BLACK ROCK MINING

Research Note

NOT ALL GRAPHITE IS CREATED (OR MINED OR TRANSPORTED) EQUALLY

Investment Highlights

- **Black Rock Mining Limited (BKT) is an ASX-listed graphite developer, focused on advancing its 100% owned Mahenge Graphite Project, located in south-central Tanzania. The Company completed a Definitive Feasibility Study (DFS) on the Mahenge Project which highlighted strong economics supported by two successful and significant pilot plants (90 kt and 18 kt) underscoring the strong technical approach by the management team, and the Company's willingness to demonstrate repeatability of laboratory trials on a larger scale. We are initiating coverage on BKT with a Speculative Buy rating and a $0.24/share valuation.**

- **Mahenge: a globally significant project.** Mahenge has a delineated JORC-compliant Mineral Resource of 211.9 Mt at 7.8% total graphitic content (TGC). Importantly, BKT has the second largest JORC Mineral Reserve globally with 69.6 Mt at 8.5% TGC, with 6 Mt of contained graphite. The Mahenge DFS which included a post-tax NPV_{10} of USD$895 million with a post-tax internal rate of return (IRR) of 42.8%, inclusive of the Tanzanian government's 16% free carry.

- **Geographical and logistics advantage.** The Mahenge Project is located proximal to key infrastructure including grid power 60km from site and a railway line that feeds directly to the Port of Dar es Salaam. BKT's access to the rail and port enhances logistics and helps to underpin a long-term, low cost operation.

- **Leveraging graphite expertise.** The Company has secured the services of CPC Engineering and Yantai Jinyuan Group, a major Chinese mining machinery group, to design and build the process plant, both of whom have significant experience in graphite and Africa-specific skills.

- **Funding Mahenge a near term challenge.** Phase 1 of Mahenge is expected to cost US$115m. The DFS staged development approach is positive in that Stages 2 and 3 can be funded via Stage 1 cash flows. Successful sell down of a stake in the Mahenge Project would provide a read through valuation for BKT and would provide further credibility to the Project.

- **Valuation: $0.24/share.** Our BKT valuation is based on a discounted cash flow analysis of the Mahenge Graphite Project development, risk weighted at 50%. We assume Mahenge is financed with 50% debt and 50% equity.

Year End Jun 30	2018A	2019F	2020F	2021F	2022F
Reported NPAT ($m)	(2.0)	(2.8)	(3.7)	(11.1)	(6.4)
Recurrent NPAT ($m)	(2.0)	(2.8)	(3.7)	(11.1)	(6.4)
Recurrent EPS (cents)	(0.5)	(0.5)	(0.7)	(2.1)	(1.2)
EPS Growth (%)	na	na	na	na	na
PER (x)	(16.8)	(14.5)	(11.0)	(3.7)	(6.4)
EBITDA ($m)	(2.0)	(2.8)	(3.2)	(5.3)	10.0
EV/EBITDA (x)	(15.9)	(14.1)	(14.3)	(30.0)	18.6
Free Cashflow	(5.3)	(6.4)	(6.2)	(111.3)	(48.3)
FCFPS (cents)	(1.2)	(1.2)	(1.2)	(20.7)	(9.0)
PFCF (x)	(6.3)	(6.4)	(6.6)	(0.4)	(0.8)
DPS (cents)	0.0	0.0	0.0	0.0	0.0
Yield (%)	0.0	0.0	0.0	0.0	0.0
Franking (%)	0.0	0.0	0.0	0.0	0.0

7 May 2019

12mth Rating		Speculative Buy
Price	A$	0.08
Target Price	A$	0.24
12mth Total Return	%	214.9
RIC: **BKT.AX**		BBG: **BKT AU**
Shares o/s	m	585.6
Free Float	%	97.9
Market Cap.	A$m	44.5
Net Debt (Cash)	A$m	-1.8
Net Debt/Equity	%	na
3mth Av. D. T'over	A$m	0.132
52wk High/Low	A$	0.09/0.03
2yr adj. beta		0.98
Valuation:		
Methodology		DCF
Value per share	A$	0.24

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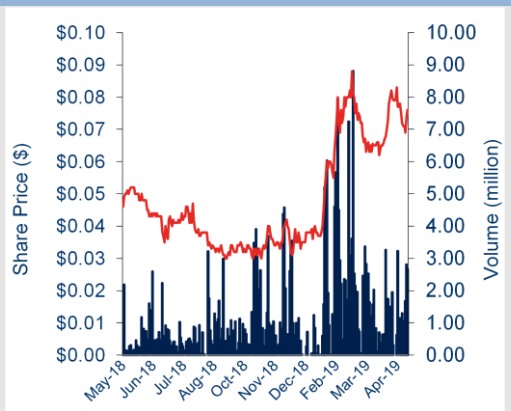
12 Month Share Price Performance



Performance %	1mth	3mth	12mth
Absolute	13.4	(5.0)	65.2
Rel. S&P/ASX 300	12.4	(9.3)	61.9

COMPANY OVERVIEW AND INVESTMENT THESIS

Black Rock Mining Limited (BKT) is an ASX-listed graphite developer, focused on advancing its 100% owned Mahenge Graphite Project, located in south-central Tanzania which has a JORC compliant Mineral Resource of 212 Mt at 7.8% Total Graphitic Carbon (TGC). In 2018 BKT ran a large 90 tonne pilot plant in Canada with SGS Lakefield, which produced 8 tonnes of concentrate and followed up with a 18.5 tonne pilot plant in China in March 2019. The pilot plants have given potential offtakers an opportunity to validate the quality of the product to be produced from Mahenge Graphite Project. In late 2018, BKT released a comprehensive Definitive Feasibility Study for the Mahenge which demonstrated strong project economics for a three stage project. We believe BKT has the potential to be one of the first graphite producers in Tanzania.

We initiate coverage of BKT with a Speculative Buy rating and a $0.24/share valuation. Key BKT investment considerations include:

- **Globally significant project.** Mahenge has a delineated JORC-compliant Mineral Resource of 211.9 Mt at 7.8% total graphitic content (TGC). Importantly, BKT has the second largest JORC Mineral Reserve globally with 69.6 Mt at 8.5% TGC, with 6 Mt of contained graphite.

- **Significant valuation and strong project economics.** In late 2018, BKT completed a Definitive Feasibility Study (DFS) for the Mahenge Project which included a post-tax NPV_{10} of USD$895 million with a post-tax internal rate of return (IRR) of 42.8%, inclusive of the Tanzanian government's 16% free carry.

- **Low peak capital expenditure.** The Phase1 capital expenditure of US$115 million highlighted in the DFS indicates the lowest peak capital expenditure per annual tonne of production of any development-stage graphite project, coupled with a high margin due to very low operating costs (C1 US$397/t) and best in class concentrate grade and flake size distribution.

