

Sheffield Resources Limited

Sandsational returns

July 2023

Recommendation: BUY

- **A globally significant project with attractive economics in a tier one location**
- **Construction is 90% complete with first mineral sands revenue next half**
- **Trading at a discount to project NPV, excluding its organic growth options**

ASX: SFX

Share Price: \$0.47

Target Price: \$1.15

M/Cap.: \$185M

Valuation: \$1.15/share

Valuation: \$462M

Shares/options: 392.6

Monthly T/over: \$2M



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Petra Capital Pty Ltd

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Figure 1: Top 20 Shareholders (June 2023)

Name	Amount	%
1 Yangang (Hong Kong)	38,870,771	9.9%
2 BlackRock Investment Mgt	25,515,475	6.5%
3 Mr & Mrs Walter MG Yovich	17,375,524	4.4%
4 Mr Walter MG Yovich	14,020,611	3.6%
5 Konwave	13,413,723	3.4%
6 Thorney Investments	10,999,999	2.8%
7 Private Clients of HUB 24 Custodial Services	9,931,602	2.5%
8 Mr & Mrs Albert J Matthews	8,400,000	2.1%
9 Private Clients of FNZ Custodians	8,265,767	2.1%
10 Mr David L Archer	8,182,055	2.1%
11 Mr Bruce M McQuitty	7,991,289	2.0%
12 Mr William J Burbury	7,482,000	1.9%
13 Ms Anna M Weldon	4,737,554	1.2%
14 Mr & Mrs Gilbert M Pesenti	4,285,714	1.1%
15 Dimensional Fund Advisors	4,046,102	1.0%
16 Mr & Mrs Rees HJ Jones & Mr Walter MG Yovich	3,961,612	1.0%
17 Mr & Mrs Franklyn R Brazil	3,191,431	0.8%
18 Baumann & Cie	3,000,000	0.8%
19 Mr Allan W Tattersfield	2,942,307	0.7%
20 Kimberley Land Council Aboriginal Corp	2,836,120	0.7%
Total	199,449,656	50.8%

Source: IRESS

Sheffield Resources Ltd (SFX)

BUY

Share Price: A\$0.47

Sandsational returns

Target Price: A\$1.15

Sheffield Resources Ltd (SFX) is on the verge of becoming a mineral sands producer at its 50% owned Thunderbird Mineral Sands Project, located in the Kimberly region of WA. Thunderbird is a large, long-life asset in 50/50 joint venture with Yansteel, where Stage 1 is fully funded, 90% complete and tracking on time and budget. A simplified flowsheet will deliver concentrate products into a robust pricing environment, with strong cash flow to assist delivery of Stage 2 from 2029. In addition, SFX's South Atlantic Project mineral sands project provides scope for further growth and diversification. SFX trades at 0.41x P/NPV, a punitive discount given the minimal remain capex and low-technical risk development plan being implemented. We see SFX re-rating upon successful commissioning and sales over the coming 6-12 months. We initiate coverage with a BUY rating and A\$1.15/sh price target (1xP/NPV₁₀).

A simple, scalable project in a tier one jurisdiction

- Construction at Thunderbird is 90% complete and fully funded, with first sales expected early in 1H CY24
- The March 2022 DFS outlined 1.0-1.8Mtpa of mineral sands concentrate at a revenue to cost ratio of 2.2x
- The study outlined average annual free cash flow of A\$162m, a A\$1.3bn NPV₈ and 27.5% IRR (100% basis)
- Construction has progressed very well, with capital costs in line with the A\$484m budget, despite recent inflation
- We forecast low risk organic growth when plant capacity at Thunderbird is doubled in 2029, post debt repayment
- The project will supply 6.5% of global zircon supply and 3.5% of titanium feedstock supply over a 35-year period

Significant upside to our A\$1.15/sh price target

- Our fully diluted A\$1.15/sh target is based on 1.0x NPV₁₀
- We see material upside to the A\$0.81/sh valuation for Stage 1 alone, and back this management team to deliver on the organic growth opportunities in the portfolio

Mineral sands markets are supply constrained

- Around 53% of Thunderbird revenue is from zircon, with commissioning well timed given prices at multi-year highs
- End demand for both titanium and zircon is relatively GDP linked and also correlated to global housing trends
- While we conservatively forecast prices to fall from spot of US\$1,950/t to US\$1,300/t longer term, we highlight that spot pricing improves our price target to A\$2.60/sh

Key Dates Ahead

- March Q'24 – First revenue from Thunderbird
- Dec Q'24 – Thunderbird hits nameplate capacity
- July 2024 – South Atlantic Project investment decision

Company Data

Shares – ordinary (M)	392.6
Market capitalisation (\$M)	185
12 month low/high (\$)	0.4/ 0.68
Average monthly turnover (\$M)	2
GICS Industry	Metals & Mining

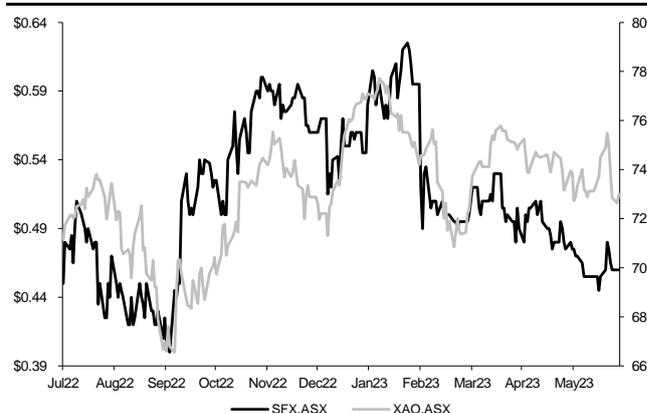
Financial Summary (attributable to SFX's 50% share)

Year end June	2024F	2025F	2026F	2027F	2028F
Revenue (\$M)	37.4	168.7	177.0	172.3	170.7
Costs (\$M)	(42.5)	(102.8)	(112.2)	(116.2)	(117.4)
EBITDA (\$M)	(5.1)	65.8	64.9	56.1	53.3
NPAT (\$M)	(29.9)	21.0	24.2	17.8	4.5
EPS (¢ps)	(7.6)	5.4	6.2	4.5	1.2
EPS growth (%)	n.m.	n.m.	0	(0)	(1)
PER (x)	(6)	9	8	10	41
Op. Cashflow (\$M)	(16.5)	45.4	44.7	37.6	28.7
OCFPS (¢ps)	(4.2)	11.6	11.4	9.6	7.3
POCFPS (x)	n.m.	9.9	10.1	12.0	15.8
EV (\$M)	111	58	95	156	103
EV / EBITDA (x)	n.m.	n.m.	n.m.	n.m.	n.m.
Payout ratio (%)	-	-	-	-	-
Dividends (¢ps)	-	-	-	-	-
Yield (%)	-	-	-	-	-
Franking (%)	-	-	-	-	-

Board

Director	Position	Executive
Bruce Griffin	Chair	Yes
Ian Macliver	Director	No
John Richards	Lead Independent Director	No
Vanessa Kickett	Director	No
Gordon Cowe	Director	No

