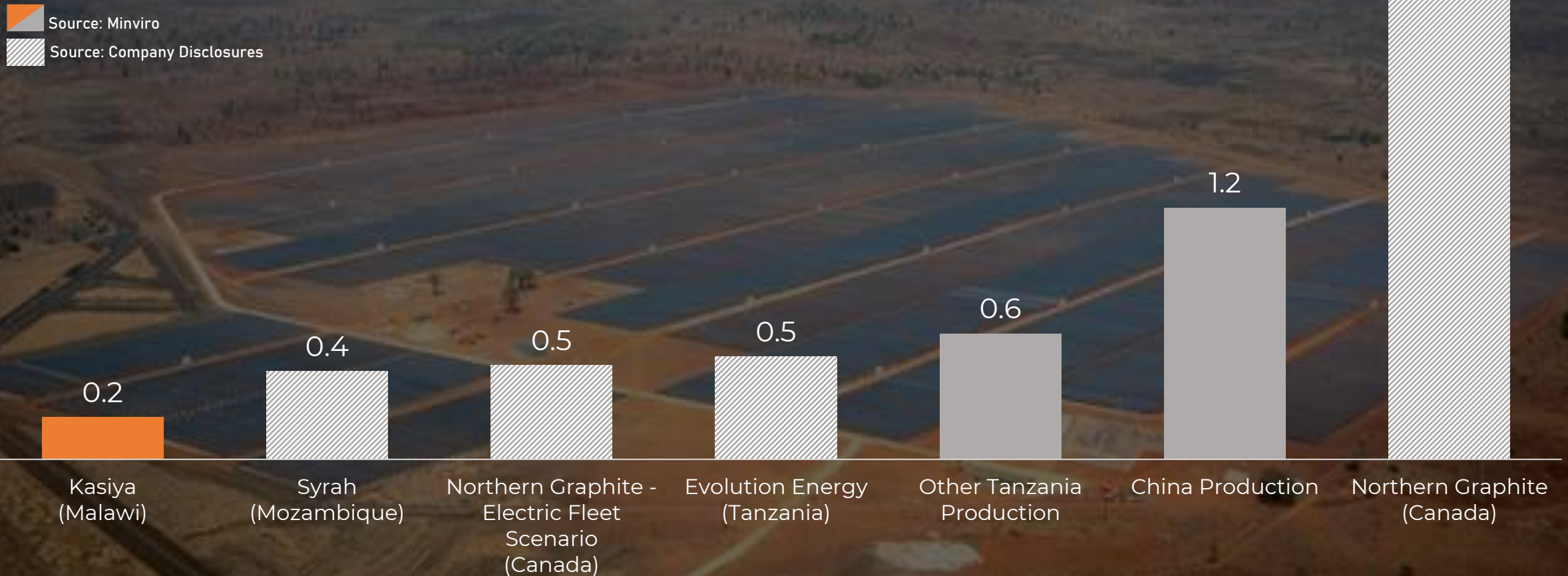
# SIGNIFICANT COST AND ENVIRONMENTAL BENEFITS COMPARED TO HARD ROCK GRAPHITE DEPOSITS





# LOWEST CO<sub>2</sub>-FOOTPRINT

Global Warming Potential of Current and Future Graphite Supply (CO<sub>2</sub> equivalent / tonne)





MALAWI

KASIYA

MOZAMBIQUE

NACALA PORT

NACALA LOGISTICS CORRIDOR

SENA LOGISTICS CORRIDOR

BEIRA PORT

Existing logistics infrastructure connects Kasiya to key global markets





# MINING IS CENTRAL TO MALAWI'S ECONOMIC DEVELOPMENT STRATEGY

“

*Malawi is poised to benefit from a package committed by the US towards development projects and programs on the African continent*

*- His Excellency President Lazarus Chakwera at the 2<sup>nd</sup> US-Africa Leaders' Summit 2022*

“

*The recent discovery in Malawi of the largest deposit of rutile in the world means that Malawi's economic rise is imminent*

*- His Excellency President Lazarus Chakwera speaking at the UN General Assembly in 2022*



# SOVEREIGN METALS – MORE THAN JUST A “MINING COMPANY”



**Equal opportunities & diversity**



**Community initiatives**



**Promoting education**



**Advancing local infrastructure**



# ADVANCING KASIYA TOWARDS PRODUCTION WITH RIO TINTO

## RioTinto

**US\$110Bn**

Market Cap listed in UK, USA and Australia

**35 Countries**

Operations in iron ore, copper, aluminium, critical minerals etc.

**US\$26.3Bn**

Underlying 2022 EBITDA

**52,000+**

Employees servicing 2,000 customers across the globe

**150 yrs+**

Mining experience and knowledge over generations

- ☑ One of the worlds largest mining companies
- ☑ World's largest titanium feedstock producer
- ☑ Battery minerals division
- ☑ Global MOUs with various OEMs

# MALAWI LAB PRODUCING GRAPHITE CONCENTRATE





**LARGE RESOURCE  
& PRODUCTION**



Multi-generational  
graphite and rutile  
supply

**LOW-COST  
PRODUCER**



Able to withstand  
economic cycles

**LOW CO<sub>2</sub>-  
FOOTPRINT**



Low-emissions  
critical minerals  
supply chain

**INFRASTRUCTURE  
IN PLACE**



Access to global  
anode and titanium  
market

**EXPERT STRATEGIC  
PARTNER**



Technical expertise  
to develop a world-  
class project



**SOVEREIGN**  
METALS LIMITED

Positioned to supply the world with economically and environmentally sustainable graphite and titanium feedstock for generations

# THANK YOU

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METALS LIMITED





# APPENDICES

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# Key PFS Results



Exceptional Economic Returns

**US\$1,605M**

After Tax NPV<sub>8</sub>

**28%**

After Tax IRR

**US\$415M**

Ave. Annual EBITDA



Poised to be the World's Largest Producers of Rutile and Graphite

**222ktpa**

Ave. Annual Rutile Production

**244ktpa**

Ave. Annual Graphite Production

**25 yrs**

Modelled Initial Life



Lowest Global Cost Producer of Rutile and Graphite

**US\$404/t**

Operating Costs (FOB Nacala)

**US\$597M**

Capex to First Production

**64%**

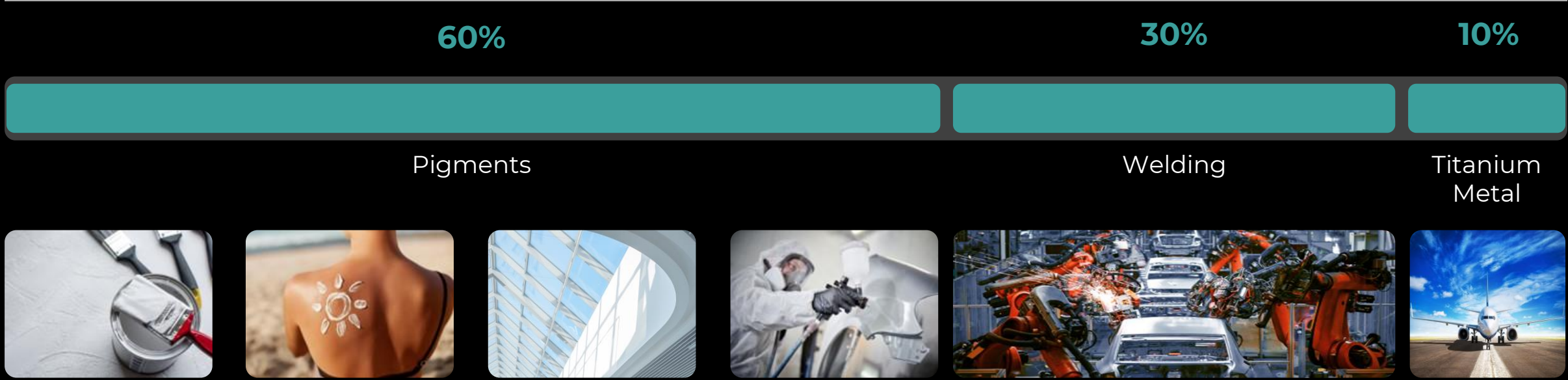
EBITDA Margin



# Natural Rutile

Highest grade, naturally found titanium feedstock  
Used in various multi-billion-dollar end-use industries  
Critical Mineral for the US and EU

## Demand



# Kasiya rutile LCA indicates low carbon-footprint

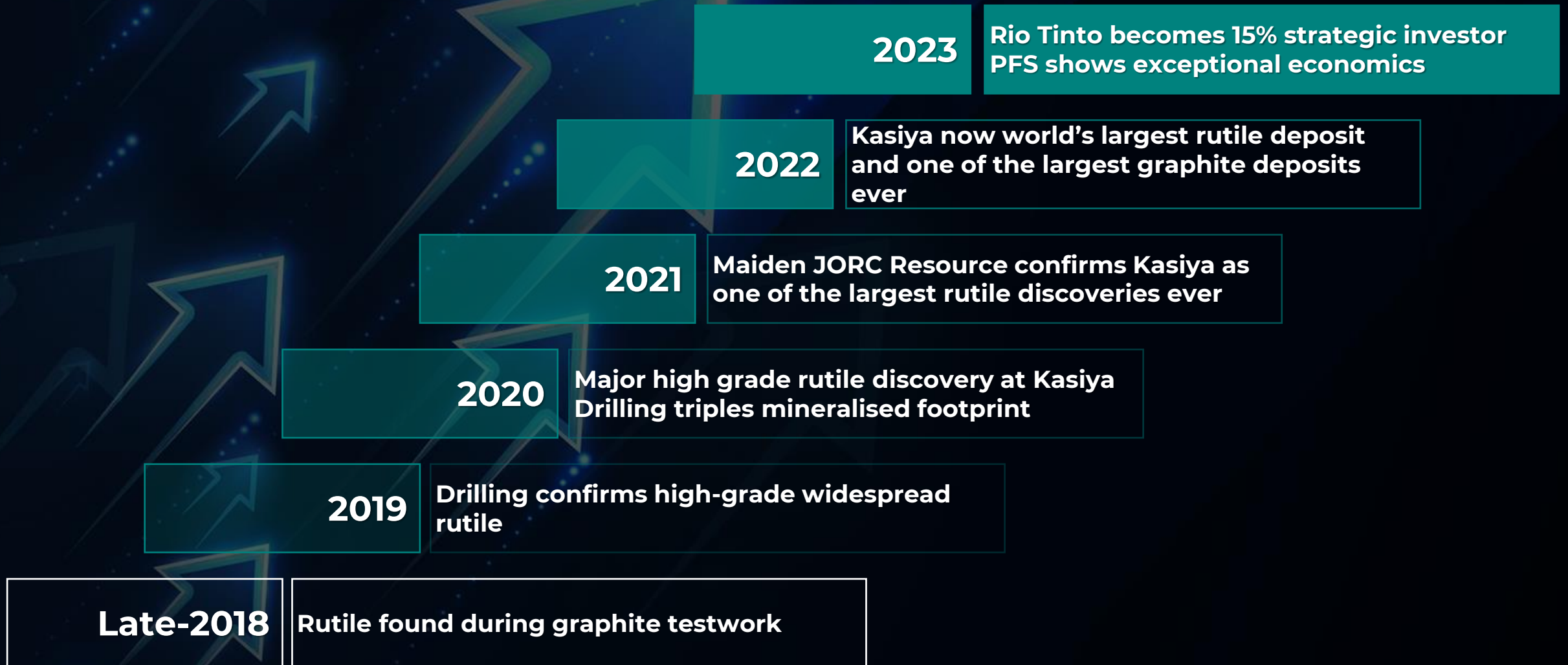
Scope 1 and 2 Global Warming Potential impact of natural rutile production from Kasiya as a titanium feedstock vs. alternatives (CO<sub>2</sub> equivalent / tonne)



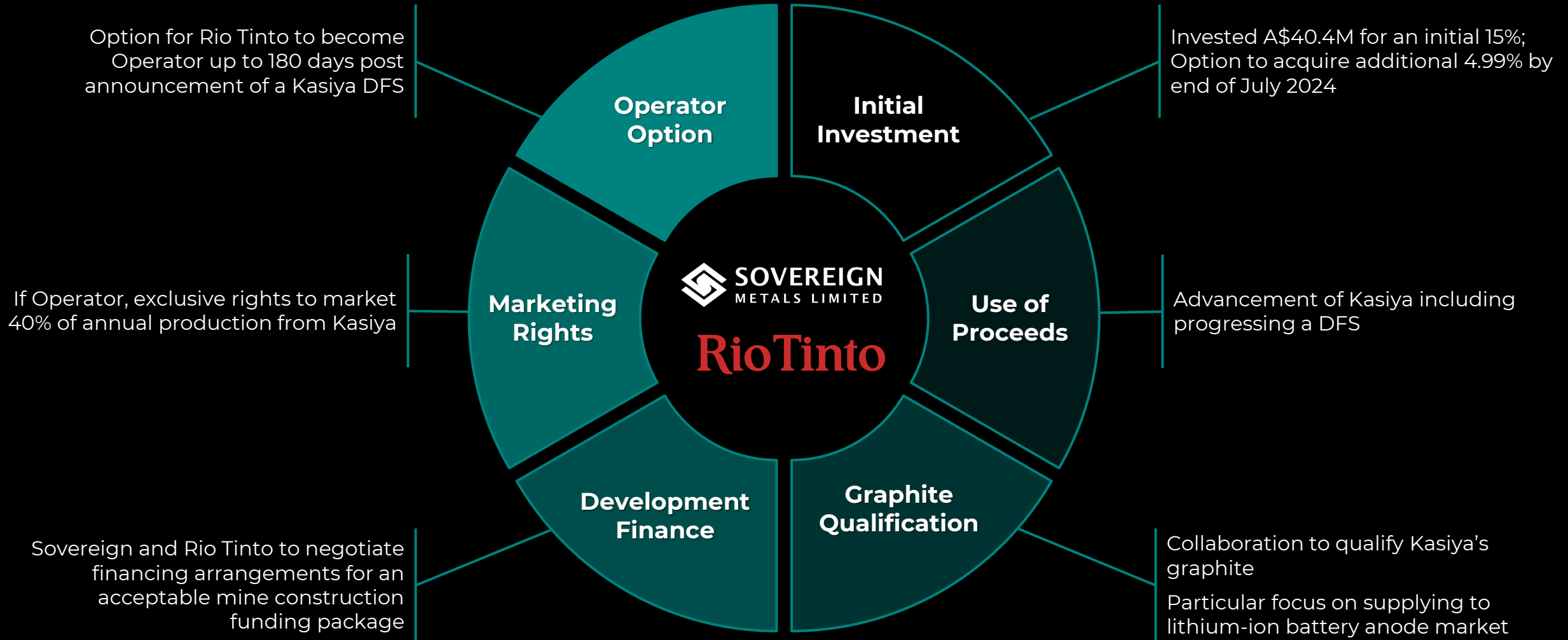
Source: Sovereign Metals; Minviro  
Figures relate to previous Scoping Studies conducted on the Kasiya Rutile-Graphite Project