- **Staged production ramp up.** Mahenge will have a globally significant production profile of 83,000t of concentrate per annum in Phase 1 (materially larger than all other ASX developers), ramping up to 250,000tpa by year 5 in Phases 2 and 3. Expansion beyond Phase 1 is able to be undertaken via free cash flow and extension of potential Phase 1 debt facilities.

- **Technically de-risked**. BKT has significantly de-risked the technical and operational aspects of the proposed project, with a substantial pilot plant run of 90 tonnes followed by a further 18.5 tonne plant to enable a proven, simple flowsheet to be designed to deliver a high quality product to customers. The pilot plants underscore the strong technical approach by the management team, and willingness to demonstrate repeatability of laboratory trials on a larger scale.

- **Low operating cost and strong margins.** BKT has used a price deck with a weighted average basket price of US$1,301/t. This is driven by a relatively high concentrate grade of 97.5% (traditional market concentrate spec is 95%) and coarse flake-size distribution. With a low C1 cash cost of US$397/t, the Project is expected to generate US$313m in EBITDA over the first 3 years of operations.

- **Geographical and logistics advantage.** The Mahenge Project is favourably located proximal to key infrastructure requirements including grid power 60km away from site and the TAZARA railway line which feeds directly to the deep-water Port of Dar es Salaam (which handles over 90% of Tanzania's trade cargoes). Access to the rail and port enhances logistics and helps to underpin a long-term, low cost operation which will minimise trucking distances, reduce power costs, and utilise an existing export hub.

- **Leveraging graphite expertise.** The Company has secured the services of CPC Engineering and Yantai Jinyuan Group, a major Chinese mining machinery group, to design and build the process plant, both of whom have significant experience in graphite and Africa-specific skills. CPC Engineering conducted the Mahenge DFS and have significant experience in Graphite, having built Syrah's Balama Project which is the only 'Western' graphite project globally to date. Meanwhile Yantai has constructed and delivered four graphite mines globally in the past 10 years and have a deep knowledge of the graphite market and product specifications required.

- **Metallurgical performance validated.** Yantai has replicated the SGS Lakefield pilot plant findings in its own pilot plant trials, producing +99% TGC at a 93% recovery within two days – validating the metallurgical performance of the flowsheet. This enables BKT and Yantai to pursue a 'performance warranty' for the recovery rates, throughput and flake size which underwrites BKT's "Build-Operate-Transfer" model with Yantai. This shows BKT is making best efforts to avoid the issues Syrah Resources (SYR.ASX) faced in commissioning its Balama plant which has underperformed market expectations in terms of ramp up, pricing and production.

VALUATION

Our BKT valuation is based on a discounted cash flow analysis of BKT's interest in the Mahenge Graphite Project. We have risk weighted Mahenge at 50% to reflect uncertainty around country risk, funding, grade, production, cost and timing of the development.

Figure 1: BKT Valuation

	A$m	A$/share
Mahenge Graphite Project, risked at 50%	485	0.33
Exploration	0	0.00
Net Cash (Debt)	1	0.00
Debt Funding for Mahenge	-95	-0.06
Corporate Costs	-35	-0.02
Total Valuation	**356**	**0.24**

Source: Patersons Securities estimates

We utilise a 10% Weighted Average Cost of Capital to derive our valuation. Our valuation on a per share basis is diluted to account for a potential equity raising to fund 50% of the project's start-up capital requirement of US$115m (plus working capital).

Figure 2 shows the graphite price and A$/US$ used to derive our valuation.

Figure 2: Graphite Price and A$/US$ Forecasts

	2019	2020	2021	2022	2023
Graphite Basket Price (US$/t)	1,200	1,200	1,200	1,219	1,249
A$/US$	0.72	0.72	0.73	0.73	0.72

Source: Patersons Securities estimates

Figure 3 shows the sensitivity of our valuation to the graphite price on a risked an unrisked basis.

Figure 3: Valuation Sensitivity to Graphite Price

Graphite Basket Price (US$/t)	**900**	**1,000**	**1,100**	**1,200**	**1,300**	**1,400**	**1,500**
Valuation ($/share)	0.09	0.14	0.19	0.24	0.29	0.34	0.38

Source: Patersons Securities estimates.

RESERVES & RESOURCES

The Mahenge Project has Mineral Reserves and Resource totalling 212 Mt at an average grade of 7.8% TGC, containing a total of 16.6 Mt of graphite. The 70 Mt of Reserves support a 250 kt per annum development over a 25 year mine life. The Resource model was based on information from 175 RC drill holes for approximately 15,167m and 34 diamond drill holes for 3,911m, all drilled by BKT and it used 100m by 100m, 100m by 50m and 50m by 50m grid drill spacings.

Figure 4: Mahenge Reserves & Resources by Category

	Tonnes (Mt)	Grade (% TGC)	Contained Graphite (Mt)
Reserves			
Proven	0	-	0
Probable	69.6	8.5%	6.0
Total Reserves	**69.6**	**8.5%**	**6.0**
Resources			
Measured	25.4	8.6%	2.2
Indicated	88.1	7.9%	6.9
Inferred	98.3	7.6%	7.5
Total Resource*	**211.8**	**7.8%**	**16.6**

*Source: Black Rock Mining, Patersons Securities. * Resource is inclusive of Reserve*

The Mahenge Project Resource is located in three separate prospect areas, as shown in Figure 5. The Reserves comprise 46.5 Mt at 8.4% TGC in the Ulanzi area and 23.1 Mt at 8.6% in Cascade.