SFX – performance over one year



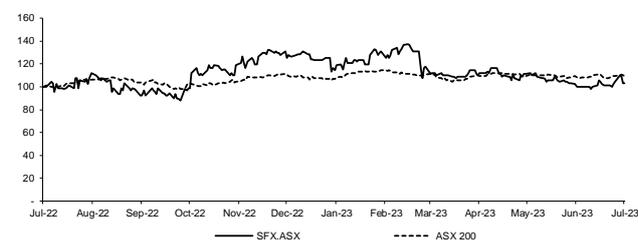
Analysis

Sheffield Resources (SFX)

Year end 30 June

Recommendation		Buy
Price	\$	0.47
Target Price (12-month)	\$	1.15
Upside / (Downside)	%	145%
52 week high / low	\$	0.625 - 0.4
Market capitalisation	\$m	185
Shares on issue	m	393
Options/Rights outstanding	m	8
Shares raised*	m	0
Shares on issue (diluted)	m	400

SHARE PRICE VS INDEX



PROFIT & LOSS (attributable)	2024E	2025E	2026E	2027E	2028E
Revenue	\$M 37	169	177	172	171
Operating Costs	\$M (42)	(101)	(110)	(114)	(115)
Exploration	\$M (1)	(2)	(2)	(2)	(2)
Other	\$M -	-	-	-	-
EBITDA	\$M (5)	66	65	56	53
Dep. & Amort.	\$M (12)	(22)	(18)	(18)	(22)
EBIT	\$M (17)	43	46	38	31
Net Interest	\$M (12)	(13)	(12)	(13)	(25)
Pre-Tax Profit	\$M (30)	30	35	25	6
Tax	\$M -	(9)	(10)	(8)	(2)
Net Profit	\$M (30)	21	24	18	5
Abnormal	\$M -	-	-	-	-
Reported Profit	\$M (30)	21	24	18	5

ASSUMPTIONS	2024E	2025E	2026E	2027E	2028E
A\$/US\$ exchange rate	A\$/US\$ 0.69	0.73	0.75	0.75	0.75
Zircon reference price	US\$/t 1,800	1,525	1,375	1,300	1,300
Thunderbird Zircon conc.	US\$/t 885	749	676	639	639
Ilmenite mag conc.	US\$/t 130	130	130	130	130

CASH FLOW (attributable)	2024E	2025E	2026E	2027E	2028E
Operating Cashflow	\$M (17)	45	45	38	29
Capex	\$M (47)	(2)	(2)	(18)	(74)
Exploration	\$M (1)	(2)	(2)	(2)	(2)
Other	\$M -	-	-	-	-
Investing Cashflow	\$M (48)	(4)	(4)	(20)	(76)
Equity Issues	\$M -	-	-	-	-
Borrowings / Prepayments	\$M 69	11	-	-	100
Financing Cashflow	\$M 69	11	(78)	(79)	100
Free Cashflow	\$M (64)	42	41	17	(48)
Surplus Cash Flow	\$M 4	52	(37)	(62)	52

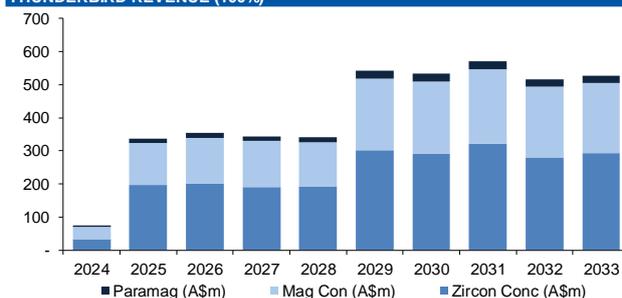
RESERVES AND RESOURCES

	Mt	HM (%)	Z (%)	HiTi (%)	Leu (%)	Ilm (%)
Reserve	754	11%	0.8%	0.3%	0.3%	3.1%
Resource	1,050	12%	0.9%	0.3%	0.3%	3.3%

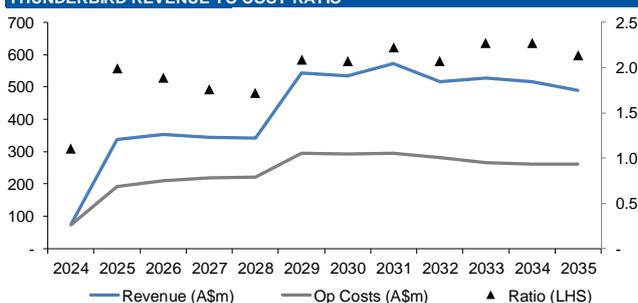
THUNDER BIRD PRODUCTION (100%)	2024E	2025E	2026E	2027E	2028E
Zircon in Zircon Conc	14	95	112	113	113
Zircon Conc	27	189	223	224	225
Mag Conc	208	712	798	800	780

Revenue to cost ratio: 1.1 (2024E), 2.0 (2025E), 1.9 (2026E), 1.8 (2027E), 1.7 (2028E)

THUNDERBIRD REVENUE (100%)



THUNDERBIRD REVENUE TO COST RATIO



BALANCE SHEET (attributable)	2024E	2025E	2026E	2027E	2028E
Cash	\$M 74	126	89	28	80
Other Current	\$M 1	1	1	1	1
Total Current	\$M 75	127	90	29	81
PP&E	\$M 218	197	180	180	233
Other	\$M 116	116	116	116	116
Total NC Assets	\$M 333	312	295	296	348
Total Assets	\$M 408	439	386	325	429
Current Liab	\$M 12	12	12	12	12
Non Current Liab	\$M 152	163	85	6	106
Total Liabilities	\$M 164	175	97	18	118
Net Assets	\$M 244	265	289	307	311
Equity	\$M 244	265	289	307	311
Total Debt	\$M 146	157	79	0	100
Net Debt / (Cash)	\$M 73	31	(10)	(28)	20

RATIO ANALYSIS	2024E	2025E	2026E	2027E	2028E
EPS	¢ (7.6)	5.4	6.2	4.5	1.2
PER	x (6.2)	8.8x	7.6x	10.4x	40.8x
EPS Growth	% n.m.	n.m.	15%	(27%)	(75%)
EV/EBITDA	x (50.7)	3.3x	2.7x	2.8x	3.8x
EV/OCF	x	-	-	-	-
FCFPS	¢ (16.2)	11.2	11.0	4.9	(11.7)
FCF Yield	% n.m.	24%	23%	10%	n.m.
Payout Ratio	% 0%	0%	0%	0%	0%
DPS	¢ -	-	-	-	-
Yield	% -	-	-	-	-
Franking	% 0%	0%	0%	0%	0%
Gearing ND/E	% 30%	12%	(4%)	(9%)	6%
Interest Cover	x (1.4)	3.2	3.9	3.0	1.3
EBITDA Margin	% (14%)	39%	37%	33%	31%
EBIT Margin	% (47%)	26%	26%	22%	18%
Return On Assets	% (7%)	7%	9%	8%	2%
Return On Equity	% (12%)	8%	8%	6%	1%
Eff Tax rate	% 30%	30%	30%	30%	30%

VALUATION - Fully Diluted, 10% Discount Rate

	A\$m	A\$/Sh
Thunderbird Project (50% ownership)	537	1.34
South Atlantic Project (20% ownership)	20	0.05
Exploration	10	0.02
Attributable Net Debt	(73)	(0.18)
Corporate	(32)	(0.08)
Group Valuation	462	1.15

Source: Petra Capital

Executive Summary

Entering production this half in a tier one jurisdiction

Sheffield Resources (SFX) is an ASX-listed mineral sands developer through its 50% owned Thunderbird Mineral Sands Project, located in the Kimberley region of Western Australia. Construction at Thunderbird is 90% complete, with first production expected this half and first sales in the March quarter 2024. Thunderbird's March 2022 DFS outlined a staged project capable of producing up to 1.8Mtpa of mineral sands concentrate at a revenue to cost ratio of 2.2x. These attractive margins delivered a study post-tax IRR of 28% and an NPV₈ of A\$1.3bn (100%). It has a 700Mt Reserve and 35 year mine life, capable of producing 6.5% of the world's zircon needs and 3.5% of titanium feedstock requirements. Thunderbird is a globally significant project with attractive economics in a tier one location.