# From discovery to PFS in four years



# Rio Tinto Strategic Investment in Sovereign Metals





# Rio Tinto Activity in Titanium and Battery Minerals

## Rio Tinto Titanium

### World's Largest Titanium Slag Producer

**1,200ktpa**

Titanium dioxide produced in 2022

### Existing Operations in Africa

Richards Bay Minerals (74%) – South Africa  
QIT Madagascar Minerals (80%) – Madagascar  
Rio Tinto Iron and Titanium (100%) – Canada

## Battery Minerals

**2021**

Battery Minerals Division set up

### Battery Lab

End-to-end battery laboratory to become operational in November 2023 to test performance of Rio Tinto's minerals and other products in batteries

### MoUs with Major OEMs

Rio Tinto has multiple MoUs with major OEMs to jointly develop more sustainable and secure supply chains for battery and low-carbon materials to be used in EV



**VOLVO**

# Strong Support from the Government of Malawi



We applaud the timely investment by Rio Tinto as it will mark a milestone towards realizing the country's aspirations of a prosperous Malawi

Government's commitment to ensuring growth of the mining sector...establishing a conducive investment environment

**Ministry of Mining, Government of Malawi**



Malawi's economic development strategy focus on attracting investors to three sectors:

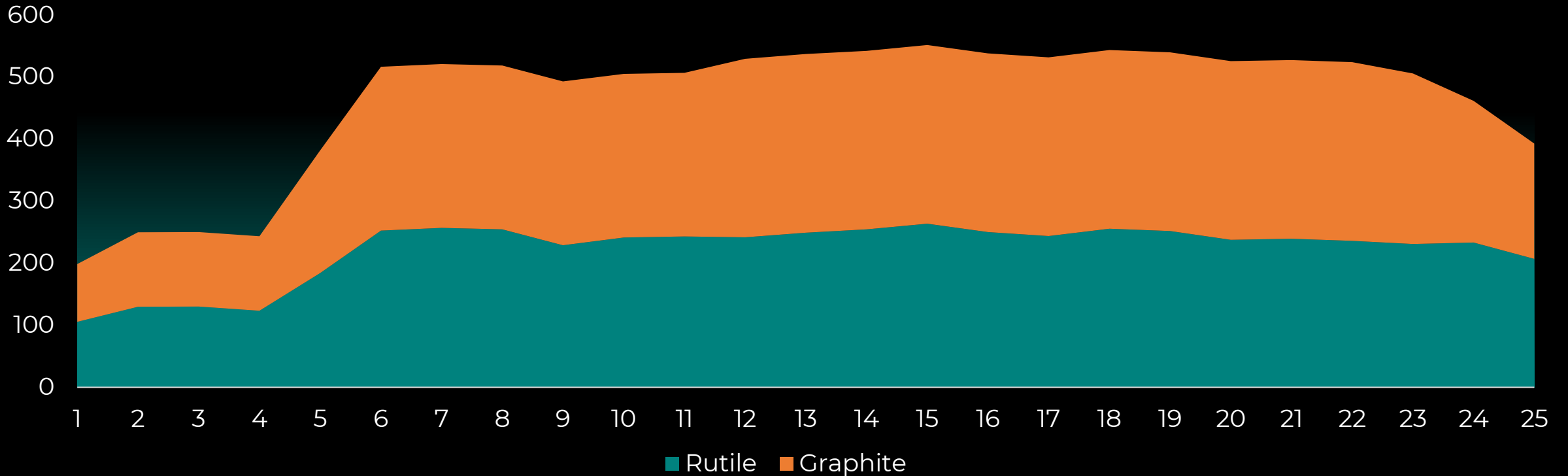
**Agriculture – Tourism – Mining**

**Inter-ministerial Project Development Committee** constituted to work alongside Sovereign to assist in the permitting processes



# Large-scale, long-life project

Rutile and Graphite Production Profile over 25-year initial mine life (ktpa)



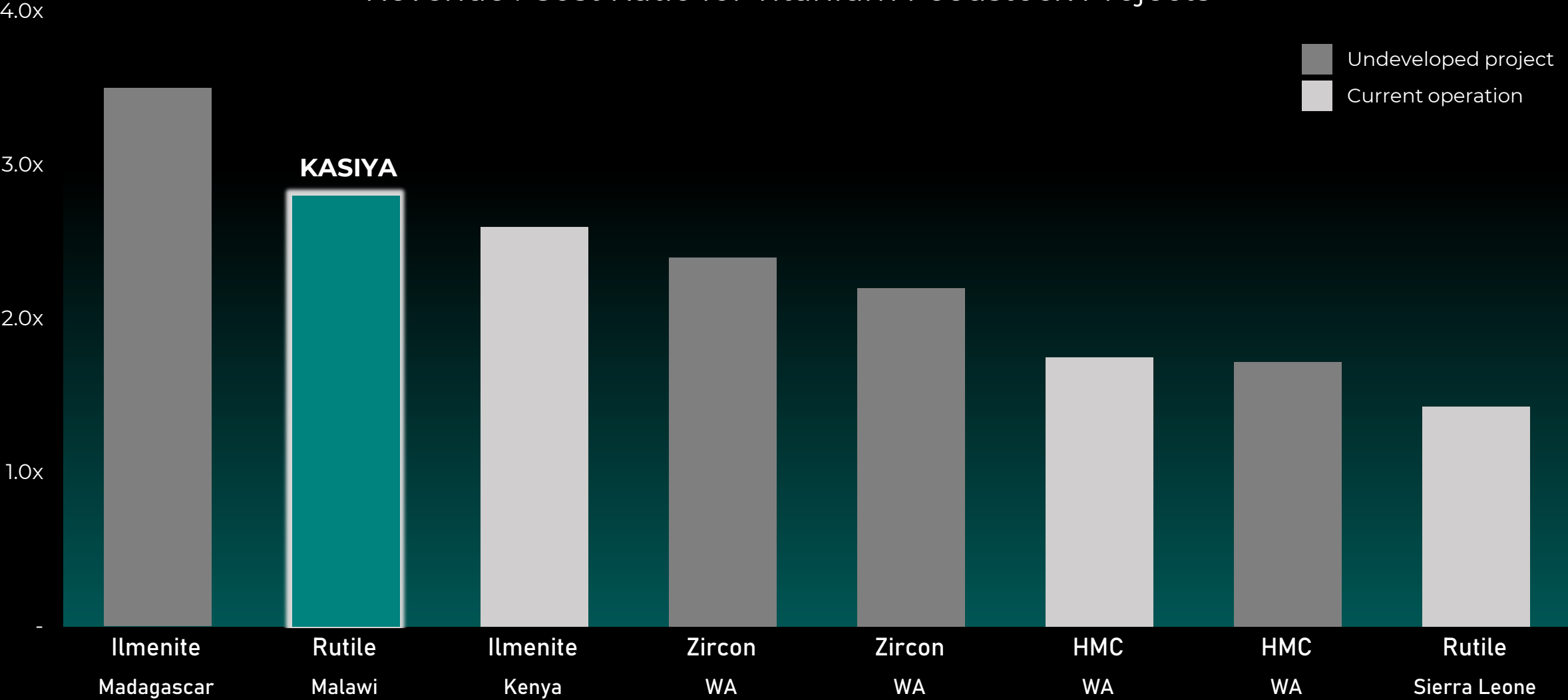
**1,809Mt**  
Total Resource  
@ 1.01% rutile  
@ 1.32% graphite