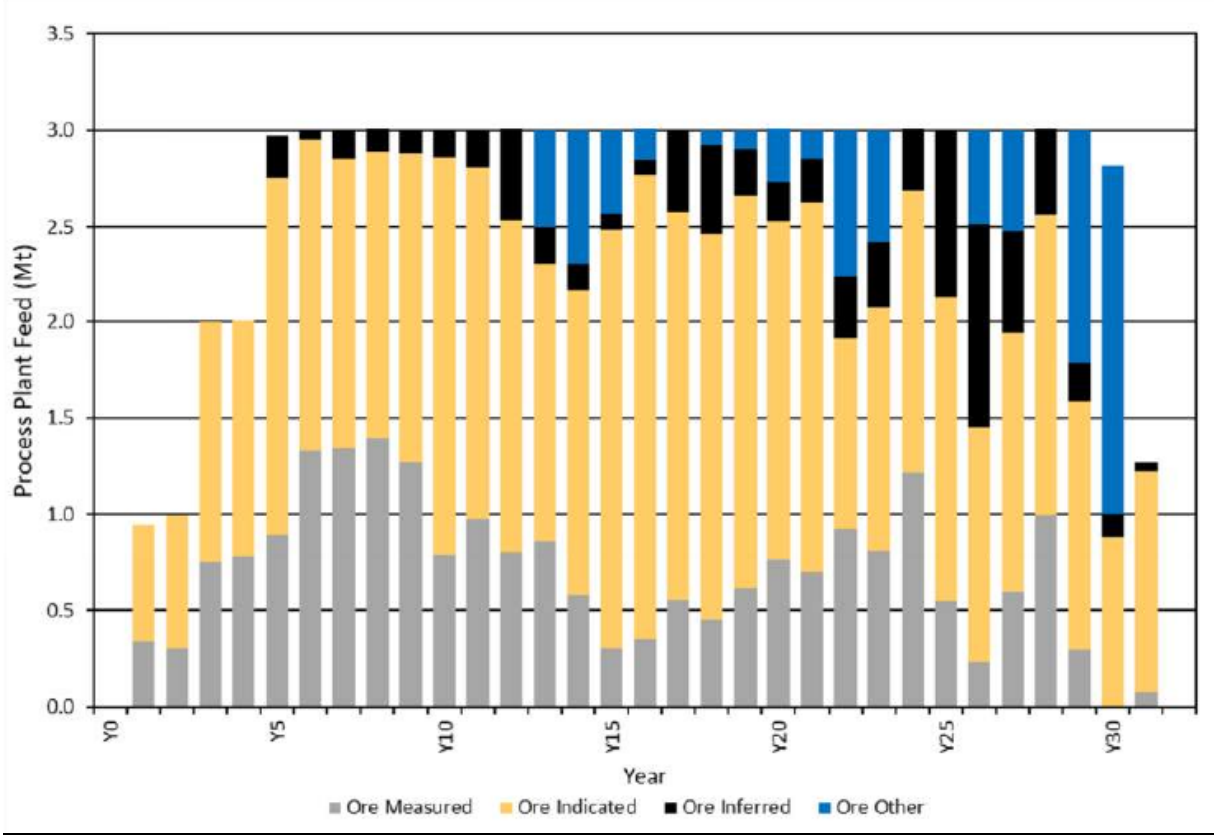
Figure 5: Mahenge Resource By Prospect

Prospect	Category	Tonnes (Mt)	Grade (% TGC)	Contained Graphite (Mt)
Ulanzi				
	Measured	13.3	8.9%	1.2
	Indicated	49.7	8.2%	4.1
	Inferred	50.2	8.1%	4.1
	Sub-total	**113.3**	**8.2%**	**9.3**
Cascade				
	Measured	12.1	8.3%	1.0
	Indicated	20.8	8.3%	1.7
	Inferred	27.3	7.9%	2.2
	Sub-total	**60.2**	**8.1%**	**4.9**
Epanko				
	Measured	0		0.0
	Indicated	17.6	6.4%	1.1
	Inferred	20.8	5.9%	1.2
	Sub-total	**38.4**	**6.1%**	**2.3**
Combined				
	Measured	25.5	8.6%	2.2
	Indicated	88.1	7.9%	7.0
	Inferred	98.3	7.6%	7.5
	Total	**211.9**	**7.8%**	**16.6**

Source: Black Rock Mining, Patersons Securities

The 86.0 million tonnes (Mt) of resource in the mining schedule consists of the 69.6 Mt of ore Reserves and 16.4 Mt of Inferred and sub-Inferred Resource representing 81% and 19% of mill feed respectively. The material distribution by resource classification of ore fed to the mill at the process plant over the life of mine (LOM) is presented in Figure 6.

Figure 6: Ore to the Process Plant by Classification

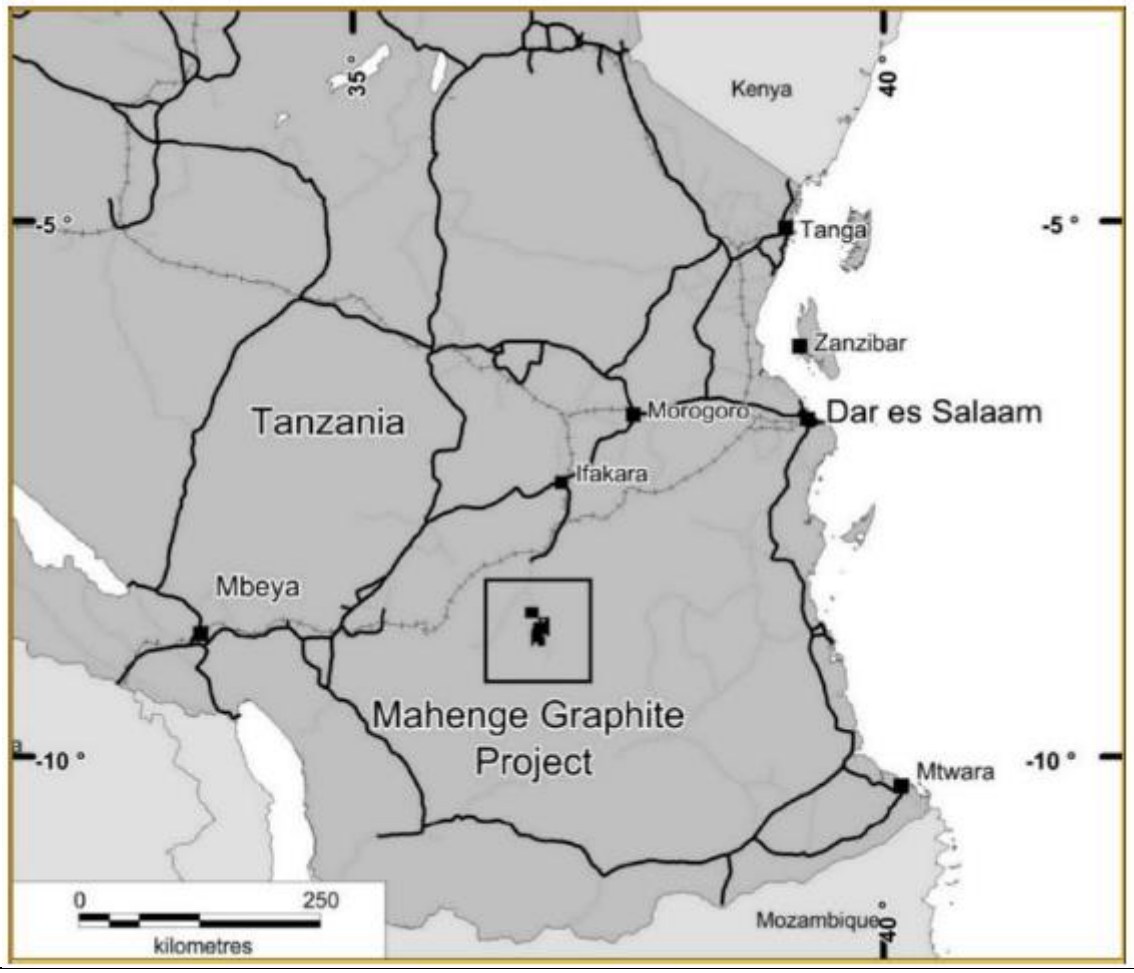


Source: Black Rock Mining

MAHENGE GRAPHITE PROJECT

Mahenge is located in south-central Tanzania, approximately 450km by road from Dar es Salaam which is the capital city and financial centre of Tanzania. It is also home of the largest port in east Africa. Importantly, Mahenge is located approximately 60km from the town of Ifakara, which is linked to Dar es Salaam by the TAZARA railway and proximal to available grid power supply. Given the roads to port are of mixed quality, we believe the use of the rail line gives BKT a significant logistics advantage.