Successful commissioning likely to drive a re-rating

Construction and commissioning is a time of heightened operational and balance sheet risk for mining projects, with equities often trading at a discount until these risks are overcome. We note Thunderbird capital costs are in line with the original A\$484m total funding requirement, with first production due for delivery in the March Q 2024. SFX trades at 0.41x P/NPV and we believe the discount is overly punitive given risk of capital overrun has been largely mitigated. With first production expected within 6 months, we don't believe investors will be waiting long for the stock price to re-rate. We also note the relatively simple development and operating approach the joint venture has taken, with conventional dozer-trap mining feeding a wet concentrate plant (WCP) producing three concentrate products for sale. There is no Mineral Separation Plant (MSP) to produce final zircon and/or titanium product streams.

Organic growth options via expansion and a second project

SFX is fully funded to 1Mtpa of production of mineral sands concentrate at Thunderbird, which we value at A\$0.81/sh, representing 50% upside from the current share price. We expect the cashflows from Stage 1 will pay down debt by 2027, after which we anticipate the joint-venture to approve the doubling of plant capacity. Doubling plant capacity is expected to cost A\$258m in capital for an incremental A\$394m NPV₁₀ on our price forecasts, equating to an additional A\$0.53/sh in NPV.

In addition to Thunderbird, SFX secured an option over the South Atlantic Mineral Sands Project in Brazil in January 2023. The project has a large exploration target of 500-720Mt at 3.2-4.0% HM with a Zr-dominant assemblage. SFX can pay US\$12.5m for a 20% stake up to July-24. In the interim, the US\$2.5m option payment is funding a Resource and DFS, upon which to base an investment decision.

A\$1.15 price target on Petra forecasts, A\$2.60/sh at spot prices

Our A\$1.15/sh price target is based on 1.0x NPV₁₀ and an average price of US\$1,314/t and 0.75 AUD. We expect zircon prices to decline from the spot price of US\$1,950/t as more supply enters the market and Chinese demand softens due to a slowing property market. Should spot currency and commodity prices continue, SFX has material leverage and upside (Figure 2).

Figure 2: Valuation sensitivity to price & FX forecasts, Petra NPV & spot valuation ranges

	Zircon USD	1,100	1,200	1,300	1,400	1,500	1,600	1,700	1,800	1,900
AUD										
0.90		0.33	0.45	0.57	0.68	0.80	0.91	1.03	1.14	1.25
0.85		0.48	0.61	0.73	0.85	0.97	1.10	1.21	1.34	1.46
0.80		0.65	0.78	0.91	1.04	1.17	1.30	1.43	1.56	1.69
0.75		0.84	0.98	1.12	1.26	1.40	1.54	1.68	1.82	1.96
0.70		1.06	1.21	1.36	1.51	1.66	1.81	1.96	2.11	2.26
0.65		1.31	1.47	1.63	1.79	1.96	2.12	2.28	2.44	2.60
0.60		1.61	1.78	1.96	2.13	2.31	2.48	2.66	2.83	3.01

Source: Petra NPV shaded grey based on LT forecasts of US\$1,300/oz & 0.70 FX; spot valuation in blue

Valuation and Price Target

We value SFX's 50% share in Thunderbird at A\$537m (A\$1.34/sh) using a 10% real discount rate, an average zircon price of US\$1,314/t and 0.75 AUDUSD, over a 35 year mine life. Figure 3 outlines the estimates and key drivers of our valuation and earnings, which largely align with the DFS metrics.

Figure 3: Petra base case assumptions

Thunderbird (50% owned)	Petra	Comments
Annual concentrate production	1Mtpa → 1.8Mtpa	Production starts at 1Mtpa, growing to 1.8Mtpa as plant capacity is doubled in 2029. Production falls back towards 1.0Mtpa at the end of the mine life on declining grades. The average production level is 1.4Mtpa for the life of mine.
Throughput	10.4Mtpa → 20.8Mtpa ore	In line with the DFS, which outlines a staged development approach.
Average head grade	0.8% Zircon 2.9% Ilmenite	Our model largely follows the grade profile outlined in the DFS. However, given we delay the expansion by one year, there are modest differences in the 2028-2030 period.
Recovery	80% Zircon 85% Ilmenite	In line with the DFS.
Operating costs	Stage 1 : A\$16.80/t ore Stage 2: A\$10.90/t ore	Our modelling uses the March 2022 DFS operating cost as a starting point. We have escalated the mining, processing, logistic and G&A costs in line with the sector inflation we have seen. Over the first 5 years, this has increased operating costs by an average of 14%.
Zircon pricing	Benchmark: US\$1,314/t Achieved: US\$694/t conc	We assume reference zircon prices of US\$1,314/t FOB in line with our industry coverage. This is below the US\$1,516/t SFX used in its DFS. On a per tonne basis, we expect SFX's zircon concentrate to achieve 47-53% of the benchmark price, with higher achievement at high prices.
Titanium pricing	Ilmenite conc: US\$130/t	Given the fixed price nature of the magnetic ilmenite concentrate, we use US\$130/t in line with the contract SFX has executed with offtake partner Yansteel.
Revenue to cost ratio	1.8x life of mine	Given stronger grades and prices in the early years, this trends from 2.1x in 2025 to 1.4x at the end of the mine life. Our lower price and higher cost assumptions are the driver of our estimate being below the 2.2x in the 2022 DFS.
Mine life	35 years	We forecast a mining inventory of 754Mt of ore, in line with the DFS reserve.
SFX Valuation (NPV₁₀)	A\$537m	We value SFX's share of Thunderbird at A\$537m, with a higher discount rate, lower prices and higher costs the main different to the A\$695m NPV ₈ outlined in the DFS.