**538Mt**  
Total Reserves  
@ 1.03% rutile  
@ 1.66% graphite

**70%**  
Resource remains  
unmined at end of  
current mine life

# Lowest cost **rutile** producer in mineral sands sector

Revenue : Cost Ratio for Titanium Feedstock Projects

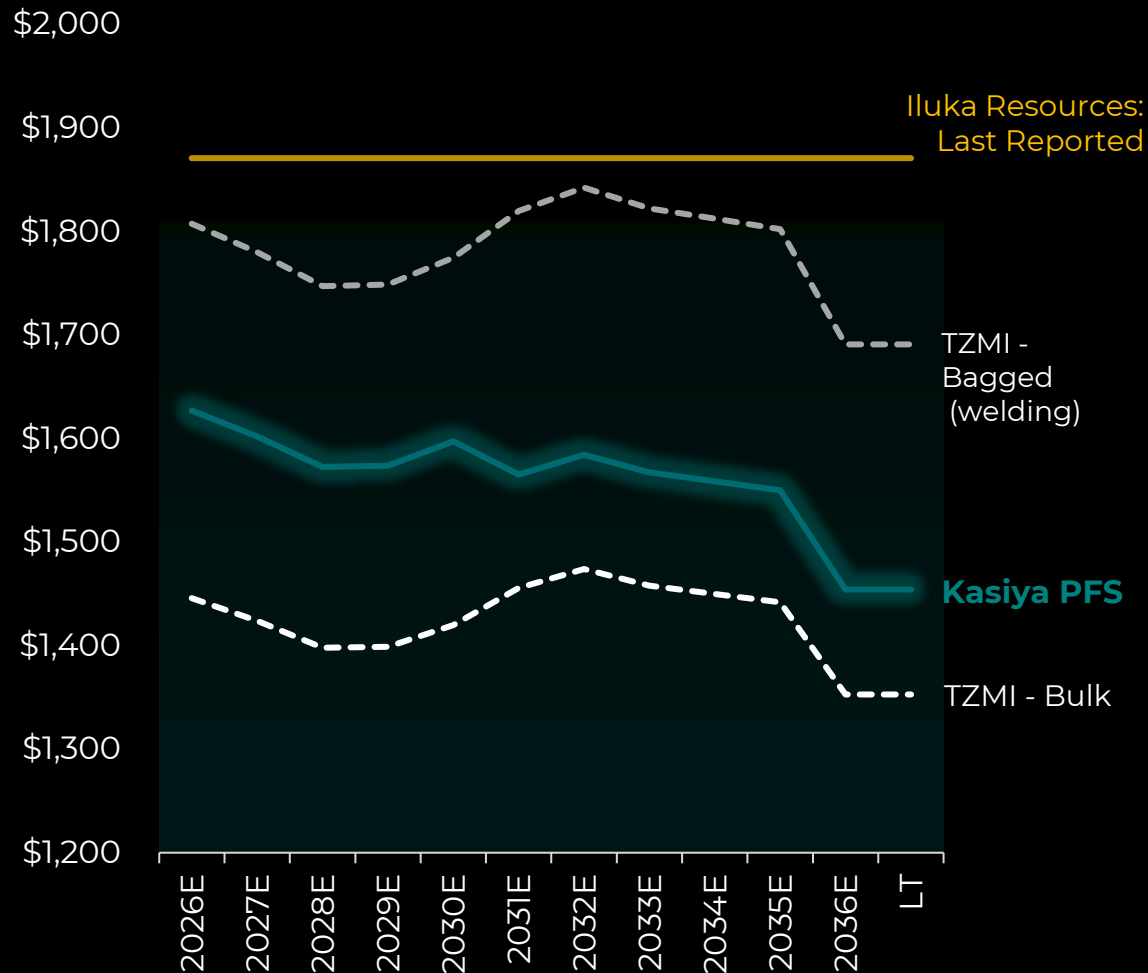


Source: Company Disclosures; refer to Appendix 10

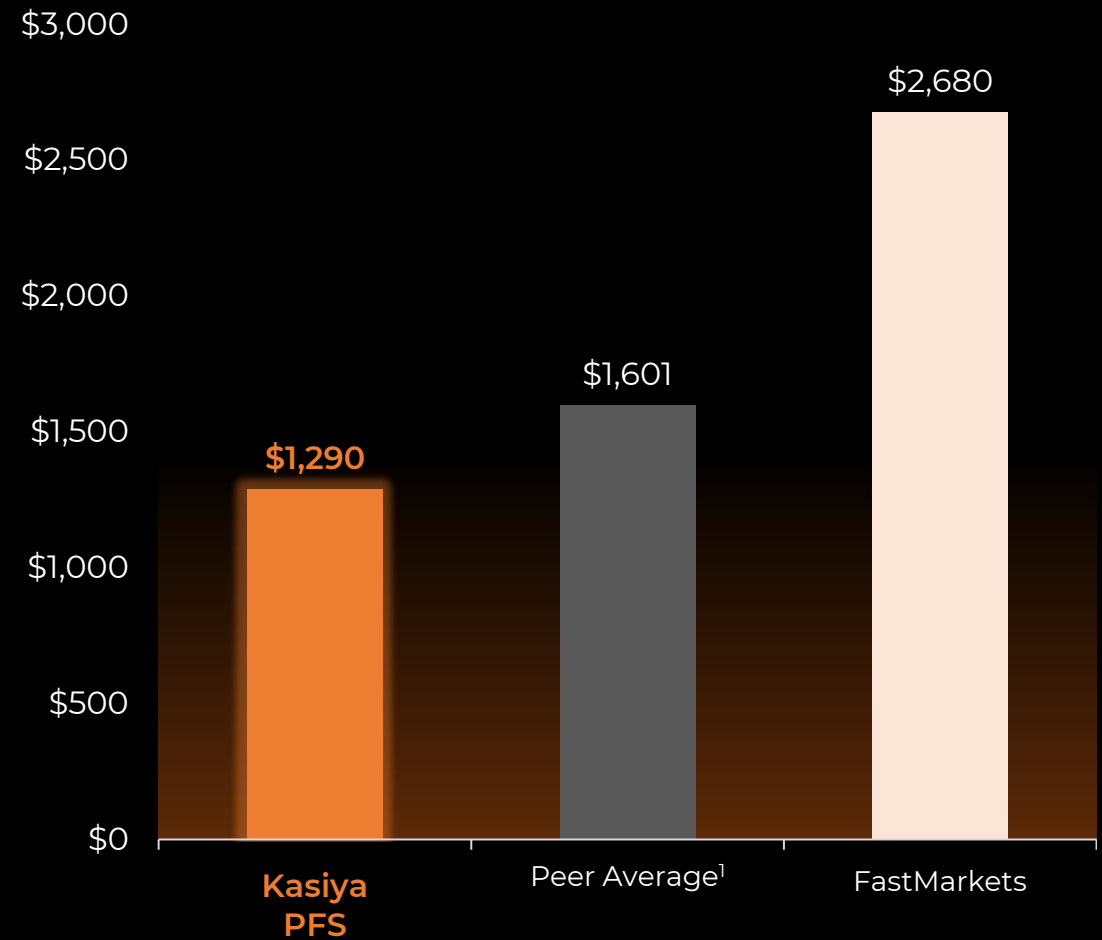


# PFS rutile and graphite prices deliver US\$16Bn LOM revenue

## PFS Rutile Price

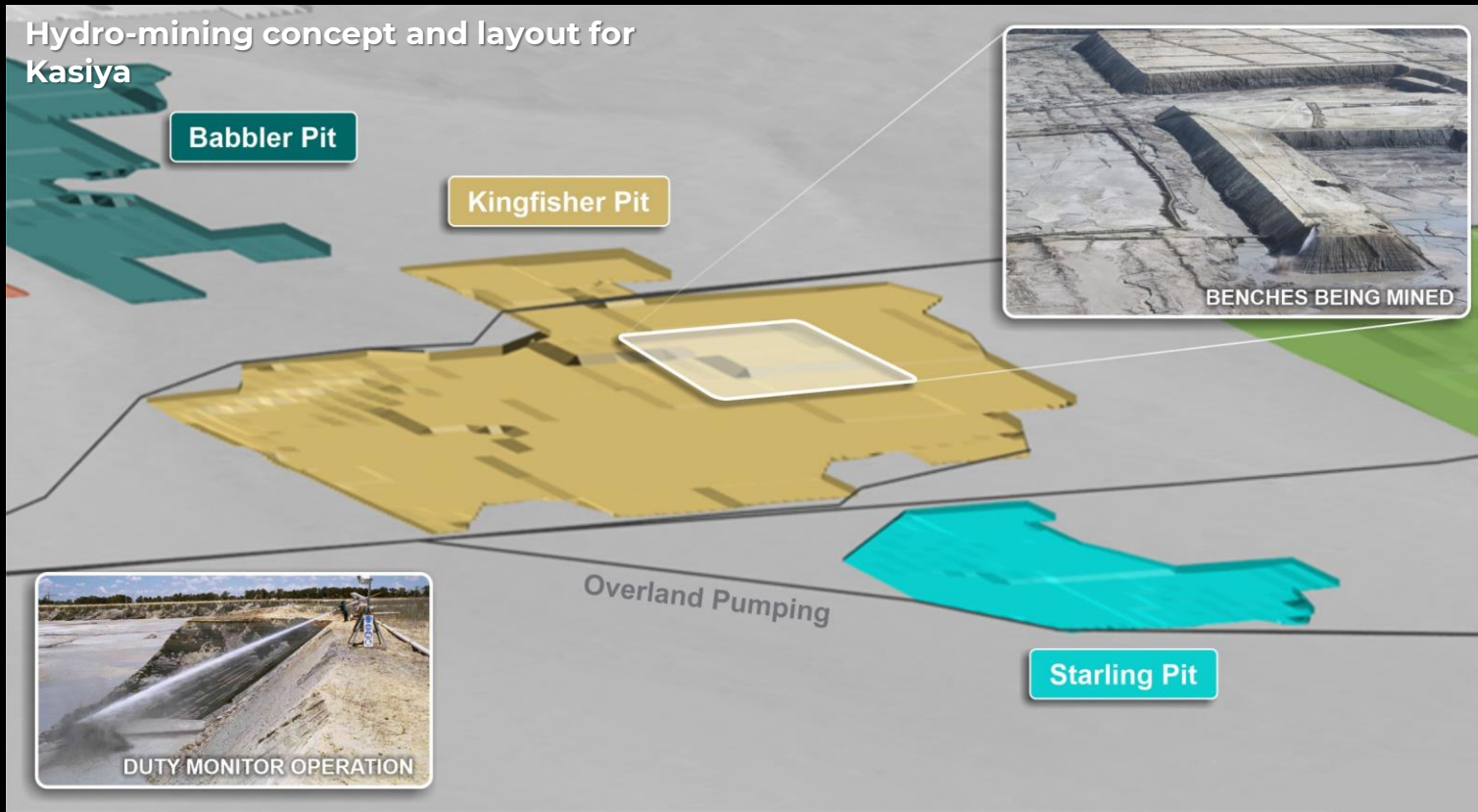


## PFS Graphite Price



Prices US\$ per tonne  
 Source: Sovereign Metals; TZMI; Fastmarkets; Bloomberg; Iluka Resources Quarterly Review to 30 June 2023.  
 1. Refer to Appendix 15 for Peer Average constituents

# Hydro-mining – low cost, low carbon-footprint



12Mtpa  
"Stage 1" throughput  
(first 5 years)

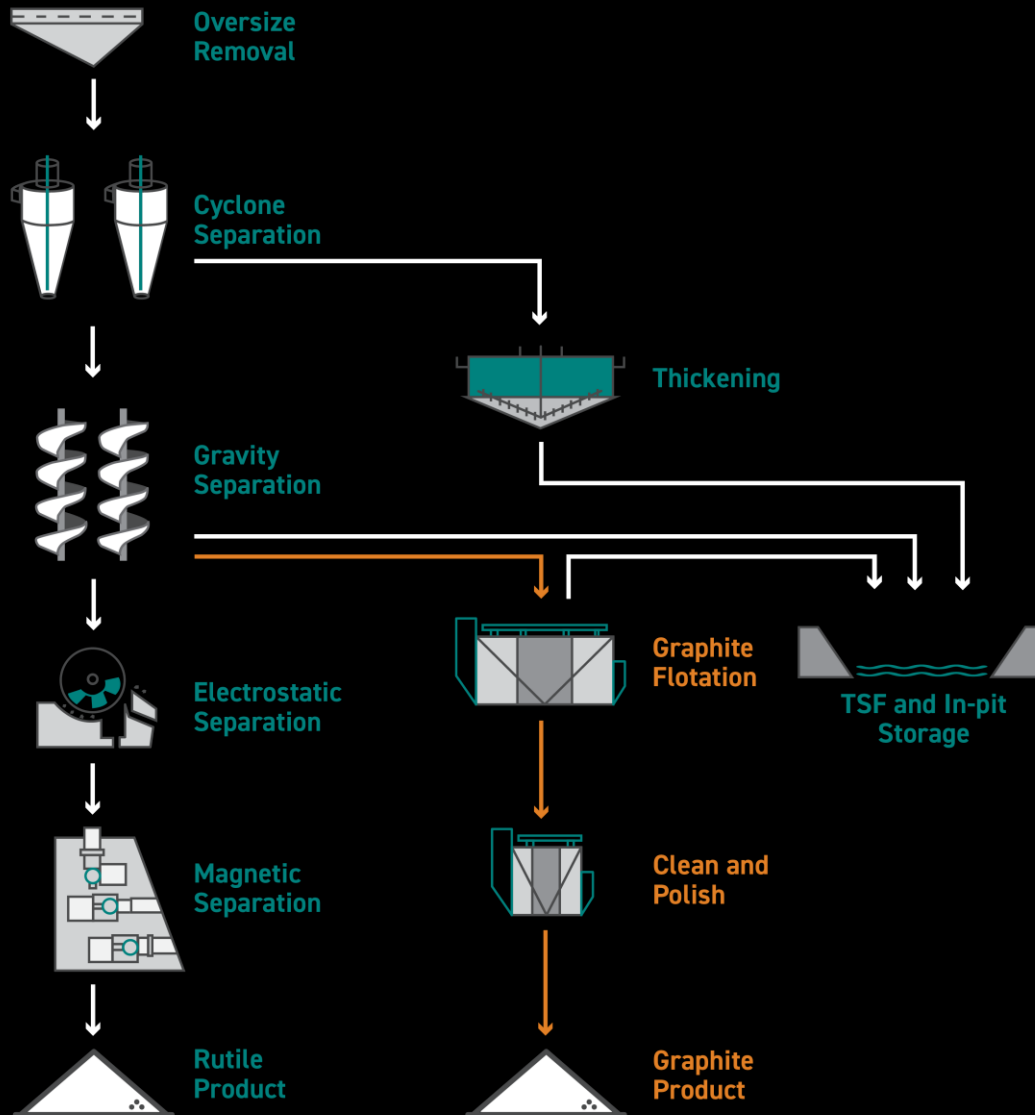
24Mtpa  
"Stage 2" throughput  
(steady state)

4 pits  
Mineable  
simultaneously

15m  
Average pit depth  
mined

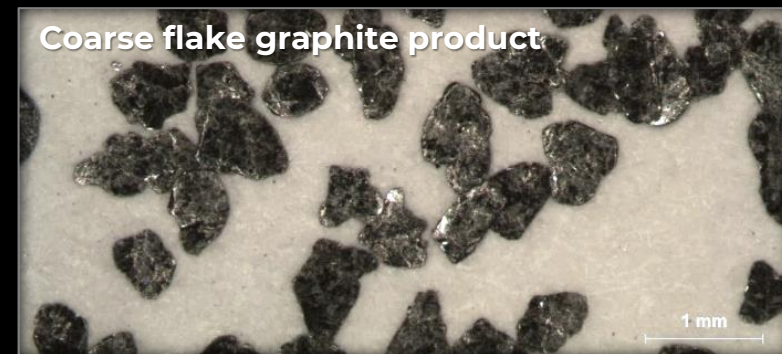


# Premium products from conventional process flowsheet



**96%**  
TiO<sub>2</sub> with premium specifications

**100%**  
Recoveries based on bulk testwork



**67.5%**  
Graphite metallurgical recovery

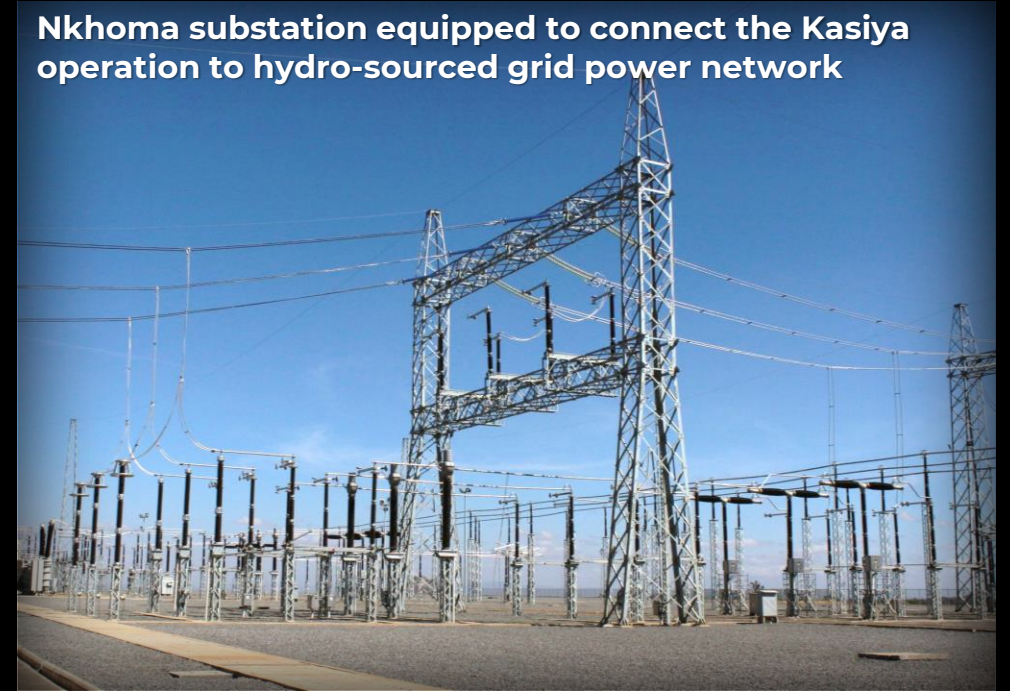
**96%**  
C<sup>t</sup> product grade

# Renewable energy solution for a low-carbon footprint operation

60MW Salima Solar Power Plant in Malawi recently constructed and commissioned by JCM



Nkhoma substation equipped to connect the Kasiya operation to hydro-sourced grid power network