Figure 7: Location of Mahenge Within Tanzania



Source: Black Rock Mining

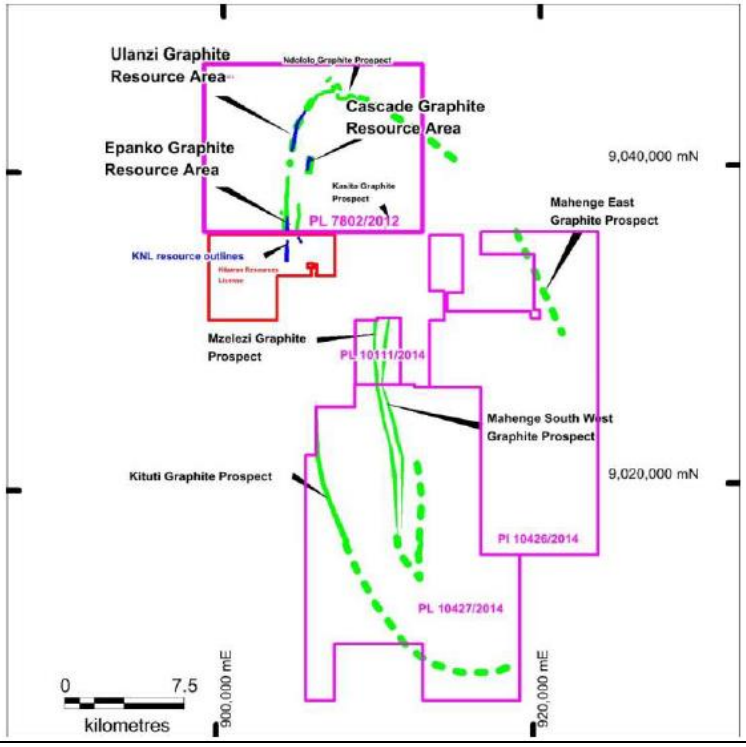
The Mahenge Project is located on the edge the Mahenge Mountains, which rise to 1,500 m above sea level. The Project area is characterised by north-south orientated steep hills and valleys. It is well drained with rapid to moderate water infiltration rates and rapid run-off on mountain slopes. With a positive water balance driven by an average rainfall of 1,870mm per annum, drainage and effective water management systems need to be in place when operating the Project, which is why BKT has adopted a dry stack tailings system for its proposed operations.

Figure 8: Topography in the Region of Mahenge

Source: Patersons Securities

The Project will be an open pit mining operation based on mining the Ulanzi and Cascade deposits using a conventional truck and shovel operation. Under the Mahenge DFS, mining commences at Ulanzi in Year 0 and is followed by Cascade in Year 4. The deposits have a specific deposit signature, but for the purposes of our valuation, we assume a common pricing applies to both the Cascade and Ulanzi deposits.

Figure 9: Tenements at Mahenge



Source: Black Rock Mining

The resource at Mahenge is shallow, and therefore it has a relatively low strip ratio ranging between 0.5 and 1.0 for the life of mine, and an average of around 0.6 for the LOM. This suggests that small scale excavation equipment will be adequate for the mine life

Initial waste rock generated from mining is to be used for constructing key infrastructure such as upgrading the haul road to the Ulanzi processing plant, ROM pad construction, causeway construction, reshaping drainage terrain and surface water embankments. The remaining LOM waste will be diverted to a central waste dump to be located east of the Ulanzi deposit and west of the Cascade deposit.

Process Plant

The Mahenge ore will be processed over the life of mine (LOM) using a three-staged approach which will initially process 1 million tonnes per year (Mt/y) in Stage 1, increase to 2 Mt/y in Stage 2 and finally process 3 Mt/y after the completion of Stage 3. The three stages will be developed over the initial years of the mine with current resource tonnes indicating a LOM of 32 years (25 years for the Ore Reserves), after which time the current defined deposits will be depleted. Stage 1 and Stage 2 will process ore predominantly from the Ulanzi deposit and Stage 3 will process ore from the Cascade deposit. BKT considers the 1 Mt/y stages to be optimal in terms of throughput in order to maximise productivity and funding subsequent stages from the previous stage cash flows.

The Stage 1 process plant has been designed to produce various graphite products targeted at specific graphite end users. Each grade is classified into size fractions relevant to specific graphite end users. Three broad classifications of products have been defined as follows:

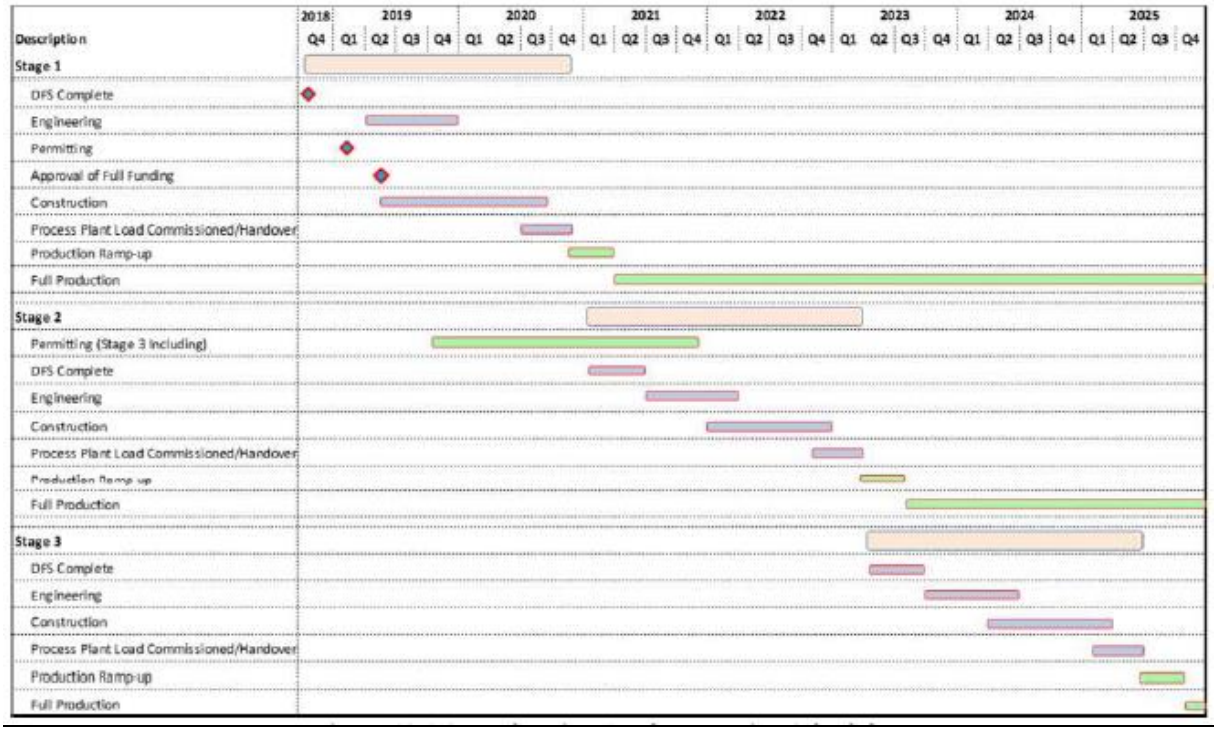
- Mahenge Standard Flake – 95% LOI;
- Mahenge Premium Flake – 97.5% LOI; and
- Mahenge ULTRA PURITY-FP™ Flake – 99%+ LOI.