Source: Petra Capital estimates

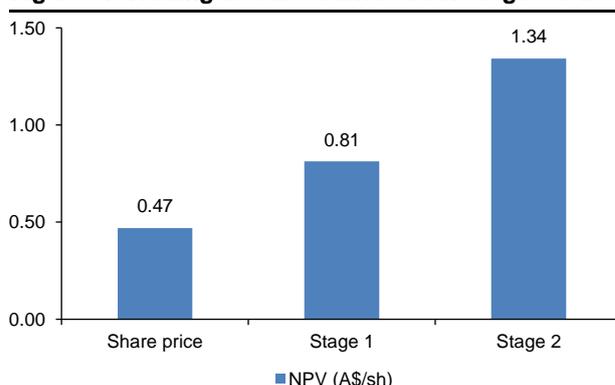
Our A\$1.15/sh price target is based on 1.0x NPV₁₀ with the components summarised in Figure 4. We note that the current share price does not give full value for Stage 1 of the Thunderbird Project, let alone the low-risk expansion (Figure 5).

Figure 4: NPV Valuation Summary

	A\$m	A\$/Sh
Thunderbird (50%)	537	1.34
South Atlantic (20%)	20	0.05
Exploration	10	0.02
Attributable Net Debt	(73)	(0.18)
Corporate	(32)	(0.08)
Group NPV	462	1.15

Source: Petra Capital

Figure 5: Trading at a discount to both Stage 1 & 2

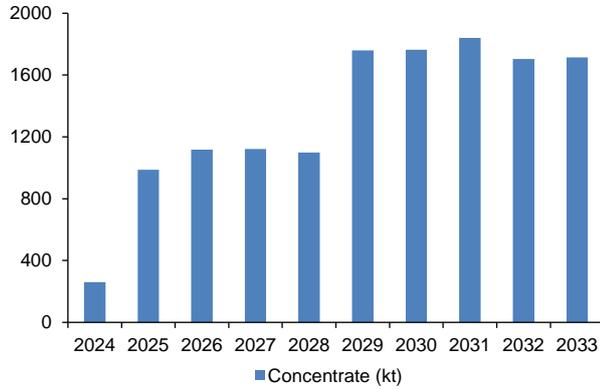


Source: Company Reports, Petra Capital

July 2023

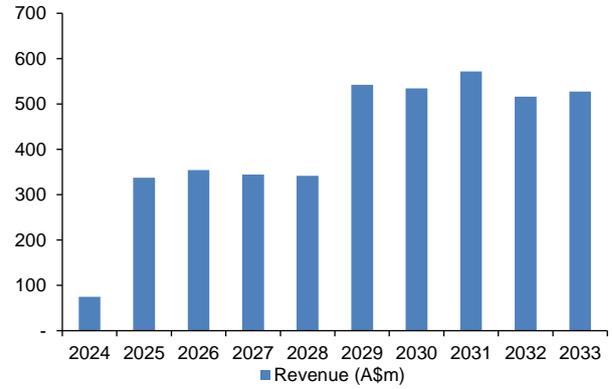
Petra Forecasts (100% basis)

Figure 6: Annual concentrate production



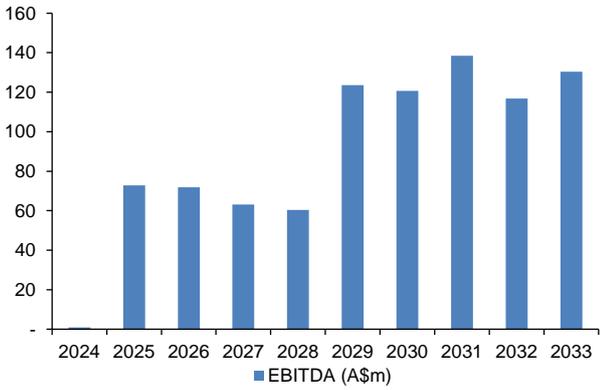
Source: Petra Capital, Financial Years

Figure 7: Annual revenue (A\$m)



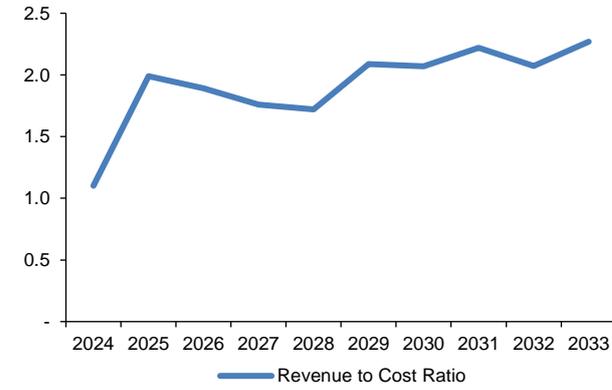
Source: Petra Capital, Financial Years

Figure 8: Annual Project EBITDA (A\$m)



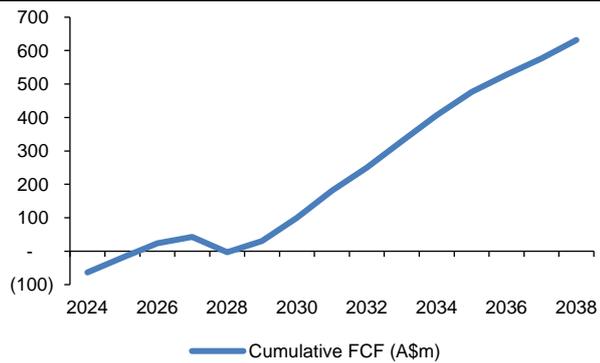
Source: Petra Capital, Financial Years

Figure 9: Revenue to cost ratio (x:x)



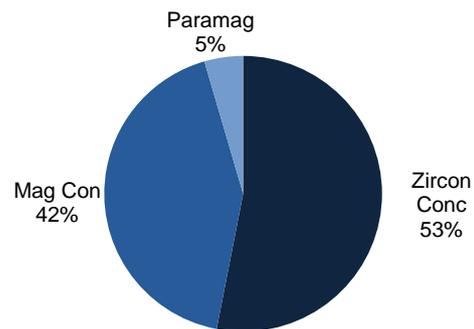
Source: Petra Capital, Financial Years

Figure 10: Cumulative FCF – SFX basis (A\$m)