**56MW**

Project requirement  
at full production

**100%**

Reliable power supply  
designed

**96.6%**

Solar and Hydro  
power in energy mix



# Excellent skilled workforce in Malawi

Sovereign's female team members at the Company's laboratory facility in Lilongwe, Malawi



995

Direct workforce during construction

1,100

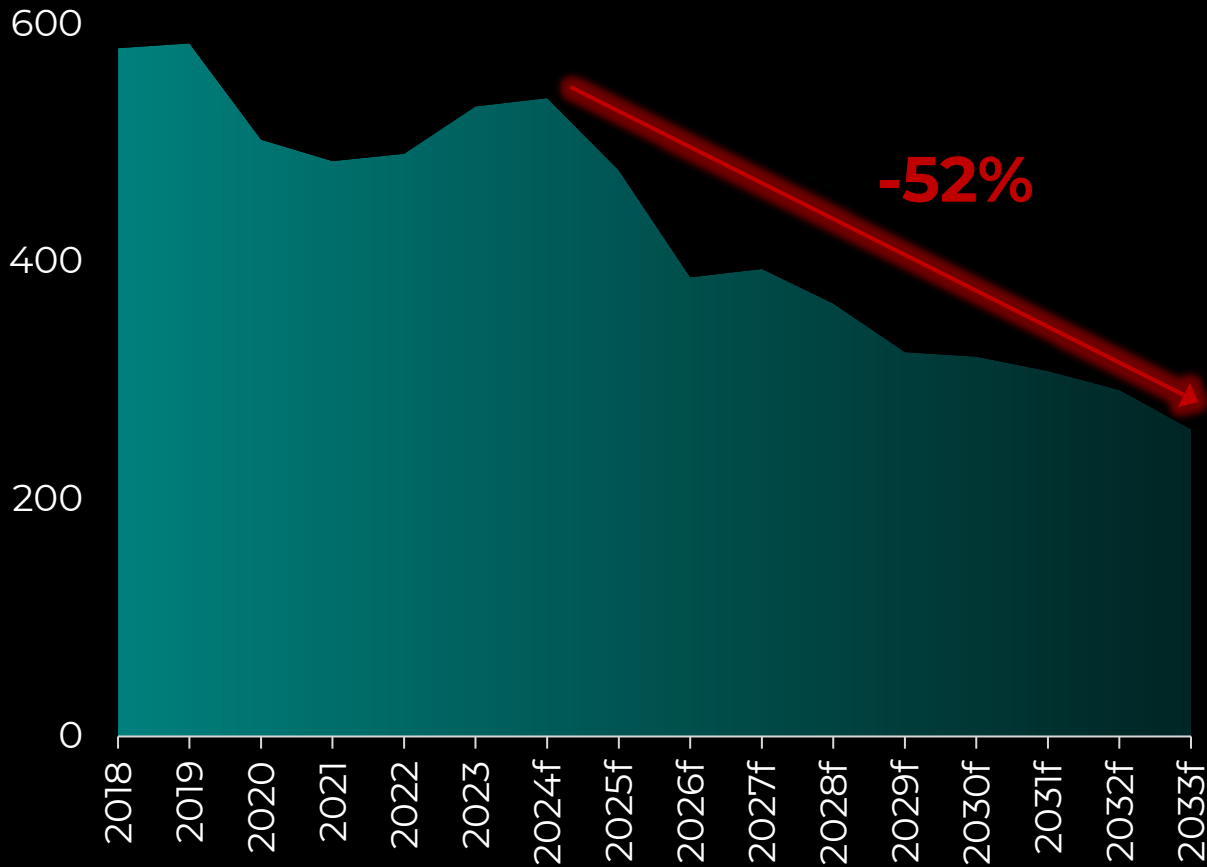
Direct workforce at steady state

30%

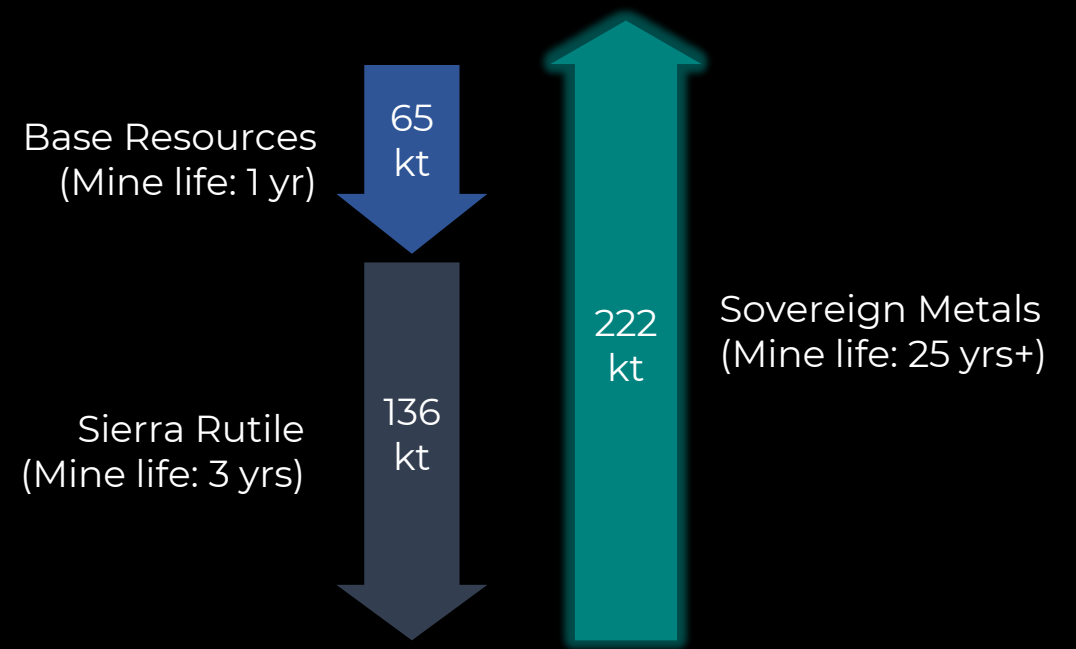
Current workforce is female

# Natural rutile supply to sharply decline from 2024

Global Rutile Supply to 2033 (ktpa)



Current Significant Rutile Producers vs Kasiya PFS (ktpa)





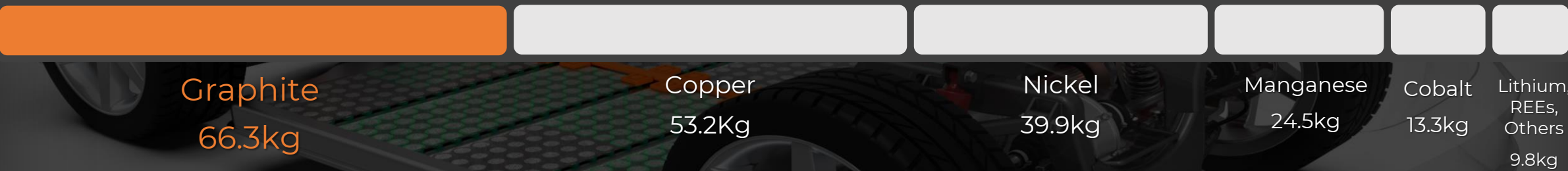
# Natural Graphite

Up to **50%** of a lithium-ion battery

Critical mineral for energy transition per US Inflation Reduction Act

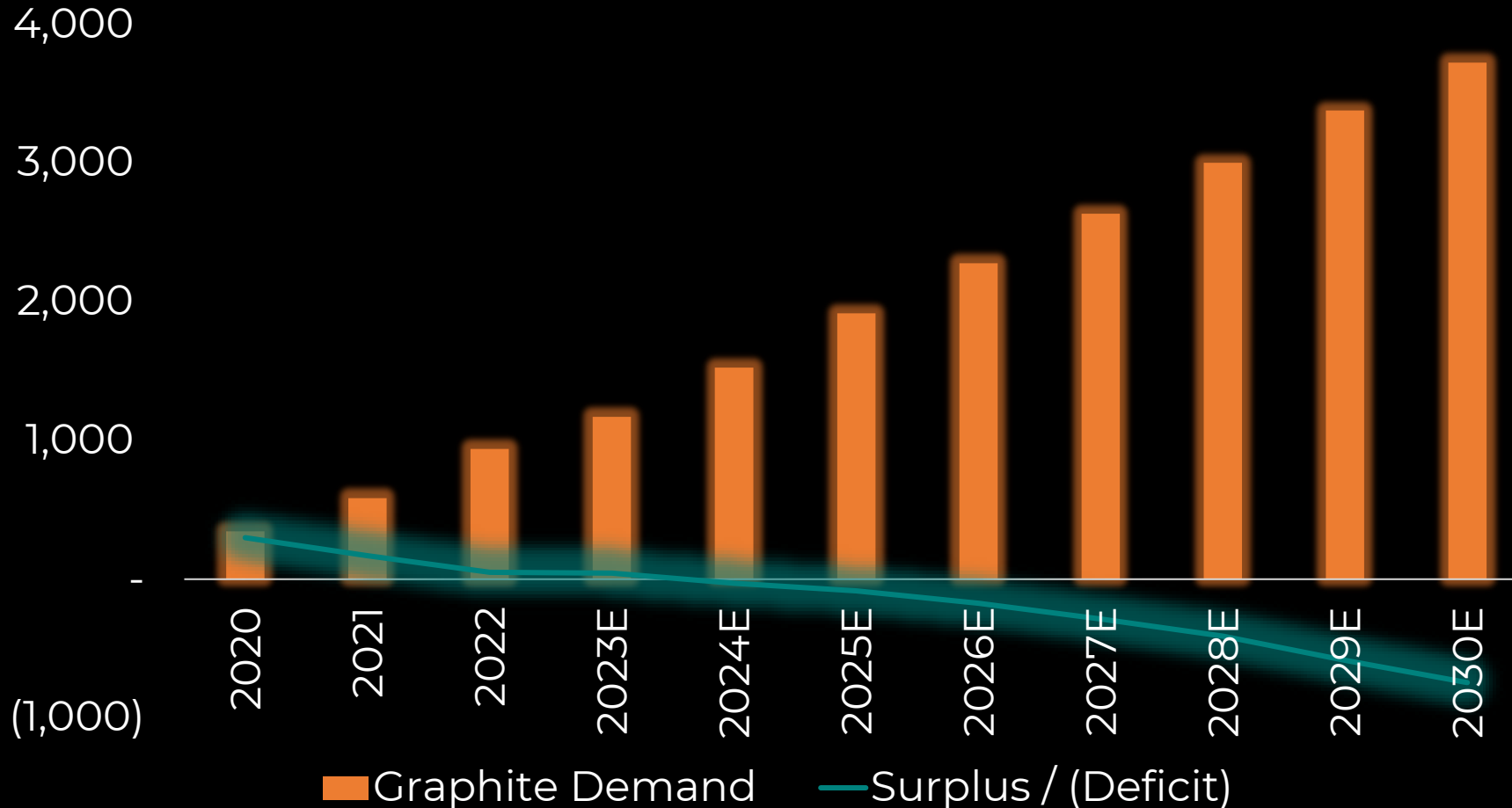
Considered Critical for the EU and Japan

Mineral content (kg / electric vehicle)



# Electrification is driving natural **graphite** demand

Graphite Demand and Market Deficit



46%

Increase in demand for anodes in 2022

230%

Increase in EV sales since 2020

US\$104B

Graphite investment requirement per Tesla Master Plan 3



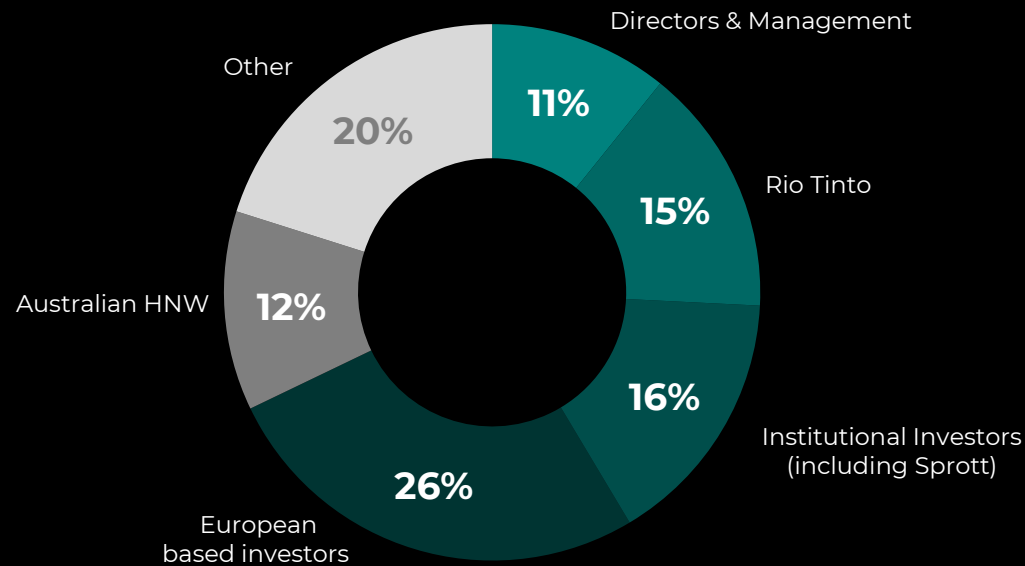
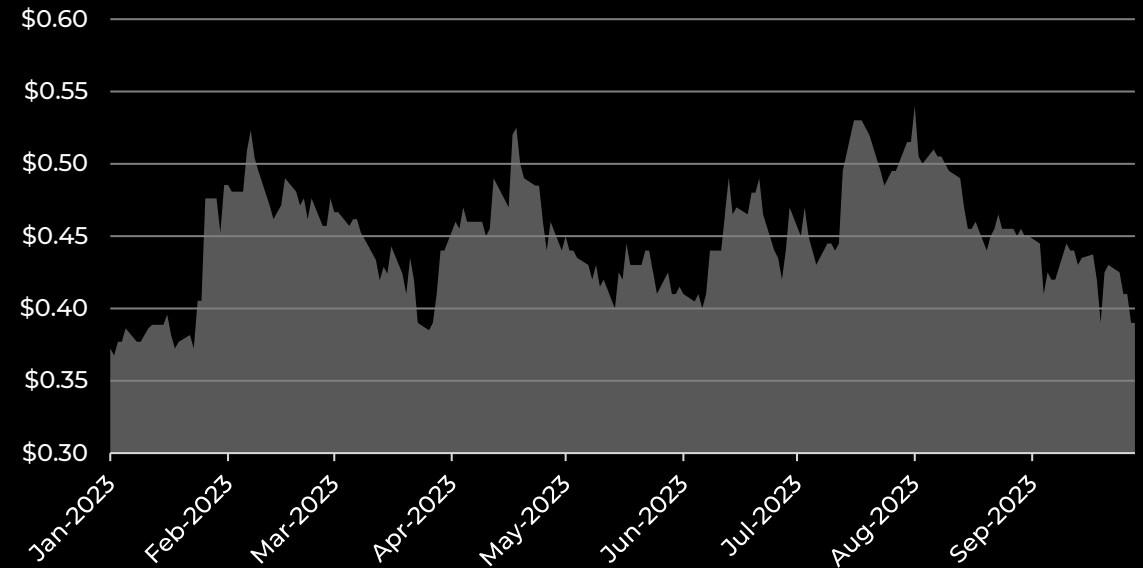
# Advancing into an optimisation phase