The Phase 2 process plant will be a duplicate of Phase 1 with respect to layout and equipment selection, although there is significant synergies in equipment and infrastructure which results in the capex for Stage 2 of US$69.5m being well below Stage 1. The additional capex in Phase 2 is US$69.5 million to increase production capacity to 167,000tpa of concentrate. Similarly, with Phase 3, a replication of the process plant from Phase 1 utilising the established infrastructure will enable Black Rock to increase production to 250,000 tpa for an additional US$84.1 million.

Project Execution

Figure 10 highlights the implementation schedule for the three stages of the Mahenge Project. Based on this timetable, full funding approval is imminent, with construction then scheduled to commence this quarter. We expect funding to take longer than this timeline suggests and we therefore forecast construction commencing in 2H 2020.

Figure 10: Project Implementation Schedule



Source: Black Rock Mining

Required Capital

Initial capital expenditure for Phase 1 is estimated by BKT at US$115 million, inclusive of a 10% contingency. BKT estimates a further US$10 million is required for connecting Mahenge to the grid power system, although we note this payment is essentially capex rather than opex, or a 'prepayment' for power that will be rebated over time – further reducing operating expenditure in the early years through a tariff offset.

The staged approach to ramp up to 250,000tpa production is seen as a practical method to deliver product in to the market without oversupplying, whilst also maximising productivity and efficiency of scale. The modular equipment will be pre-assembled where possible and shipped to site in containers to minimise logistics costs and time delays associated with assembly.

Operating Costs

According to the Mahenge DFS released in October 2018, life of mine (LOM) average C1 costs are US$397/t (US$462.4/t in the first two years of production), against an expected basket price of US$1,301/t. This low opex is driven primarily by:

- **Low logistics costs.** The railway transport to the Port of Dar es Salaam minimises logistics and transport costs. A deep-water port with container availability and year-round shipping significantly reduces working capital requirements by minimising mine-to-market timeline.

- **Low mining costs.** Driven by geographical and geological advantages, with a favourable topography and ore deposit delivering a low strip ratio. Additionally, grid power delivers a robust power saving over the LOM compared to diesel-generated power.

Figure 11: Breakdown of Average LOM Operating Costs			
	US$m/y	**US$/t Ore Feed**	**US$/t Graphite Product**
Mining	21.6	7.9	98.2
Processing	38.6	14.1	175.5
Administration	4.8	1.8	22.0
Logisitcs	5.5	2.0	25.2
Transport & Freight	16.7	6.1	76.0
Total	**87.2**	**31.8**	**396.8**

Source: Black Rock Mining DFC, dated 24 October 2018. Patersons Securities

We note the LOM cost excludes all taxes, permitting costs, corporate administrative costs and other government imposed costs.

Pilot Plant / Metallurgy

BKT has undertaken extensive pilot plant testwork, having run a 90 tonne pilot plant at SGS Lakefield in Canada, in 2018. It has also recently completed pilot plant test works processing 18.5 tonnes of ore in a dedicated pilot plant facility in China, operated by EPC partner Yantai Jinyuan Mining Machinery. The recent China pilot plant was run to ensure Yantai could replicate and validate the product attributes and processing results in Canada, and to enable Yantai to optimise the DFS flow sheet based on the first pilot plant testwork program.

The China pilot delivered recovery, grade and flake size performance consistent with lab results as announced on 1 March 2019. The pilot plant was observed by key offtakers and potential investors, and the large flake (+100 mesh) concentrate will be made available to offtakers as part of its validation process. All <100 mesh flake will be processed for battery anode precursor in dedicated facilities to establish spheronising plant performance metrics and to provide increased volumes of material for independent battery performance testing. Spheronising trials will be conducted by Wuhan University, a Chinese graphite research facility. Data from this process is expected to be available in late May.

The primary purpose of the China pilot plant is threefold in our view: (1) it enables price discovery, (2) it will identify an industry development partner to assist in funding the project, and (3) it will demonstrate repeatability of producing a 99% product that occurred in the first pilot plant, and in Yantai's laboratory.

Logistics & Infrastructure

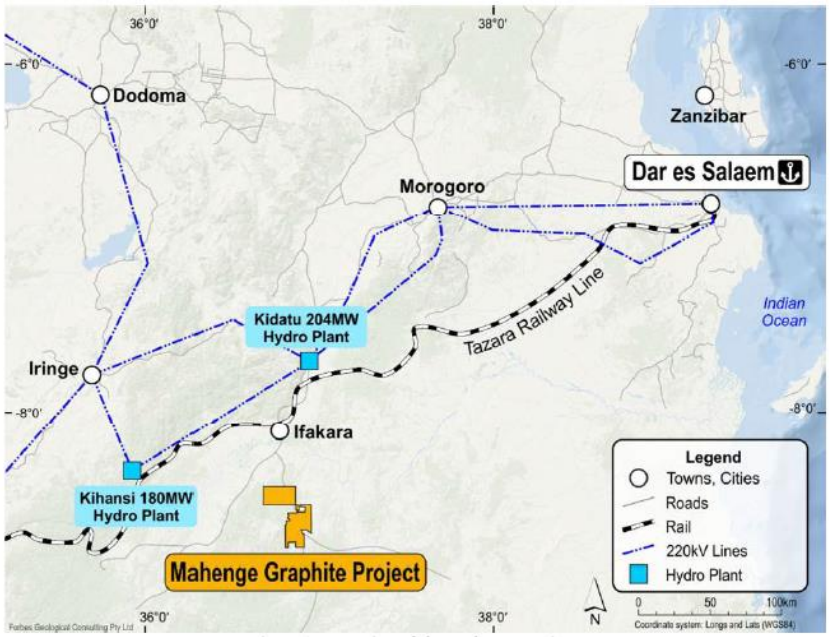
BKT's Mahenge project stands to benefit from being in a location that is proximal to utilities and logistics. The rail access from Ifakara to the Port of Dar es Salaam offers a low cost logistics' solution for getting the concentrate to market, and minimises working capital requirements given the access to frequent shipping and available containers.