Source: Petra Capital, Starts negative given capex has been spent

Figure 11: Sales mix – by revenue



Source: Petra Capital, At steady state on Petra price deck

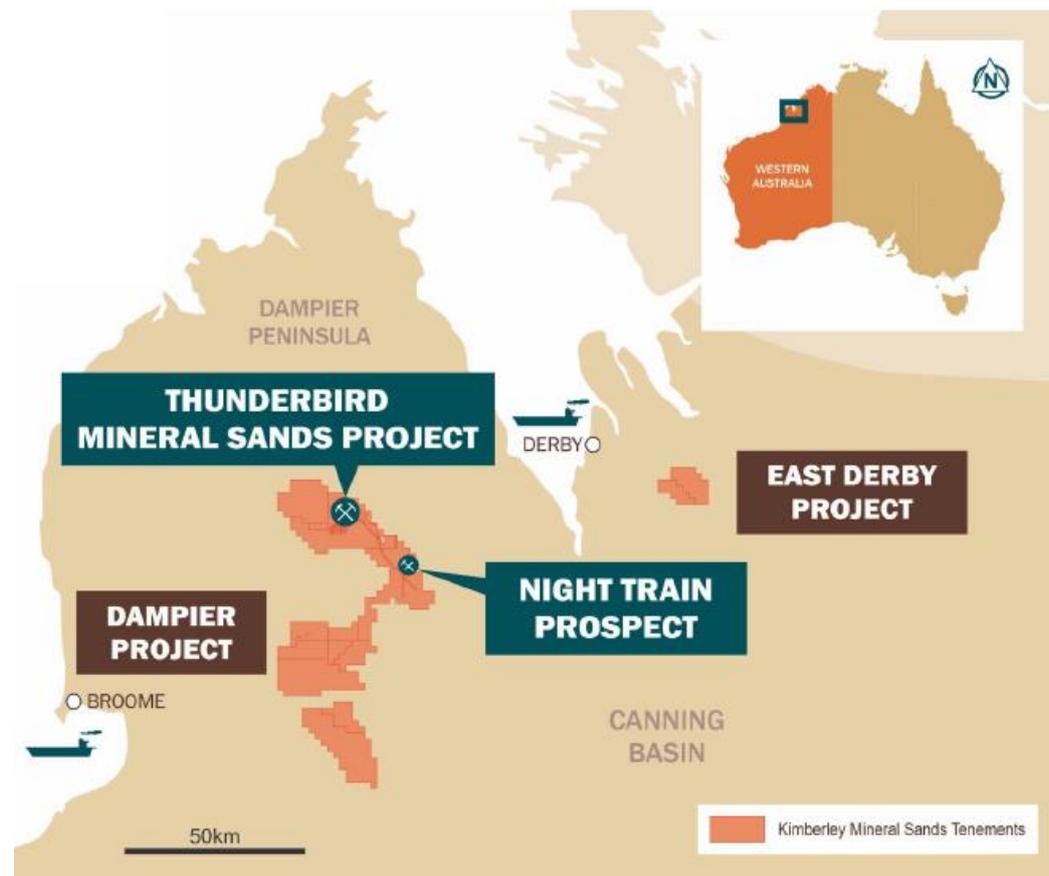
An overview of Sheffield Resources

Sheffield Resources is an ASX-listed, Perth-based mineral sands developer through its 50% owned Thunderbird project, located 100km from Broome, in WA (Figure 12). Thunderbird's March 2022 DFS outlined a staged project capable of producing over 1.8Mtpa of mineral sands concentrate at a revenue to cost ratio of 2.4x. The DFS outlined a compelling 27.5% post-tax IRR.

SFX was granted the Thunderbird exploration licences in 2011 and discovered Thunderbird in 2012. The company was awarded the Diggers & Dealers "Explorer of the Year" in 2013. SFX completed a DFS in 2016, however a combination of low mineral sands pricing and a relatively complicated flowsheet led to the project not advancing for some years. Mr. Bruce Griffin was appointed commercial director in June 2020, following a consulting engagement where he led a study to assess a range of project development options for Thunderbird. In August 2020, when SFX had a market capitalisation of around \$50m, Chinese steel and industrial company Yansteel agreed to pay A\$130m to acquire a 50% interest in the project via a 50:50 JV known as Kimberley Mineral Sands Pty Ltd (KMS). In April 2021, Mr Griffin was appointed Executive Chair. A March 2022 DFS simplified the flowsheet at Thunderbird, seeking to produce intermediate mineral sands products at lower capital intensity and operational complexity. In April 2022, NAIF approved a A\$160m debt facility followed by a US\$110m project finance facility from Orion in August, which led to a final investment decision (FID) in October 2022. Significant pre-FID site activities, including award of key contracts, resulted in a rapid transition to full construction, with the project 40% complete when FID was declared.

In June 2023 the company announced construction was 90% complete, capital costs were in line with the original A\$484m maximum funding requirement and that first product was expected to be delivered to customers in the March quarter 2024. The Project sits on granted Mining Leases and has all required Native Title and Heritage agreements in place. SFX had A\$25m of cash at end March 2023, with the KMS JV retaining sufficient cash and debt headroom to complete construction activities this year.

Figure 12: Thunderbird is in a tier 1 mining jurisdiction near infrastructure



Source: Petra Capital

Thunderbird DFS outlines an organic growth pathway

Sheffield delivered an updated DFS on Thunderbird in March 2022, which outlined a lower capital, staged development approach. The DFS stated a A\$1.4bn post-tax NPV₈ and 27% IRR using long term zircon prices of US\$1,516/t (Figure 13). Strong economics are paired with a simple plan, mining a thick and contiguous ore body in a single, staged open pit using conventional dozer-trap mining and wet processing into three concentrate products. Previous plans to produce final products (including a premium zircon and a roasted ilmenite) are no longer being considered.

Figure 13: The DFS outlined a high returning mineral sands project (100% basis – SFX owns 50%)

		Stage 1	Stage 2
Ore Mined	Mtpa	10.4Mtpa	20.8Mtpa
Zircon grades	%	1.2%	0.8%
Ilmenite grades	%	4.4%	2.9%
Zircon recovery to concentrate	%	79%	79%
Ilmenite recovery to concentrate	%	85%	85%
Average zircon conc. Production	kt	191	279
Average contained zircon	kt	95	140
Total Mineral Sand Conc. Produced	ktpa	1Mtpa	1.8Mtpa → 1Mtpa*
Undiscounted Cashflow	A\$M pa	\$120m	\$173m
NPV₅ (Real) (Post-Tax)	A\$M	\$842m	\$548m
Revenue to cost ratio		2.2	2.2
Capital Cost		\$361m	\$258m

Source: Company reports, *Grades are expected to fall towards the back end of the mine life

Key differences between our valuation of Thunderbird and the March 2022 DFS include:

- We assume long term zircon prices of US\$1,300/t FOB, vs. the US\$1,516/t assumed in the DFS
- We have inflated operating costs by 15% to capture industry cost inflation.
- We use a discount rate of 10% vs. the study assumption of 8%
- The DFS assumed an expanded plant starting in 2028, we have shifted this out one year as we expect the Orion debt to be paid off prior to additional capital spend on expansions
- We value the project post capex spend and at ownership at completion

Overall, we value SFX's 50% share in Thunderbird at \$537m vs. the A\$695m NPV outlined in the March 2022 DFS. As outlined in the announcement on 19 June 2023, construction of Thunderbird is 90% complete with the expected cost outcome within the original A\$484m funding budget (Figure 14 and Figure 15)

Figure 14: Stage 1 upfront capex

Description	Amount (A\$m)
Wet Concentrator Plant	64.4
Concentrate Upgrade Plant	26.7
Plant Area Infrastructure & Power Reticulation	17.9
Process Water Systems	11.7
EPCM, Commissioning & Indirects	49.9
General Infrastructure	51
Owners Costs	106.8
Contingency	32.8
Stage1 Upfront Capex	361.2

Source: Company Reports

Figure 15: Estimated total funding requirement

Description	Amount (A\$m)
Processing	170.6
Infrastructure	51
Owners Costs	106.8
Contingency	32.8
Stage1 Upfront Capex	361.2
Working Capital	20.4
Financing Costs	62.1
Cost Overrun Facility	40
Total Other Funding Requirements	122.5
Total Uses	483.7

Source: Company Reports

A high grade and long-life mineral sands operation

Geology is now better understood after two trial mining programs

Thunderbird is an off-shore, sub-wave base style deposit and the first to be discovered in the Canning Basin. Mineralisation occurs as a flat, thick, broad sheet-like body striking northwest and dipping shallowly under cover at around 4 degrees to the SW. It contains a continuous high-grade zone up to 43m thick and extends from surface to a maximum known depth of 155m over a 11km x 7km area. Greater than 70% conversion of the Mineral Resource to the Ore Reserve demonstrates high quality of Thunderbird Deposit (Figure 16 and Figure 17). Thunderbird is a world class deposit given its high grades and large Reserve size (Figure 18).