- Strategic investment by Rio Tinto
- Completion of the PFS
- Formal establishment of the Technical Committee with Rio Tinto
- Optimisation phase prior to moving to the DFS
- Graphite product development and qualification

# Strong cash position and growing share register

## Capital Structure (as at 24 November 2023)

<b>ASX / AIM Ticker</b>	SVM / SVML
<b>Share Price (A\$ / P)</b>	A\$0.43 / 24p
<b>Shares on Issue</b>	563m
<b>Undiluted Market Capitalisation (A\$ / £)</b>	A\$242m / £135m
<b>Performance Rights</b>	16.4m
<b>Rio Tinto Options (ex. \$0.545 expiry 21 July 2024)</b>	34.5m
<b>Cash (30 Sept 2023)</b>	A\$43.0m



## Top Shareholders

Rio Tinto	15%
Sprott Asset Management	8%
Directors	7%



# Appendix 1: Rio Tinto's Investment Agreement

## Investment Agreement

As part of the investment by Rio Tinto, the Company has agreed to provide Rio Tinto with certain rights pursuant to the Investment Agreement between the parties.

- **(Use of funds)** The Company will use the proceeds from Rio Tinto's strategic investment to fund the advancement of its Project, including the completion of a DFS, product qualification and other expenditures agreed with Rio Tinto such as permitting costs.
- **(Board nominee/observer)** Subject to Rio Tinto's voting power in the Company not falling below 15% for a continuous 3 month period, Rio Tinto will have the right to nominate one director or one observer to the board of the Company where it has not nominated a director.
- **(Right of first refusal – equity raisings)** Subject to Rio Tinto's voting power in the Company not falling below 10%, if the Company undertakes equity raisings (other than pursuant to a pro rata entitlement offer), Rio Tinto has a right to be consulted and a right of first refusal to participate in the equity raisings up to a level where Rio Tinto's aggregate voting power does not exceed 19.99%. This right is subject to any approvals required by law (including any securities exchange) and/or governmental or other regulatory approvals.
- **(Right of first refusal – Project interests)** Subject to Rio Tinto's voting power in the Company not falling below 10% and until the Investor End Date, if the Company receives an offer to dispose of any shares in or the assets held by any of its subsidiaries with interests in Kasiya (Project Interest) from a third party, then Rio Tinto has a pre-emptive right to acquire the Project Interest in priority to the third party. This right is subject to any approvals required by law (including any securities exchange) and/or governmental or other regulatory approvals.
- **(Governance)**
  - (Technical Committee & Access to Information) Until the Investor End Date, Rio Tinto and the Company will establish a technical committee comprising of 3 members appointed by each to provide recommendations, advice and reports to the Company's Board on technical matters relating to the Project. Until the Investor End Date, the Company will also provide Rio Tinto's General Manager to the Project and the members of the Technical Committee with access and inspection rights to information relating to the Project.
- **(Governance) continued**
  - (Restricted matters) Until the Investor End Date, the Company is restricted from entering into any offtake, marketing or sales agreement (including pre-pay agreements or streaming and similar agreements), royalty agreements and granting any encumbrance over the Project or shares in any of the Company's subsidiaries with interests in Kasiya without Rio Tinto's consent.
  - (Project debt funding) Until the Investor End Date, if the Company is considering any debt financing for the development and operation of Kasiya, it must consult and negotiate with Rio Tinto's to seek to put in place an acceptable mine construction funding package, with any legally binding commitments relating to such funding package not to be entered into until after the Investor End Date.
  - (Graphite co-product) Until the Investor End Date, Sovereign and Rio Tinto's will work together to qualify the Project's graphite co-product with a particular focus on supplying the spherical purified graphite segment of the lithium-ion battery anode market.
- **(Operatorship of Project and marketing)** Following the Company announcing a DFS for the Project until the Investor End Date, Rio Tinto has the option (**Rio Tinto Option**) to be appointed as the operator of the Project on arm's length terms and subject to Rio Tinto becoming the operator of the Project, be granted the exclusive right to 40% of the annual production of all products produced from the Project as identified in the DFS for so long as Rio Tinto remains the operator of the Project. This right is subject to any approvals required by law (including any securities exchange) and/or government or other regulatory approvals.

The Company has also provided undertakings to Rio Tinto to comply with various corporate governance and administrative matters.

# Appendix 2: Kasiya Resources and Reserves

<b>Kasiya Mineral Resource Estimate at 0.7% Rutile Cut-off (inclusive of Ore Reserves)</b>						
<b>Mineral Resource Category</b>	<b>Material Tonnes (millions)</b>	<b>Rutile (%)</b>	<b>Rutile Tonnes (millions)</b>	<b>Graphite (TGC%)</b>	<b>Graphite Tonnes (millions)</b>	<b>RutEq. Grade* (%)</b>
Indicated	1,200	1.0%	12.2	1.5%	18.0	1.9%
Inferred	609	0.9%	5.7	1.1%	6.5	1.6%
<b>Total</b>	<b>1,809</b>	<b>1.0%</b>	<b>17.9</b>	<b>1.4%</b>	<b>24.4</b>	<b>1.8%</b>

<b>Ore Reserve for the Kasiya Deposit as of September 2023</b>						
<b>Classification</b>	<b>Tonnes (Mt)</b>	<b>Rutile Grade (%)</b>	<b>Contained Rutile (Mt)</b>	<b>Graphite Grade (TGC) (%)</b>	<b>Contained Graphite (Mt)</b>	<b>RutEq. Grade* (%)</b>
Proved	-	-	-	-	-	-
Probable	538	1.03%	5.5	1.66%	8.9	2.00%
<b>Total</b>	<b>538</b>	<b>1.03%</b>	<b>5.5</b>	<b>1.66%</b>	<b>8.9</b>	<b>2.00%</b>

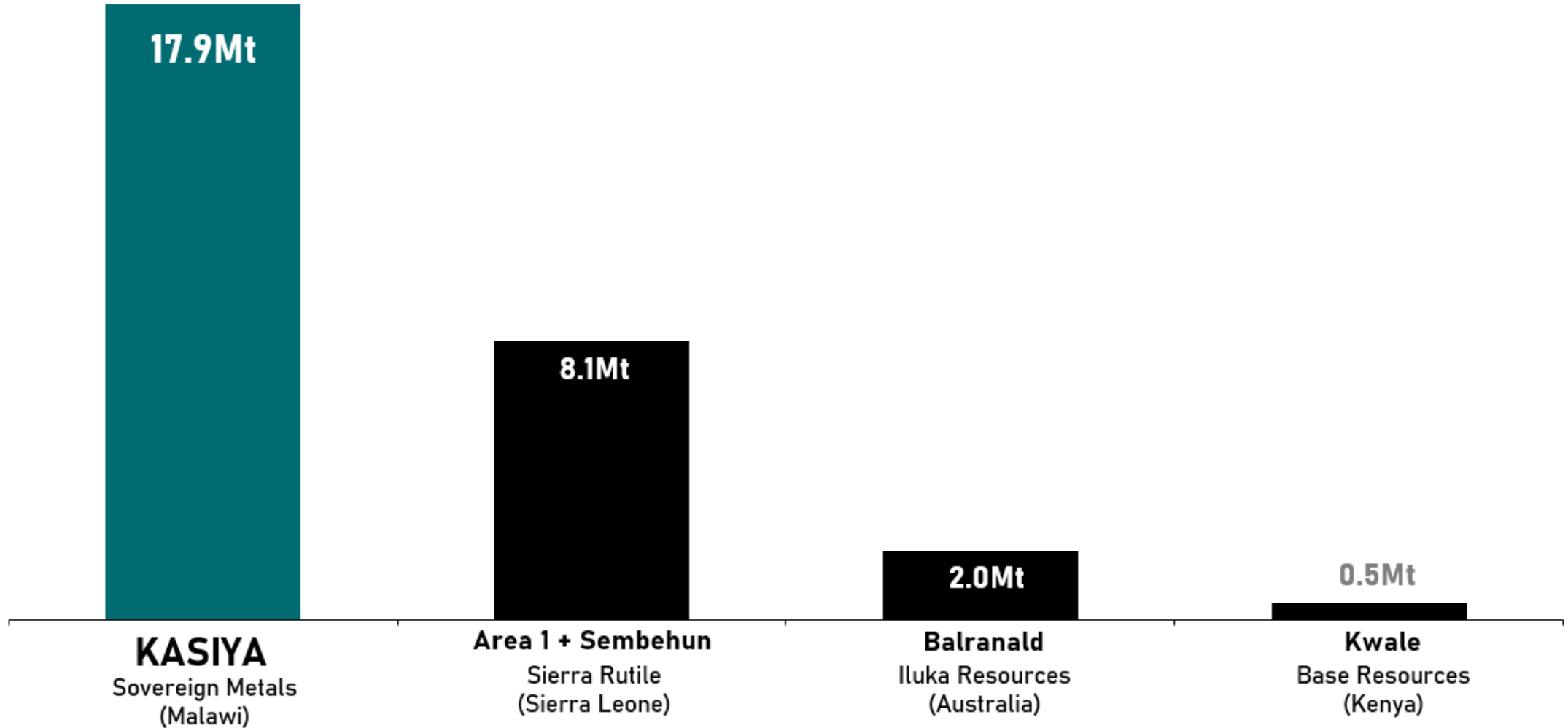
Source: Sovereign Metals

\* RutEq. Formula: Rutile Grade x Recovery (100%) x Rutile Price (US\$1,484/t) + Graphite Grade x Recovery (67.5%) x Graphite Price (US\$1,290/t) / Rutile Price (US\$1,484/t). All assumptions are taken from the Kasiya Pre-Feasibility Study with results announced on 28<sup>th</sup> September 2023; Any minor summation inconsistencies are due to rounding

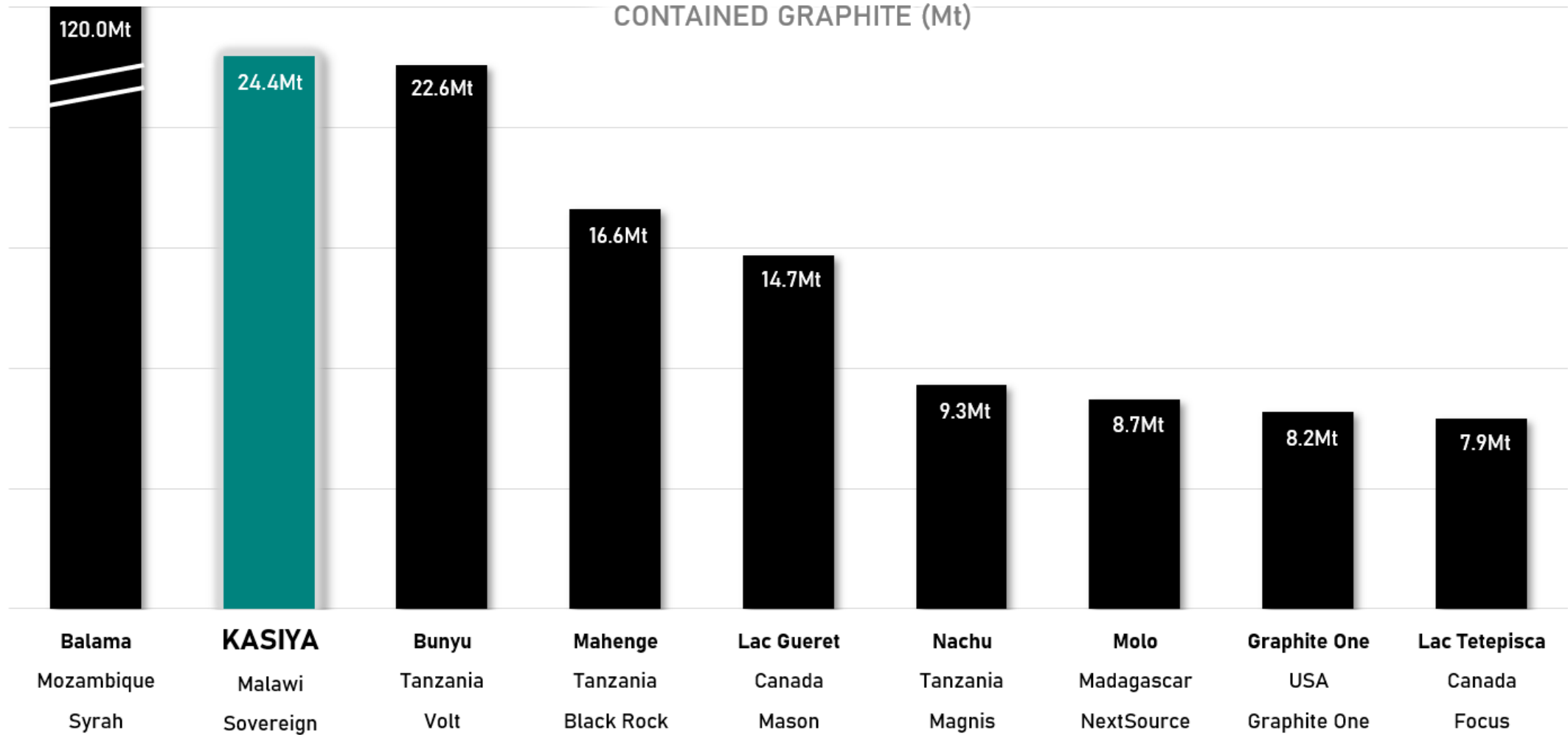


# Appendix 3: Major Rutile Dominant Resources

CONTAINED RUTILE (Mt)