Figure 12: TAZARA Rail at Ifakara Railway Station

Source: Patersons Securities

From the process plant, the graphite concentrate will be bagged into 1 tonne bags at Mahenge and transported by truck approximately 70km to the Ifakara railway station. Once at the rail head, the 1 tonne bagged product will be containerised and loaded onto railcars at Ifakara for transport on the TAZARA (Tanzania-Zambia Rail) railway line directly into Tanzania's principal post, the Port of Dar es Salaam, which handles over 90% of Tanzania's international trade.

Figure 13: Mahenge Location in Relation to Ifakara and the Port of Dar es Saleem



Source: Black Rock Mining

Mahenge is also located approximately 60km from the 220kV national grid power network. The Tanzania Electric Supply Company (TANESCO) has proposed to upgrade the local power network in the area to deliver Mahenge grid power. The required infrastructure and substation is expected to cost US$10 million, which BKT can recover from reduced tariffs. This is expected to contribute significant operating cost savings (8.1 cents/unit vs 32 cents/unit from diesel generation) once in production.

Together, the railway access to a deep-water port and grid power result in significant cost (and time) savings for a more efficient and productive business plan when compared to other peers in East Africa. Secondary ports such as Pemba, Ncala (Mozambique) and Mtwara (Tanzania) were considered by Black Rock to be too far from Mahenge and have poorer logistics connections to be a viable alternative.

Significant works will be required on existing roads in order to make them suitable for regular trucking operations. The current road into Mahenge is a narrow road that has steep winding inclines in places. Access to the mine site is currently via a single lane track from the main Ifakara to Mahenge road which will be upgraded to a two-lane unsealed road. However BKT has identified an alternate route that follows a currently largely unused colonial access track. The identified route is approximately 7 km long and is flatter than the surrounding existing roads. BKT has been in discussion with the Tanzanian government regarding the proposed route, and the government has reviewed the route and indicated it will document and gazette the route. We consider this a key piece of the infrastructure required to minimise travel time and potential safety issues.

Sales Agreements, Contracts & Sales Outlook

BKT has three offtake agreements in place for up to approximately 85% of the proposed steady state annual production of 240 kt per year. Thee offtake agreements include the following:

- On 22 October 2018, BKT signed its first offtake agreement for the Mahenge Project. The offtake agreement is with Heilongiang Bohao Graphite Company for up to three years, with supply of 30,000 tonnes of blended graphite concentrate in Year 1, 50,000 tonnes in Year 2 and up to 90,000 tonnes in Year 3. Heilongiang Bohao is understood to be one of China's largest suppliers of graphite for a variety of industrial purposes. Heilongiang Bohao currently mines graphite in the Heilongiang Province in the north-east of China.

- On 29 October 2018, BKT announced it had signed an offtake agreement with Qingdao Fujin Graphite Company Limited to supply 15,000 tonners per year of "sized graphite concentrate" for up to three years. Qingdao Fujin focuses on the small to mid-size battery market and produces anode product for customers in Asia.

- In January 2019, BKT signed its third offtake agreement, this time the agreement is with Taihe Soar (Dalian) Supply Chain Management for three years to supply sized graphite concentrate of up to 37,500 tonnes in Year 1, 80,000 tonnes in Year 2 and 100,000 tonnes in Year 3.

Figure 14: BKT Offtake Agreements

	Year 1	Year 2	Year 3
Heilongiang Bohao	30,000	50,000	90,000
Qingdao Fujin	15,000	15,000	15,000
Taihe Soar	37,500	80,000	100,000
Total	**82,500**	**145,000**	**205,000**

Source: Black Rock Mining, Patersons Securities

For each of the offtake agreements, pricing is to be agreed under terms of a formal agreement to be entered into within 12 months of execution of the Offtake Agreement, and either party may terminate the offtake agreement by giving 60 days' written notice to the other party.

With around 85% of the proposed steady state output now contracted, we don't believe BKT needs to further offtake agreements before the project goes into production, as it will likely need some flexibility in the initial years of production. However, we note the Company has recently made mention of increasing the capacity by a further 85,000 t/y, and if that is the case, there may be headroom to enter into further offtake agreements.

While the contracted offtake is significant, the terms of the agreements will not be enough to satisfy traditional debt lenders requirements in our view; no pricing has been agreed, and the ability to terminate with 60 days' notice would be of concern. See our section on funding in this report for further detail on this point.

GRAPHITE PRICING

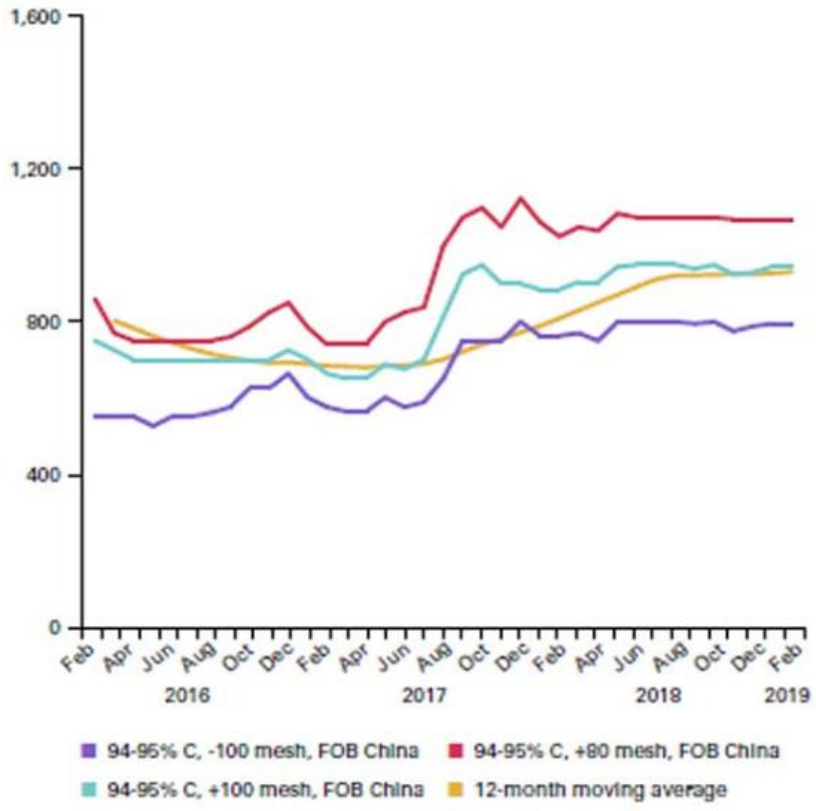
Market pricing for graphite has historically been led by steel markets, and as a result pricing has been determined by the rate of Chinese industrialisation. Lithium ion batteries (LiB), increased demand for thermal management products particularly in electronics, while expanded graphite for fire suppressant is reshaping markets, product types and quality premiums. Two factors impacting pricing relative to historical trends are increased price premiums attached to higher specification concentrate grades and flake size.