SFX completed two trial mining programs in late 2020 and mid-2021, which mined through a full section of the orebody. This identified a consistent zone of indurated material within 10-12 metres from surface (“T1”). This material was identified as a potential risk to mining and processing performance. As a result, SFX will pre-strip and stockpile this material to expose the “T2” horizon which is higher grade and has more favourable mining qualities. We have been impressed by the extensive works completed by SFX that have contributed to management’s thorough understanding of the ore body at Thunderbird.

Figure 16: Thunderbird Ore Reserves

Reserve	Mt	HM (%)	Z (%)	HiTi (%)	Leu (%)	Ilm (%)	Over (%)	Slimes (%)
Proved	239	12.9	0.96	0.29	0.28	3.4	14	16
Probable	514	10	0.79	0.26	0.27	2.9	11	15
Total	754	11	0.84	0.27	0.27	3.1	12	15

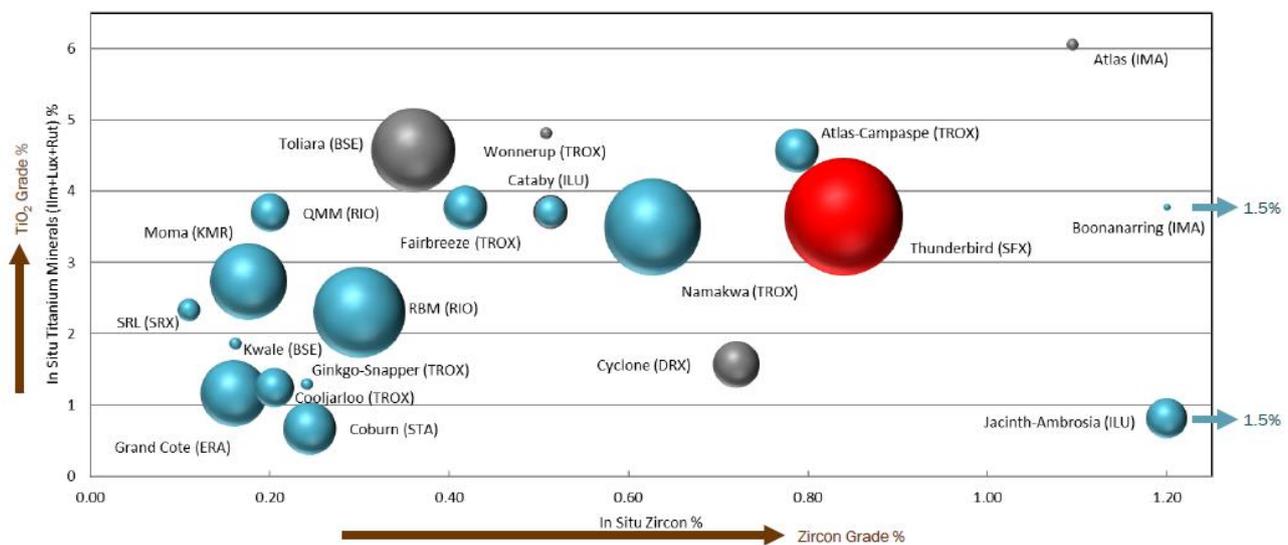
Source: Company reports,

Figure 17: Thunderbird Mineral Resources

	Mt	HM (%)	Z (%)	HiTi (%)	Leu (%)	Ilm (%)	Over (%)	Slimes (%)
Measured	220	32	1.07	0.31	0.27	3.9	15	16
Indicated	640	76	0.9	0.28	0.25	3.3	11	14
Inferred	180	20	0.87	0.27	0.26	3	9	13
Total	1,050	127	0.93	0.28	0.26	3.3	11	15

Source: Company reports,

Figure 18: Global zircon project comparison – Reserve size and grade (bubble = contained Reserve size)

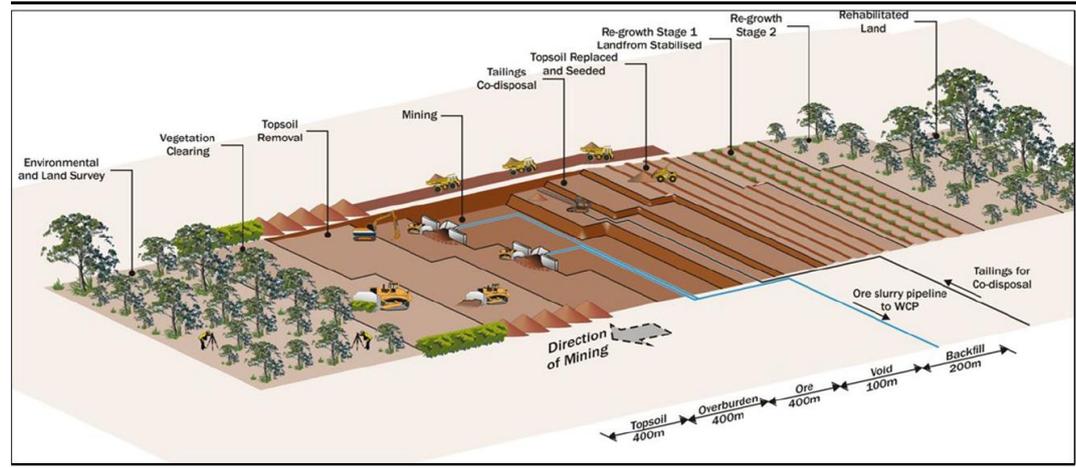


Source: Company reports

Mining

Thunderbird is a conventional dry-mining sand operation where a moving mining area extracts the ore, with waste returned to the pit soon after processing. This enables continuous and progressive rehabilitation of mined areas (Figure 19). Following mining and feed preparation through the Mining Unit Plant (MUP), the ore will be slurried and pumped to a nearby wet concentration plant (WCP). The MUP has a throughput capacity of 1,400tpd. The 2020 and 2021 trial mining programs confirmed the suitability of dozer push as the ore mining method and improved the understanding of mining costs, given 15% of the orebody reports to the oversize fraction, which has a rehandle cost associated with it.