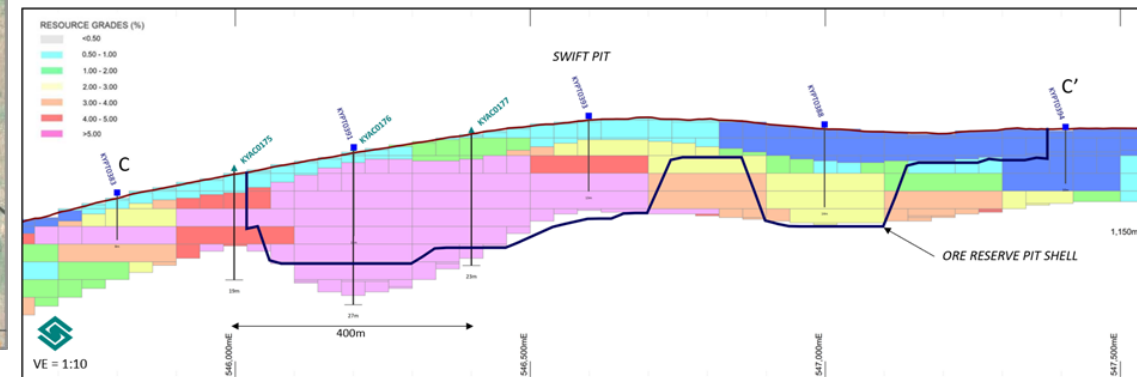
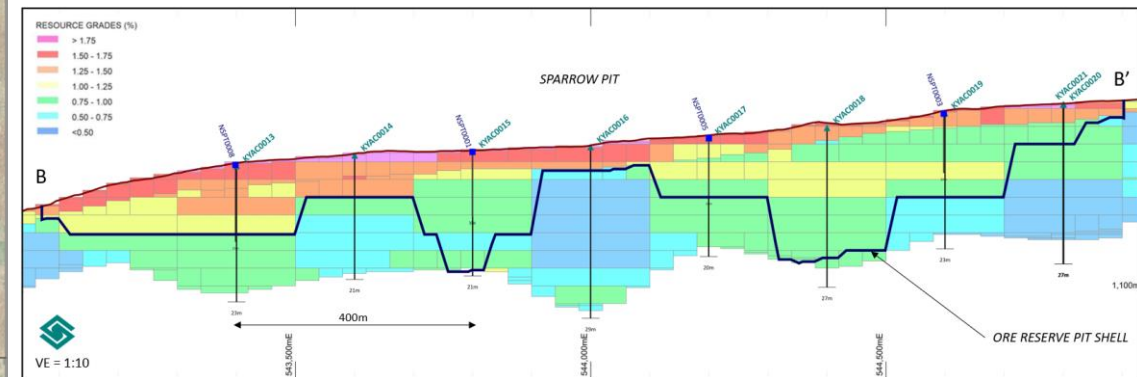
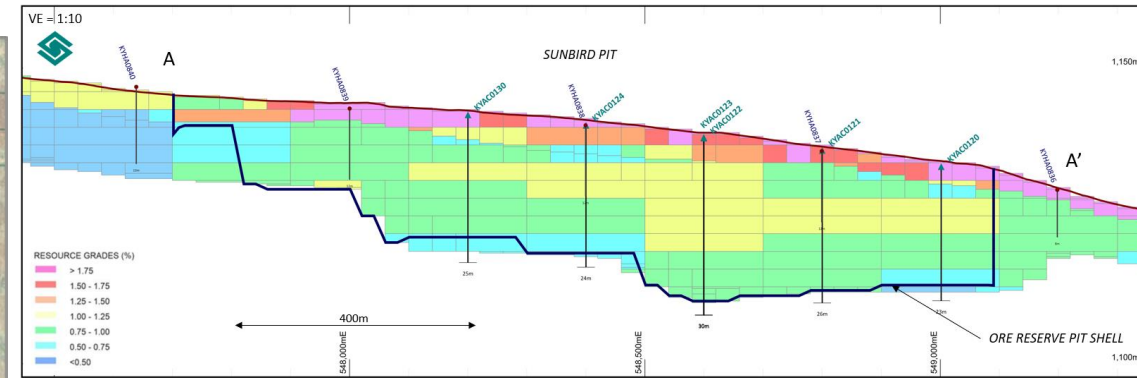
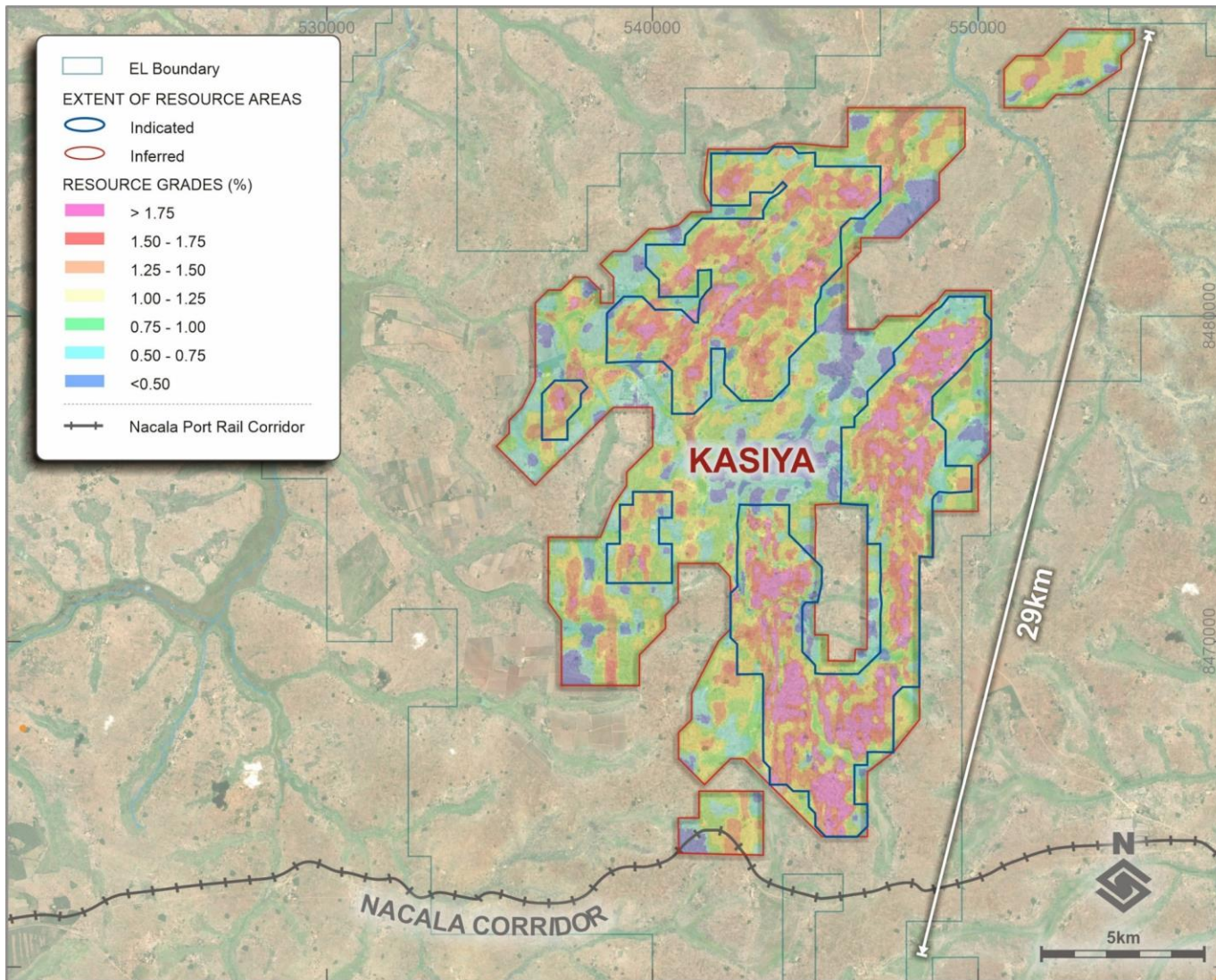


# Appendix 4: Major Flake Graphite Resources





# Appendix 5: Kasiya Resource Area and Cross-Sections



# Appendix 6: Kasiya PFS Capex and Opex Breakdowns

## Capital Expenditure

	Stage 1 12Mtpa Operation US\$m	Stage 2 Expansion to 24Mt US\$m	Plant Relocation US\$m
<b>Direct</b>			
Mining	\$13.2	\$45.4	\$63.4
Process Plant - Rutile	\$59.2	\$59.2	\$39.6
Process Plant - Graphite	\$44.0	\$51.9	\$50.3
Tailings	\$55.0	\$39.4	\$50.7
Infrastructure	\$219.2	\$8.9	\$37.1
<b>Total Direct</b>	<b>\$390.6</b>	<b>\$204.7</b>	<b>\$241.1</b>
<b>Indirect</b>			
EPCM	\$38.7	\$19.4	\$25.5
Construction, Start-up & RAP	\$80.1	\$14.7	\$38.3
<b>Total Indirect</b>	<b>\$118.8</b>	<b>\$34.1</b>	<b>\$63.8</b>
<i>Contingency</i>	<i>\$87.8</i>	<i>\$47.8</i>	<i>\$60.8</i>
<b>Total Pre-Production</b>	<b>\$597.2</b>	<b>\$286.6</b>	<b>\$365.7</b>

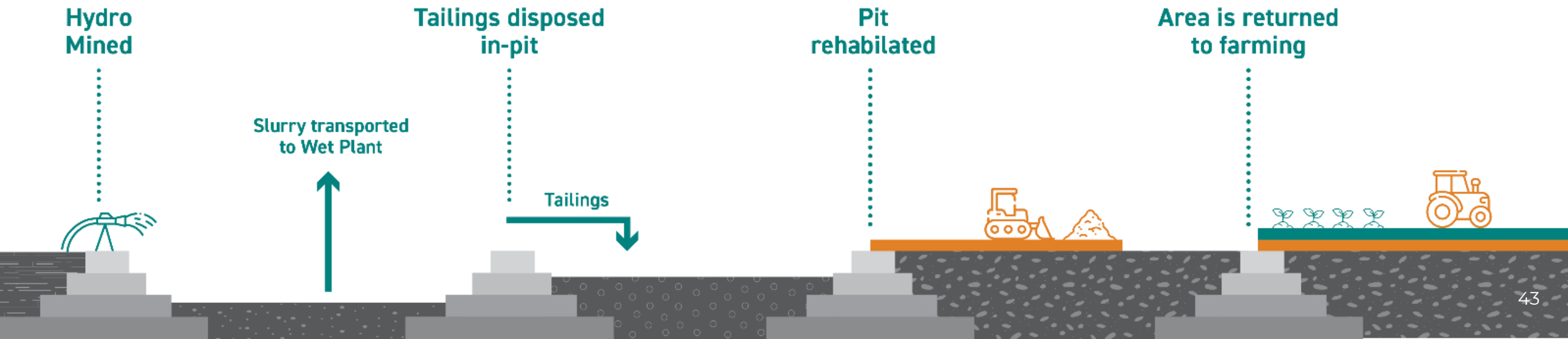
## Operating Cost

	US\$/t Mined Tonne	US\$/t Product
<b>Mine Gate</b>		
Mining	\$2.09	\$96
Processing – Rutile	\$1.90	\$88
Processing – Graphite	\$0.95	\$44
Tailings & Rehabilitation	\$1.25	\$58
General & Administration	\$0.42	\$20
<b>Total Mine Gate</b>	<b>\$6.62</b>	<b>\$306</b>
Logistics	\$2.12	\$98
<b>Total Operating Costs</b>	<b>\$8.74</b>	<b>\$404</b>

# Appendix 7.a: Tailings strategy designed to minimise impact

Tailing disposal will be a combination of in-pit disposal within the void created by mining, and ex-pit disposal in a standalone Tailing Storage Facility