Natural graphite pricing is a bit of an enigma as it is not traded on any commodity exchange, and nor is it likely to be in the foreseeable future. Instead, prices are negotiated between the buyers and sellers of the product. It is also difficult to compare pricing between producers as there are several factors taken into account in graphite prices. Some factors in graphite price include, but are not limited to, the following:

- Flake size;
- Purity of product;
- Geographic location of the market; and
- Quantity contracted.

Graphite can be sold at different stages of the production process, however they are typically sold as concentrate after undergoing basic processing such as flotation, grinding and sizing. Flake graphite generally undergoes further processing such as thermal and acid treatments to produce higher carbon contents (over 99%) with low levels of impurities.

Figure 15: Graphite Price History (US$/t)



Source: Triton Minerals, Benchmark Minerals Intelligence

Figure 15 shows historic graphite prices for different mesh sizes, however it only shows the smaller flake size prices. This highlights how opaque the high end of the market is, and the abovementioned prices are not considered representative of prices in the larger flake markets.

Natural graphite prices are forecast to increase in the short term, as battery industry growth increases and Chinese graphite production closures take hold. Existing Chinese flake producers have further capacity to meet demand, however the aforementioned closures are expected to have an impact in 2019. Roskill forecasts the highest price increases are likely in the higher carbon grades, and in the fine and medium flake sizes which are used for lithium-ion batteries.

BKT has referenced pricing to independent industry expert, Roskill Information Services, but notes that the Company has modified Roskill's estimates to account for target grades not being reported and for flake sizing not considered by Roskill. BKT's estimated pricing is shown in Figure 16. Given there is a yet to be established significant market for the larger flake graphite, we see significant uncertainty around graphite pricing for all graphite projects more generally, however we note that our preference still remains for the larger flake projects such as Mahenge as not only can it be used for smaller flake purposes, but it is also has expansion properties that can be applied to building insulation and thermal purposes.

For the purposes of our valuation we assume a weighted average basket price of US$1,200/t.

Figure 16: Mahenge Graphite Pricing Basket

Mesh Size	Price	Basket Weight	Shipping	Agent Fees	Contract Discounts	Basket Price
	(US$/t)	(%)	(US$/t)	(US$/t)	(US$/t)	(US$/t)
32	1,579	5%	2	2	2	73
50	1,449	18%	6	7	7	242
80	1,444	36%	12	13	13	482
100	1,379	9%	3	3	3	115
-100	1,314	32%	11	10	10	389
	1,404	**100%**	**33**	**35**	**35**	**1,301**

Source: Black Rock Mining DFS, 24 Oct 2018. Patersons Securities

SHAREHOLDERS & LIQUIDITY

The top five shareholders hold approximately 30% of the outstanding shares in BKT and are shown in Figure 17. Managing Director John de Vries holds 3.2m shares, or 0.6% of the shares on issue; Gabriel Chiappini holds 1.2%.

Figure 17: Top Five BKT Shareholders, as at 28 February 2019

Holder Name	Shares Held	% Holding
Stephen Copulous	109,165,576	20.3%
Harry Hatch	20,156,777	3.7%
Anthony Hall	13,790,000	2.6%
Westpark Operations P/L	10,592,499	2.0%
Daniel Turner Capital P/L	10,000,000	1.9%
Top Five Shareholders	**163,704,852**	**30.4%**

Source: Iress, Patersons Securities.

BKT has 44m unlisted options outstanding, none of which are currently in the money.

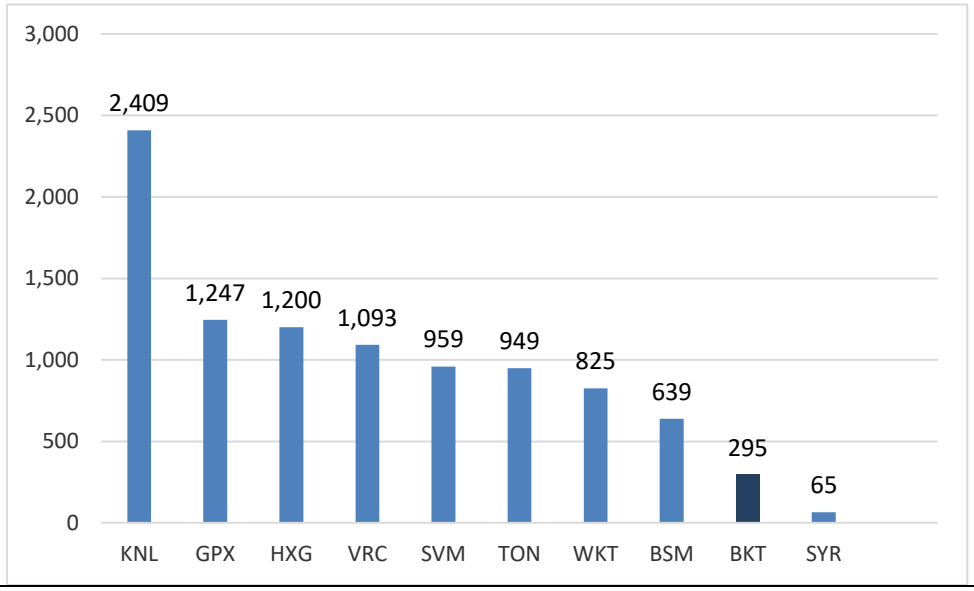
Figure 18: Options Outstanding

Expiry Date	Number (m)	Exercise Price	In the Money?
12-Apr-20	5.0	0.20	N
31-Aug-20	6.3	0.10	N
31-Aug-20	6.3	0.10	N
31-Aug-20	6.3	0.10	N
31-Aug-20	6.3	0.10	N
31-Oct-21	1.0	0.10	N
7-Nov-21	13.0	0.10	N
Total (m)	**44.0**		

Source: Company Reports, Patersons Securities

We have assessed BKT stock liquidity by dividing the market cap by the three-month average daily turnover for BKT and a range of other graphite stocks. Figure 19 shows that it takes on average 295 days for the market cap of the stock to turnover in the market, making it the second highest liquidity graphite stock on the ASX behind Syrah Resources (SYR.ASX).