Figure 19: Thunderbird mining schematic

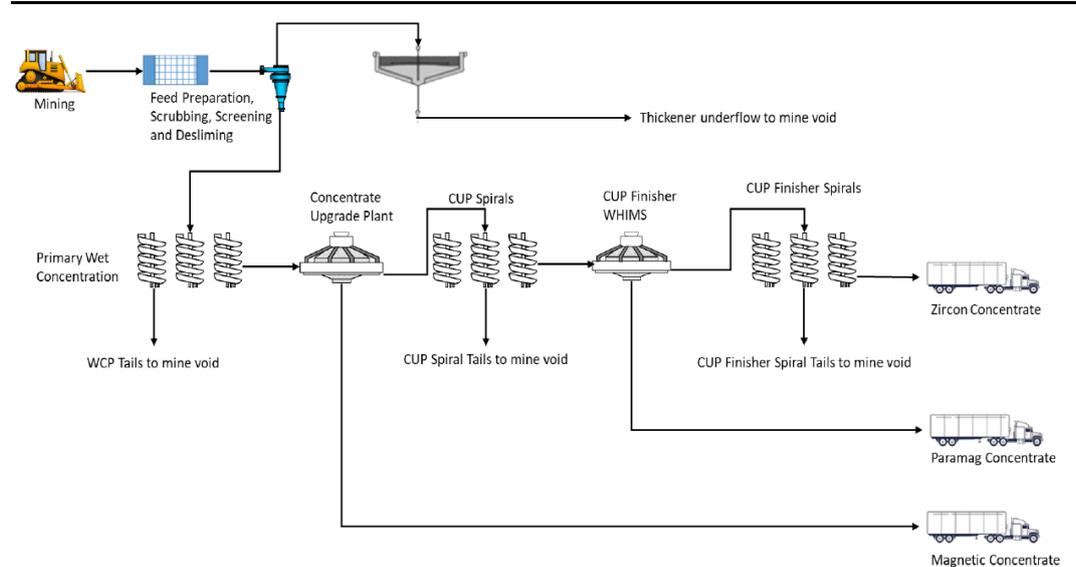


Source: Company Reports

Processing

The feed to the Wet Concentration Plant (WCP) is estimated at a rate of 1,085 dry tph of ore during Stage 1 at a size greater than 38µm and less than 2mm. The processing plant is of a conventional setup for mineral sands, involving gravity separation at the front end of the plant (spirals), followed by magnetic separation at the back end to split out the final product types (Figure 20). The non-magnetic fraction, containing zircon, rutile, leucoxene, and monazite is to be sold as a non-magnetic (zircon) concentrate. The magnetic fraction containing ilmenite and titanohematite forms the magnetic concentrate product.

Figure 20: Thunderbird processing flowsheet



Source: Company Reports

An 87.5% utilisation factor has been applied to the MUP and WCP operations and a 94% utilisation factor has been applied to the processing operations in determining annual operating hours and throughput capacity respectively. The MUP and WCP operations and the processing operations can operate independently of each other due to the installation of heavy mineral concentrate (HMC) stockpiles between the WCP and concentrate upgrade plant areas. The HMC stockpiles significantly increase operational flexibility. Our forecasts align with the DFS in regard to ramp up, where we expect the operation to hit nameplate production in the fourth quarter of operation (Q4 CY24). The Thunderbird sands are recognised as being fine grained, with this considered in the design of the processing plant. A slimes content of 15% is considered manageable.

Logistics and infrastructure

Plant infrastructure includes the Mining Unit Plant (MUP), Wet Concentration Plant (WCP), Concentrate Upgrade Plant (CUP), Non-Magnetic Finisher Circuit (NMFC) and site buildings, bore field, LNG gas supply and storage, power station and power distribution infrastructure, new roads and an accommodation village. Thunderbird is conveniently located near two existing ports, Broome and Derby. The Port of Broome is located 148km from the Project including 115km via major national highway, while the Port of Derby is 146km away, including 113km on major national highway. Port of Derby is the port chosen in feasibility studies as it has existing bulk facilities. The barging & transshipment of bulk products has been successfully operated at Derby by previous users at 500ktpa rate. We do not anticipate the Uranium-Thorium content of the zircon concentrate will present challenges for transportation.

Marketing agreements and achieved pricing

In 2019, management changed strategy from the 2017 DFS to produce interim mineral sands concentrates rather than final products. Given the higher capex required and the modest 15% IRR for upgrading, the decision was a positive economic trade and reduced the potential shareholder dilution in the project build. It also simplified the marketing process, with intermediate products having less stringent product specifications and requiring lower investment in the marketing and sales process. The SFX management team has considerable industry expertise and contacts, which facilitated the decision.

Zircon concentrate– sold to three Chinese offtake partners

On our commodity price forecasts, around 53% of Thunderbird revenue is from zircon concentrate, with 75% of forecast production covered under offtake agreements with three Chinese counterparties over a 5-yr period. The largest counterparty is Hainan Wensheng, the biggest processor of mineral sands concentrate in China. China has many processors capable of taking this type of concentrate and we estimate, in line with the DFS, that SFX can achieve 75% of the value of contained zircon units through its offtake agreements at current pricing. This discount accounts for the known iron-staining of around 40% of the Thunderbird zircon. Based on the expected concentrate product grade, we expect Sheffield's zircon concentrate on a tonnage basis to achieve 47% of the benchmark price at lower prices (e.g. our US\$1,300/t long term price) and up to 53% in strong price environments (current spot of US\$1,950/t).

Ilmenite concentrate (titanium feedstock with iron credits) – 100% offtake to Yansteel

SFX's magnetic concentrate is atypical for the market. It is a mixture of ilmenite and titanohematite that requires further reduction and magnetic separation. The ilmenite is ideal as feedstock for chloride slag (TiO₂) production and for direct use in sulfate pigment production. Titanohematite can be used in a steel production. This magnetic concentrate product will be sold to Thunderbird JV partner Yansteel who has built a downstream plant in China that can process this material. SFX has a life of mine binding offtake agreement with Yansteel for all ilmenite production from Stage one production, with fixed pricing for the first five years of US\$130/t. Concentrate from Thunderbird will comprise around half of the capacity of the Yansteel plant in China, which is currently sourcing material from third parties.

Thunderbird is also expected to produce a paramagnetic concentrate as a co-product. This will contain zircon, titanium and rare earth oxides. SFX has received offtake interest from prospective customers, however given this product represents less than 5% of revenue, the JV is expected to sell this product into spot markets. We assume the US\$107/t price outlined in the DFS in our forecasts.

South Atlantic Project to provide medium term growth

On 28 Feb 2023, SFX announced it would acquire a 20% interest in the South Atlantic Mineral Sands Project (South Atlantic) in Brazil. This was structured via a US\$2.5m loan which granted SFX an option for 20%, following a further US\$12.5m in staged payments. The current owner Rio Grande Mineração S/A (RGM) is a subsidiary of MSP Group, a large private company in Brazil. MSP is a controlling shareholder of TSX-listed Aura Minerals (gold/copper) and a private operating zinc/lead mine in Northern Brazil.

The project is a continuous sequence of dunes and beach sands over 80km located in Rio Grande do Sul in Brazil (Figure 21). Four main deposits have been identified within the project area: Retiro, Estreito, Capao do Meio and Bujuru, with an exploration target developed for the Retiro and Bujuru deposits. The exploration target is 500-720Mt grading 3.2-4.0% HM, with likely products including premium zircon and sulfate ilmenite.

In 2014, RGM completed reverse circulation air core (RCAC) drilling and bulk sample test work programs. In 2022, a program of sonic drilling was carried out by RGM over Retiro and Bujuru and test pitting was carried out on Bujuru. This data was considered in the calculation of the exploration target.