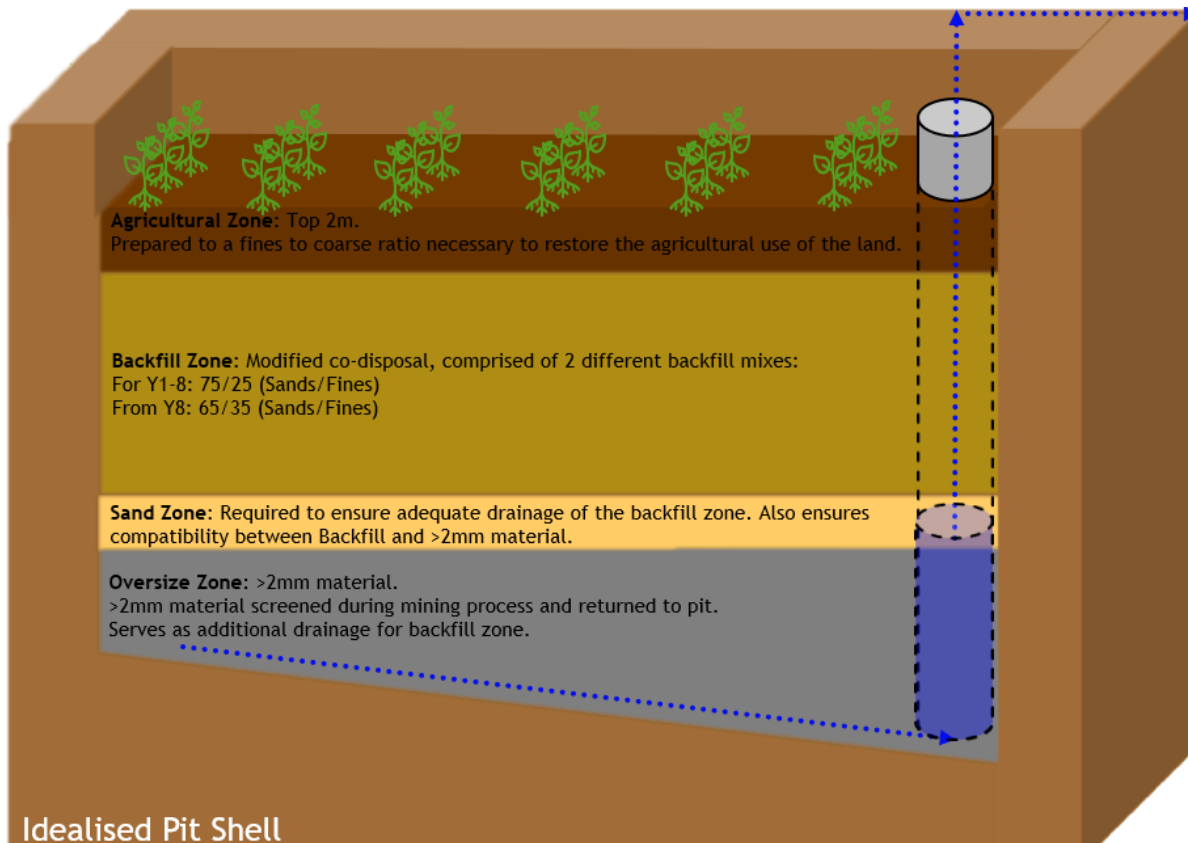
Example of a vetiver cover crop at a TSF rehabilitation site in southern Africa



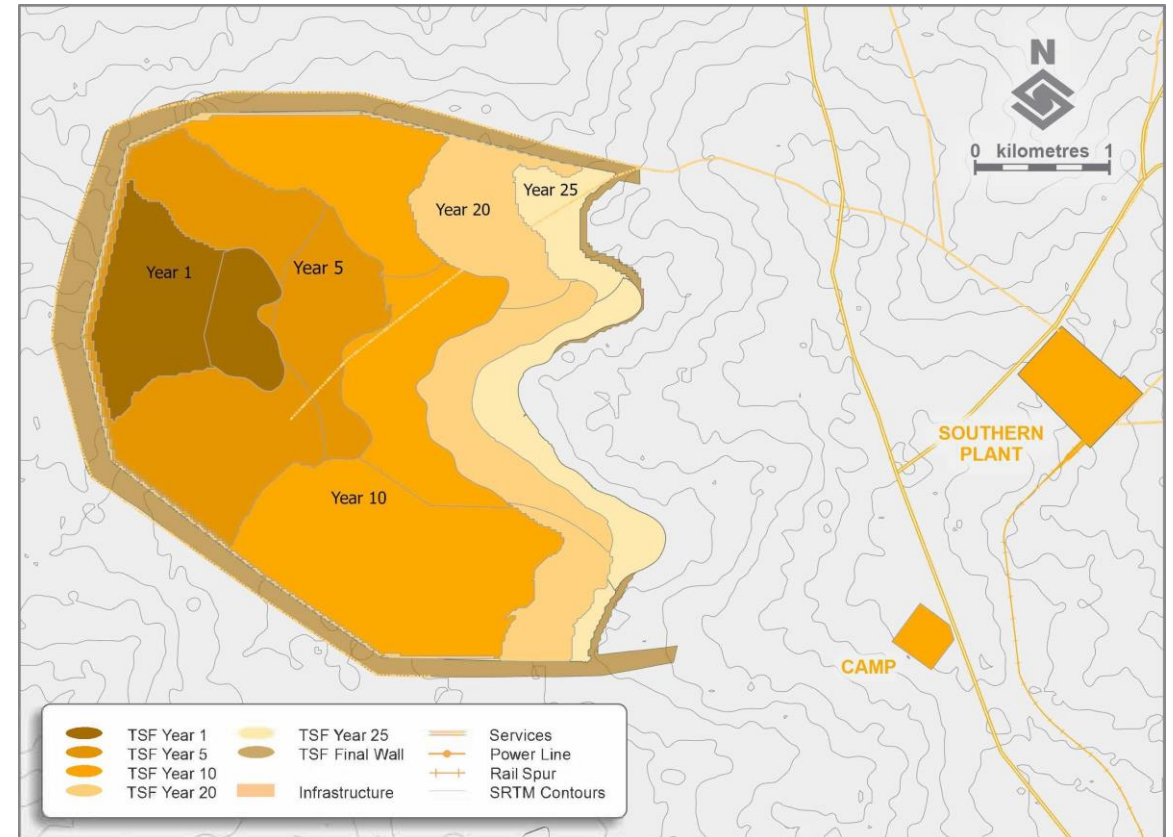


# Appendix 7.b: Tailings strategy designed to minimise impact

## In-pit deposition



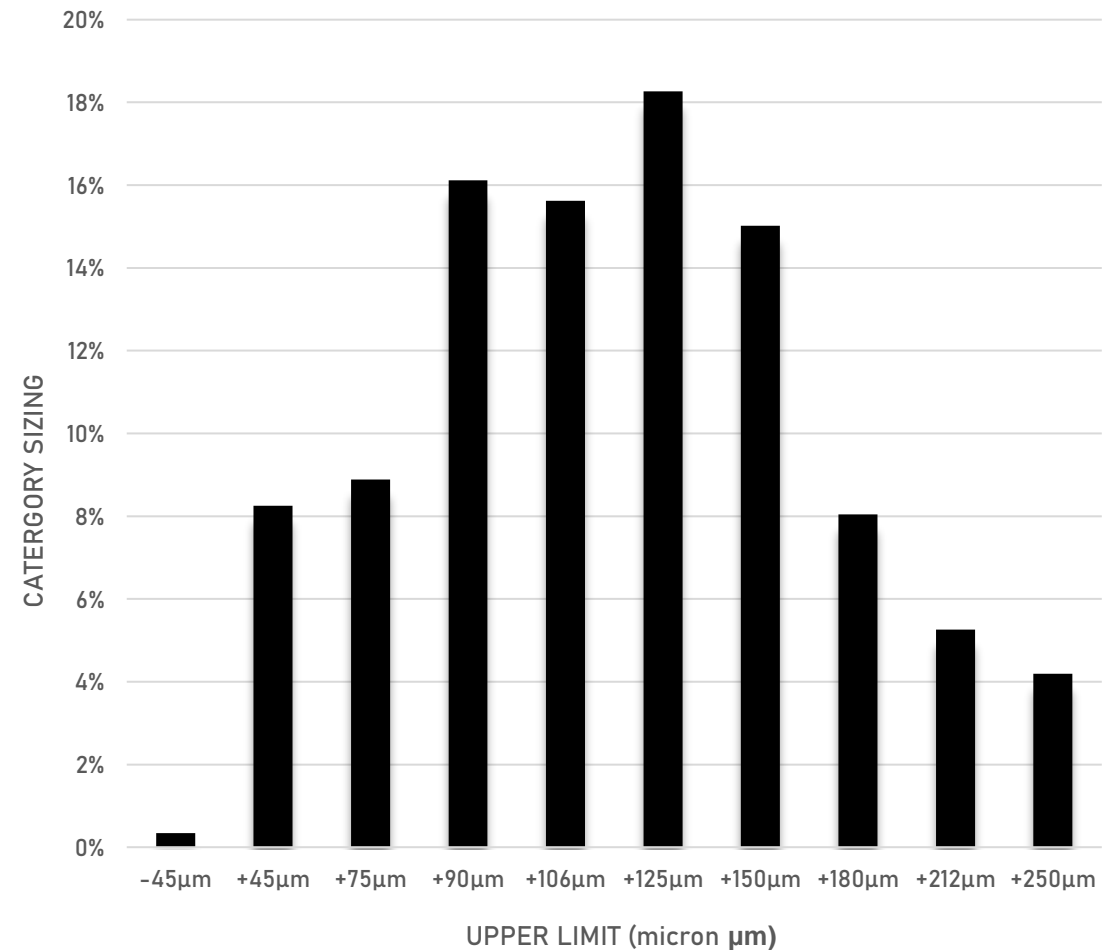
## Tailings Storage Facility



# Appendix 8: Rutile Product Specifications

Constituent		Peer Comparisons		
		Kasiya (Sovereign Metals)	Sierra Rutile (Sierra Rutile Limited)	Kwale (Base Resources)
TiO <sub>2</sub>	%	95.7	96.3	96.2
ZrO <sub>2</sub> +HfO <sub>2</sub>	%	0.18	0.78	0.72
SiO <sub>2</sub>	%	0.70	0.62	0.94
Fe <sub>2</sub> O <sub>3</sub>	%	0.98	0.38	1.25
Al <sub>2</sub> O <sub>3</sub>	%	0.44	0.31	0.23
Cr <sub>2</sub> O <sub>3</sub>	%	0.10	0.19	0.17
V <sub>2</sub> O <sub>5</sub>	%	0.58	0.58	0.52
Nb <sub>2</sub> O <sub>5</sub>	%	0.37	0.15	-
P <sub>2</sub> O <sub>5</sub>	%	0.018	0.01	0.00
MnO	%	0.007	0.01	0.03
MgO	%	0.001	0.01	0.10
CaO	%	0.011	0.01	0.04
S	%	0.005	<0.01	-
U+Th	ppm	30	26	53

## Kasiya Rutile Particle Size Distribution



Source: Sovereign Metals

Selected rutile product specification derived from bulk test-work on Kingfisher pit sample representing the first 3 years of mining which in general is also broadly representative of the overall Kasiya Ore Reserve. "Base Resources" is Base Resources Limited. "b/d" is below the analytical level of detection; "-" is not disclosed. Sources: Sierra Rutile and Kwale data from BGR Assessment Manual titled "Heavy Minerals of Economic Importance" 2010.

# Appendix 9: Graphite Product Specifications and Price Assumptions

Tyler Mesh	Particle Size	Carbon (C <sup>t</sup> %)	Weight Distribution (% w/w)	Flake Category
	Micron (μ)			
+32	+500	97.1	5.6	Super Jumbo
-32 +48	-500 +300	96.4	24.2	Jumbo
-48 +80	-300 +180	96.7	27.1	Large
-80 +100	-180 +150	97.1	11.6	Medium
-100 +150	-150 +106	96.9	12.3	Small/Medium
-150 +200	-106 +75	98.2	7.7	Small
-200	-75	94.1	11.7	Amorphous
Total		96.5	100	

Graphite Price Assumption				
Flake Category	Micron (μm)	Distribution (% w/w)	Forecast Price US\$/t	Contribution US\$/t
Super Jumbo	+500	5.5	\$2,513	\$138
Jumbo	-500 +300	23.9	\$2,047	\$490
Large	-300 +180	26.8	\$1,396	\$374
Medium	-180 +150	11.6	\$931	\$108
Fine	-150	32.2	\$558	\$180
<b>Total</b>		<b>100</b>	<b>-</b>	<b>\$1,290</b>



# Appendix 10: Mineral Sands Peer Information

(Slide 26)