SFX has an option to acquire its 20% stake by July 2024. SFX's US\$2.5m contribution, combined with RGM contributing US\$3.0m, provides resources to execute an agreed work program, including:

- Drilling and JORC Mineral Resource estimate
- Finalisation of installation licence of the Retiro mining area
- Trial mining
- Complete DFS on current development concept
- Port and land access agreement
- Repeal of local municipal legislation limiting mining activities

The asset is located near infrastructure, with sealed roads and access to grid power. There is a deep-water port adjacent to the deposit with existing industrial companies and workforce in the area. Permitting appears to be the key risk for progressing the asset into production, given the location.

Figure 21: The South Atlantic Project is located in Brazil



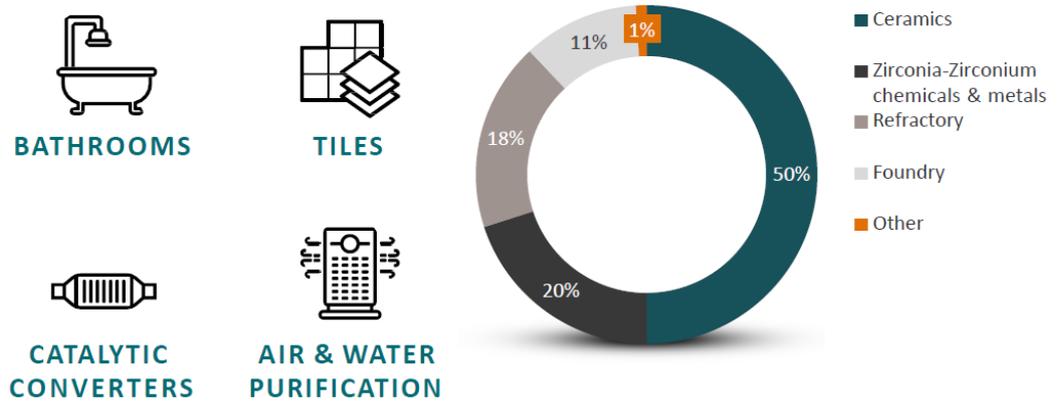
Source: Company Reports

Mineral Sands Markets

Zircon – 53% of Thunderbird Revenue based on Petra mineral sand price forecasts

- The primary market of zircon is ceramics
- Also used in refractories and foundry casting
- Growing use in catalytic converters, and air and water purification
- Thunderbird will produce 6.5% of the global Zircon supply

Figure 22: Global zircon market by demand type

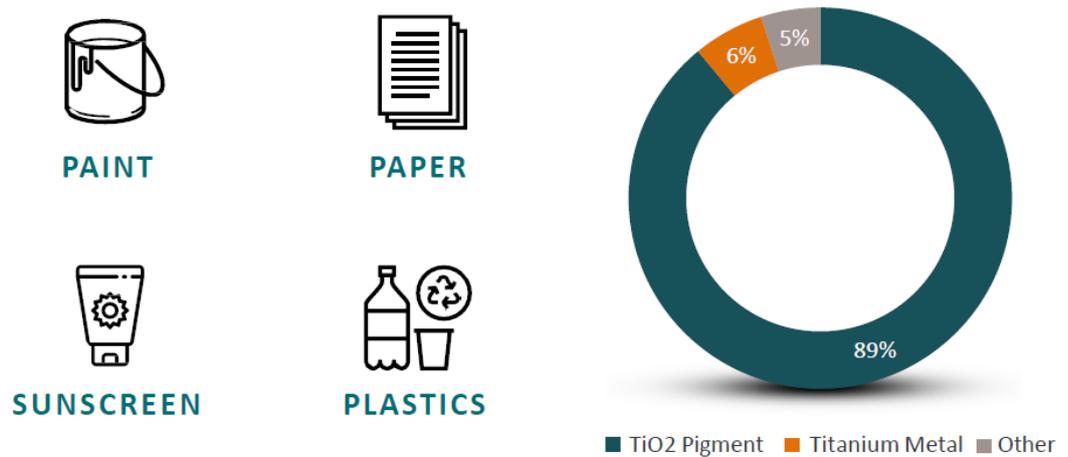


Source: Company Reports

Titanium Minerals – 42% of Thunderbird Revenue

- Around 90% of the titanium concentrate produced goes to the TiO2 pigment market.
- Key applications are paint, plastics and paper
- Delivers opacity and non-toxic UV protection
- Smaller quantities of titanium are used in the production of titanium metal and welding
- Thunderbird will produce 3.5% of the global Ilmenite supply

Figure 23: Global titanium market by demand type



Source: Company Reports

The Board

Bruce Griffin (Executive Chair) most recently held the position of Senior Vice President Strategic Development of Lomon Billions Group, the world's third largest producer of high-quality titanium dioxide pigments. Bruce previously held executive management positions in several resource companies, including acting as the Chief Executive Officer and a director of TZ Minerals International Pty. Ltd. (TZMI), the leading independent consultant on the global mineral sands industry, World Titanium Resources, a development stage titanium project in Africa and as Vice President Titanium for BHP Billiton.

Ian Macliver (Non-Executive Director) is the Executive Chairman of Grange Consulting Group Pty Ltd & Grange Capital Partners. Prior to establishing Grange he held positions in various listed and corporate advisory companies. His experience covers all areas of corporate activity including capital raisings, acquisitions, divestments, takeovers, business and strategic planning, debt and equity reconstructions, operating projects and financial review and valuations. Mr Macliver is the Non-Executive Chairman of MMA Offshore Limited.

John Richards (Lead Independent Non-Executive Director) John Richards is an economist with more than 35 years' experience in the resources industry; holding various positions within mining companies, investment banks and private equity groups. He has been involved in a wide range of mining M&A transaction in multiple jurisdictions. Mr Richards is an Independent Non-Executive Director; holding previous positions at Normandy Mining Ltd, Standard Bank, Buka Minerals and Global Natural Resources Investments; he is a Non-Executive Director of Northern Star Limited and a Non-Executive Chair of Sandfire Resources Limited.

Vanessa Kickett (Non-Executive Director) Vanessa Kickett has extensive experience and involvement with Aboriginal engagement, native title and heritage matters throughout Western Australia. A member of the Whadjuk Noongar community, Mrs Kickett is currently Deputy Chief Executive Officer of the South West Aboriginal Land and Sea Council, responsible for the recent implementation and operation of the South West (Western Australia) native title settlement. Mrs Kickett has also held a variety of roles in the public sector, leading the development of heritage and native title policy and frameworks on behalf of Water Corporation in Western Australia.

Gordon Cowe (Non-Executive Director) A qualified mechanical engineer with over 30 years' experience, Gordon has had significant involvement in leading business start-up, planning and delivery of multiple complex projects including Mining & Mineral Processing, Oil & Gas and Resources based infrastructure projects globally. He has enjoyed an extensive career with leading contractors (including Bechtel and Worley Parsons) and project owners on a wide range of projects.

Figure 24: Directors' Interests

Director	Shares	Options & Rights	Total
Bruce Griffin	320,000	2,431,742	2,751,742
Ian Macliver	107,142	480,000	587,142
John Richards	400,000	480,000	880,000
Vanessa Kickett	-	480,000	480,000
Gordon Cowe	-	480,000	480,000

Source: Company Reports



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