Reference	Company	Project	Stage of Development	Revenue to Cost ratio	Source
Ilmenite - Madagascar	Base Resources	Toliara	FS Complete	3.5	ASX Announcement: <a href="https://wcsecure.weblink.com.au/pdf/BSE/02426235.pdf">https://wcsecure.weblink.com.au/pdf/BSE/02426235.pdf</a>
Ilmenite - Kenya	Base Resources	Kwale	Production	2.6	ASX Announcement (Quarterly Report): <a href="https://wcsecure.weblink.com.au/pdf/BSE/02689519.pdf">https://wcsecure.weblink.com.au/pdf/BSE/02689519.pdf</a>
Zircon – Western Australia	Strandline	Coburn	Construction	2.4	Investor Presentation: <a href="https://cdn-api.markitdigital.com/apiman-gateway/ASX/asx-research/1.0/file/2924-02641224-6A1139803?access_token=83ff96335c2d45a094df02a206a39ff4">https://cdn-api.markitdigital.com/apiman-gateway/ASX/asx-research/1.0/file/2924-02641224-6A1139803?access_token=83ff96335c2d45a094df02a206a39ff4</a>
Zircon – Western Australia	Sheffield Resources	Thunderbird	Construction	2.3	Investor Presentation: <a href="https://www.sheffieldresources.com.au/site/pdf/ff58d7eb-b9a1-450a-b126-4462767a646e/Investor-Presentation.pdf">https://www.sheffieldresources.com.au/site/pdf/ff58d7eb-b9a1-450a-b126-4462767a646e/Investor-Presentation.pdf</a>
HMC – Western Australia	Image Resources	Boonanarring	Production	1.8	ASX Announcement (Quarterly Report): <a href="https://cdn-api.markitdigital.com/apiman-gateway/ASX/asx-research/1.0/file/2924-02691913-6A1160840?access_token=83ff96335c2d45a094df02a206a39ff4">https://cdn-api.markitdigital.com/apiman-gateway/ASX/asx-research/1.0/file/2924-02691913-6A1160840?access_token=83ff96335c2d45a094df02a206a39ff4</a>
HMC – Western Australia	Image Resources	Bidamina	PFS Complete	1.7	ASX Announcement: <a href="https://cdn-api.markitdigital.com/apiman-gateway/ASX/asx-research/1.0/file/2924-02679921-6A1155680?access_token=83ff96335c2d45a094df02a206a39ff4">https://cdn-api.markitdigital.com/apiman-gateway/ASX/asx-research/1.0/file/2924-02679921-6A1155680?access_token=83ff96335c2d45a094df02a206a39ff4</a>
Rutile – Sierra Leone	Sierra Rutile	Mine Area 1	Production	1.4	ASX Announcement (Quarterly Report): <a href="https://cdn-api.markitdigital.com/apiman-gateway/ASX/asx-research/1.0/file/2924-02690469-6A1160073?access_token=83ff96335c2d45a094df02a206a39ff4">https://cdn-api.markitdigital.com/apiman-gateway/ASX/asx-research/1.0/file/2924-02690469-6A1160073?access_token=83ff96335c2d45a094df02a206a39ff4</a>

# Appendix 11: Graphite Peers Operating Cost Information

(Slide 6)

Company	Project	Stage of Development	Operating Costs			Source
			(FOB)	Steady State Production	Current Production	
			US\$/t	Tpa	tpa	
Focus Graphite	Lac Knife	FS updated	415	47,781	n/a	Company Announcement: Focus Graphite Announces Benchmark Feasibility Study Update for its Lac Knife Graphite Project, Québec (6 March 2023)
Nouveau Monde	Matawinie	DFS complete	443	103,328	n/a	Company Announcement: NextSource Materials Announces Preliminary Economic Assessment for a Mine Expansion of 150,000 Tonnes per Annum of SuperFlake® Graphite Concentrate (28 February 2022)
Black Rock Mining	Mahenge	DFS complete	466	89,000	n/a	Company Announcement: Black Rock Completes Front End Engineering Design, Reconfirming Mahenge as Tier 1 scale project with compelling projected returns (10 October 2022)
Renascor	Siviour	DFS complete	472	150,000	n/a	Company Announcement: Siviour Battery Anode Material Study Results (8 August 2023)
NextSource Minerals	Molo	PEA complete	479	150,000	n/a	Company Announcement: NextSource Materials Announces Preliminary Economic Assessment for a Mine Expansion of 150,000 Tonnes per Annum of SuperFlake® Graphite Concentrate (28 February 2022)
Blencowe	Orom-Cross	PFS complete	499	101,000	n/a	Company Announcement: Major Milestone as Blencowe Delivers US\$482M NPV Pre-Feasibility Study for Orom-Cross Graphite Project (19 July 2022)
EcoGraf	Epanko	Pre-development	508	73,000	n/a	Company Announcement: Epanko Pre-Development Program Delivers Outstanding Results (28 April 2023)
Syrah Resources <sup>1</sup>	Balama	Production	565	240,000	129,000	Company Presentation: Q2 2023 Quarterly Activities Report (18 July 2023)
SRG Mining	Lola	DFS updated	585	94,000	n/a	Company Announcement: SRG Announces Positive Economic Results of Updated Feasibility Study for Lola Graphite Project (27 February 2023)
Magnis Energy	Nachu	DFS updated	639	236,000	n/a	Company Presentation: BFS Update 2022 (2 November 2022)
Evion Group	Maniry	DFS complete	658	52,000	n/a	Company Announcement: DFS forecasts strong returns for Maniry Project (3 November 2022)
Northern Graphite	Okanjande	PEA complete	666	31,000	n/a	Company Announcement: Northern Graphite Completes Preliminary Economic Assessment on Relocating Processing Plant for Namibian Operations (28 August 2023)
Volt Resources	Bunyu	FS updated	670	24,780	n/a	Company Announcement: Feasibility Study Update for Bunyu Graphite Project Stage 1, Tanzania, delivers significantly improved economics (14 August 2023)
Evolution Energy	Chilalo	DFS complete	773	52,000	n/a	Company Announcement: FEED and updated DFS confirms Chilalo as a standout high margin, low capex and development-ready graphite project (20 March 2023)
Graphite One	Graphite One	PFS complete	1,394	51,813	n/a	Company Announcement: Graphite One Advances its United States Graphite Supply Chain Solution Demonstrating a Pre-tax USD\$1.9B NPV (8%), 26.0% IRR and 4.6 Year Payback on its Integrated Project (29 August 2022)

Note: Canadian dollar (CAD) costs converted to US\$ at exchange rate per source documentation.

1. Operating costs shown are last reported C1 cash costs as at April 2023; Steady State Production relates to company guidance; current production is total of production reported in last four quarters

# Appendix 12: Rutile Mineral Resources Information

(Slide 39)

Ref	Company	Project	Status	Source
1	Sierra Rutile	Sierra Rutile	Production & Development	<a href="https://sierra-rutile.com/our-operations-assets/ore-resources-and-mineral-resources/">https://sierra-rutile.com/our-operations-assets/ore-resources-and-mineral-resources/</a>
2	Iluka Resources	Balranald	Development	Iluka Resources Limited Annual Ore Reserve and Resources as at 31 December 2022: <a href="https://iluka.com/media/k40pfhj5/resource-and-reserve-deposit.pdf?lang=en-AU">https://iluka.com/media/k40pfhj5/resource-and-reserve-deposit.pdf?lang=en-AU</a>
3	Base Resources	Kwale	Production	2023 Mineral Resources and Ore Reserves Statement (released on ASX 11 August 2023)

## Detailed Mineral Resources by Category

1. Sierra Rutile – Sierra Rutile			
	Mt	Rutile Grade*	In-situ Rutile
Measured	181	1.3%	2.4
Indicated	314	1.0%	3.1
Inferred	284	0.9%	2.7
<b>Total</b>	<b>779</b>	<b>1.0%</b>	<b>8.1</b>
2. Iluka Resources - Balranald			
	Mt	Rutile Grade*	In-situ Rutile
Measured	6	5.7%	0.3
Indicated	35	4.1%	1.2
Inferred	13	3.0%	0.4
<b>Total</b>	<b>54</b>	<b>3.7%</b>	<b>2.0</b>
3. Base Resources - Kwale			
	Mt	Rutile Grade*	In-situ Rutile
Measured	112	0.2%	0.2
Indicated	69	0.2%	0.2
Inferred	3	0.2%	0.1
<b>Total</b>	<b>184</b>	<b>0.2%</b>	<b>0.5</b>

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



# Appendix 13: Graphite Resource Information

(Slide 40)

Ref	Company	Project	Project Status	Source
1	Syrah Resources	Balama	Production	<a href="https://www.syrahresources.com.au/our-business/reserves-resources">https://www.syrahresources.com.au/our-business/reserves-resources</a>
2	Volt Resources	Bunyu	FS Complete	<a href="https://voltresources.com/assets/bunyu-graphite-project/">https://voltresources.com/assets/bunyu-graphite-project/</a>
3	Black Rock Mining	Mahenge	FS Complete	ASX Announcement: <a href="https://blackrockmining.com.au/wp-content/uploads/BlackRockCompletesFEEDAndDFSUpdate.pdf">https://blackrockmining.com.au/wp-content/uploads/BlackRockCompletesFEEDAndDFSUpdate.pdf</a>
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	<a href="https://www.nextsourcematerials.com/graphite/molo-graphite-project/">https://www.nextsourcematerials.com/graphite/molo-graphite-project/</a>
7	Graphite One	Graphite One	PEA Complete	<a href="https://www.graphiteoneinc.com/graphite-one-increases-tonnage-grade-and-contained-graphite-of-measured-and-indicated-and-inferred-resources-in-updated-mineral-resource-estimate/">https://www.graphiteoneinc.com/graphite-one-increases-tonnage-grade-and-contained-graphite-of-measured-and-indicated-and-inferred-resources-in-updated-mineral-resource-estimate/</a>
8	Focus Graphite	Lac Tetepisca	Resource	<a href="https://focusgraphite.com/focus-graphite-reports-major-maiden-mineral-resource-estimate-at-lac-tetepisca-quebec/">https://focusgraphite.com/focus-graphite-reports-major-maiden-mineral-resource-estimate-at-lac-tetepisca-quebec/</a>

## Detailed Mineral Resources by Category

1. Syrah Resources – Balama			
	Mt	TGC (%)	In-situ TGC
Measured	22	17.0%	3.7
Indicated	240	13.0%	31.2
Inferred	774	11.0%	85.1
<b>Total</b>	<b>1,036</b>	<b>11.6%</b>	<b>120.0</b>
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
<b>Total</b>	<b>461</b>	<b>4.9%</b>	<b>22.6</b>
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
<b>Total</b>	<b>213</b>	<b>7.8%</b>	<b>16.6</b>
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
<b>Total</b>	<b>83.2</b>	<b>17.6%</b>	<b>14.7</b>

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
<b>Total</b>	<b>174</b>	<b>5.4%</b>	<b>9.3</b>
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
<b>Total</b>	<b>254</b>	<b>0.2%</b>	<b>0.7</b>
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
<b>Total</b>	<b>103</b>	<b>8.0%</b>	<b>8.2</b>
8. Focus – Lac Tetepisca			
	Mt	TGC (%)	In-situ TGC
Measured	-	-%	-
Indicated	59	10.6%	6.3
Inferred	15	11.1%	1.6
<b>Total</b>	<b>74</b>	<b>10.6%</b>	<b>7.9</b>

# Appendix 14: Graphite Resource Global Warming Potential

(Slide 9)

Ref	Company	Project	Project Status	GWP (CO <sub>2</sub> e)	LCA Boundary	Source
1	Syrah Resources	Balama	Production	0.42	FOB Nacala	ASX Announcement: Syrah approves Balama solar and battery system final investment decision (released 6 Apr 2022)
2	Northern Graphite (Electric Fleet Scenario)	Bisset Creek	FS & PEA	0.45	Cradle-to-gate	TSX Announcement: Northern Graphite Plans to Further Reduce Carbon Footprint of Bissett Creek Project (released 9 Mar 2022)
3	Evolution Energy	Chilalo	DFS Underway	0.49	Cradle-to-gate	ASX Announcement: Independent life cycle assessment demonstrates Chilalo's low carbon footprint (released 6 Oct 2022)
4	Other Tanzania Production	n/a	n/a	0.60	Cradle-to-gate	Provided by LCA Manager, Minviro Ltd
5	China Production	n/a	n/a	1.20	Cradle-to-gate	Provided by LCA Manager, Minviro Ltd
6	Northern Graphite	Bissett Creek	FS & PEA	2.20	Cradle-to-gate	TSX Announcement: Northern Graphite Plans to Further Reduce Carbon Footprint of Bissett Creek Project (released 9 Mar 2022)

# Appendix 15: Graphite Peer Pricing Information

(Slide 27)

Company	Project	Graphite Concentrate Price (US\$/t FOB)	Source
Northern Graphite	Lac-des-Iles	\$1,601	Technical Report on the Lac-des-Iles Quarry, Quebec Report for Ni 43-101 (22 December 2021)
Nouveau Monde	Matawinie	\$1,675	Company Announcement: NextSource Materials Announces Preliminary Economic Assessment for a Mine Expansion of 150,000 Tonnes per Annum of SuperFlake® Graphite Concentrate (28 February 2022)
Magnis Energy	Nachu	\$1,847	Company Presentation: BFS Update 2022 (2 November 2022)
Black Rock Mining	Maniry	\$1,709	Company Announcement: Black Rock Completes Front End Engineering Design, Reconfirming Mahenge as Tier 1 scale project with compelling projected returns (10 October 2022)
Evion Group	Mahenge	\$1,448	Company Announcement: DFS forecasts strong returns for Maniry Project (3 November 2022)
SRG Mining	Lola	\$1,400	Company Announcement: SRG Announces Positive Economic Results of Updated Feasibility Study for Lola Graphite Project (27 February 2023)
Evolution Energy	Chilalo	\$1,614	Company Announcement: FEED and updated DFS confirms Chilalo as a standout high margin, low capex and development-ready graphite project (20 March 2023)
Focus Graphite	Lac Knife	\$1,679	Company Announcement: Focus Graphite Announces Benchmark Feasibility Study Update for its Lac Knife Graphite Project, Québec (6 March 2023)
EcoGraf	Epanko	\$1,800	Company Announcement: Epanko Pre-Development Program Delivers Outstanding Results (28 April 2023)
Northern Graphite	Okanjande	\$1,550	Company Announcement: Northern Graphite Completes Preliminary Economic Assessment on Relocating Processing Plant for Namibian Operations (28 August 2023)
Volt Resources	Bunyu	\$1,288	Company Announcement: Feasibility Study Update for Bunyu Graphite Project Stage 1, Tanzania, delivers significantly improved economics (14 August 2023)



# Appendix 16: Rutile vs. Alternatives

Scope 1 & 2

Scope 3

**Natural Rutile**  
**0.1**  
tonnes CO<sub>2</sub>e  
per tonne of titanium  
feedstock

**Ilmenite**  
upgraded alternatives  
**Up to 3.3**  
tonnes CO<sub>2</sub>e  
per tonne of titanium  
feedstock