Figure 19: Comparison of Market Cap Divided by 3-Month Average Daily Turnover



Source: Patersons Securities, Iress

FINANCIAL

As at 31 December 2018, BKT had $1.3m in cash with no debt. In March 2019 BKT completed a $3m placement at $0.065/share, a 9.7% discount to the closing price. BKT has forecast cash out flow of $650k in the March quarter.

Capital Required

Based on the DFS, Phase 1 of the Mahenge Graphite Project is expected to cost US$115m, with a further, rather precise, US$69.5m and $84.2m required for Phase 2 and 3 respectively. The US$115m for Phase 1 includes a 10% contingency, with Phases 2 and 3 each including a 15% contingency in the DFS estimates. We estimate that the contingency in the Phase 1 cost estimate may not be satisfactory for any potential debt providers, and we therefore use US$140m for Phase 1 development. This includes an additional contingency plus some working capital. Based on the proposed timing of the additional Phases of development, we forecast BKT can fund the expansion from cash flows plus debt.

The Stage 1 capex was generated from direct vendor quotes and based on the pilot plant results. BKT's partnership and strategic agreement with Chinese engineering and mining equipment manufacturing company Yantai has the potential to deliver further capital expenditure reductions, through further design enhancements and FEED process, however we do not include this potential saving in our valuation. By using a single-source for the entire process plant reduces risk associated with the assembly and ramp-up, which is underpinned by Yantai's experience in the graphite space having delivered four significant graphite process plants in the past 10 years.

Funding

On 12 March 2019, BKT stated it has multiple finance streams and options including:

1. A vendor bid of up to US$40m;
2. Finance from China, rest of Asia, North America, Australia, Middle East and Africa;
3. A strategic partner;
4. Sell down of Mahenge Resources to fund construction;
5. Debt – a "function of visibility of price point"; and
6. BKT also states "all equity approach not available".

We believe financing will be one of the major near term challenges for BKT, and we discuss the project sell down and debt options in further detail below.

- **A strategic development partner / stake.** In our view, the sell down of a stake in the Project to a strategic partner makes a lot of sense as it would alleviate some of the financing requirement, while also giving the Project additional credibility. Based on our risk weighted valuation, a 25% stake in Mahenge would be worth approximately $120m. However, a potential purchaser would be seeking a larger discount than that in our view as they would be in a relatively strong negotiation position. Let's not forget BKT has a market cap of around $38m, so anyone farming in to the Project could arguably buy the whole Company for the amount they would likely need to pay to make bringing them in worth BKT's while. On this point, however, we do note that Galena Mining (ASX: G1A) recently sold a 40% stake in its Abra Base Metals Project for $90m to Toho Zinc Co Ltd. At the time the transaction was announced, G1A's market cap was around $57m. However, the individual enterprises amongst the flake graphite customers are quite small, and therefore unlikely to have the balance sheet to come into the project with an equity stake. As a result, a strategic partner is more likely to come to the project from the battery side of the graphite industry.

- **China debt.** As part of BKT's Strategic Cooperation Agreement with Yantai Jinyuan Mining Machinery Ltd, Yantai has agreed to work with BKT to secure up to US$40m in project finance from Chinese groups including the Government import export credit agency. We still see risk around this debt funding avenue, as it will likely depend on the terms being palatable to BKT.

- **Other debt.** Given the Mahenge project is located in Tanzania and the price for large flake graphite is yet to be established, obtaining debt facilities from the majority of traditional debt lenders will be challenging in our view. However conventional debt from African-based banks such as NED Bank and African Development Bank, private equity or global resource funds may be possible. The African banks, and indeed others, will likely want to see a strategic partner involved before they will commit to debt funding.

Before funding can occur, incoming financiers will want to see documentation finalised around the shareholder agreement with the government to confirm the 16% free carry interest for the Tanzanian government before potential funding can be achieved. It is widely acknowledged that the free carry is 16%, however the legislative wording currently states 16% to 50%, and we understand that Cabinet is expected to meet soon to formally remove the "to 50% component" of the legislation.

RISKS

Investment risks associated with the uranium sector and BKT include, but are not limited to, the following:

- **Commodity price and FX assumption risk.** Graphite price and currency movements may differ materially from the assumptions used in this report, and may cause economic prospects of projects to deteriorate or improve. The market for large flake graphite products is still materialising and being developed, and therefore there is limited data points to assess the robustness of the large flake graphite pricing used in our valuation.

- **Exploration and geological risk.** Resource exploration relies upon the interpretation of complex and uncertain data and information which cannot necessarily be relied upon to lead to a successful outcome. Resource exploration is inherently uncertain and involves significant risk of failure. We do note that the proposed Mahenge Project is not dependent on exploration success, but it will carry geological risk.

- **Reserves and Resource estimation risk.** Resource estimates are based on standard industry practice, experience and judgement that carry inherent uncertainty, and future exploration may alter the current resource estimates. Changes to resource estimation may affect the economics of future developments, and graphite price movement can have an impact on reserve estimates.

- **Project execution risk.** There is potential for developments to cost more and/or take longer to complete than originally anticipated which can have a material impact on the valuation of the assets being developed. Furthermore, head grade can have a material impact on production output.

- **Financing risk.** Ability to source funds for the development will have a significant impact on our forecast production expectations. We discuss financing in further detail in the previous section of this report.

DIRECTORS AND KEY MANAGEMENT

Until recently, BKT prescribed to the minimum of three directors for an ASX listed company. However on 2 May 2019, BKT appointed Ian Murray as a Non-Executive Director, and Jeff Dawkins was appointed Chief Financial Officer and Company Secretary We would expect the Board to grow further over time to ensure overall adequacy of skills, and diversity of perspective if the Mahenge Project progresses. We have therefore factored the appointment of more directors into our corporate costs estimates.

Richard Crookes - Chairman. Richard is a geologist with over 30 years' executive experience in the resources and investments industry. Until recently Richard was an Investment Director of EMR Capital and was formerly a Director of Macquarie Bank's Metals Energy Capital Division and was Chief Geologist with Ernest Henry Mining.

John de Vries – Managing Director. John is a mining engineer with over 35 years-experience in mine development and operations. Previously, John was General Manager Technical Services with St Barbara and integral in the 2014 turnaround. John has held senior positions at BHP Nickel West and Orica Mining Services, and has experience operating mines in Africa, the Pacific, North America and South America.

Gabriel Chiappini – Non-Executive Director. Gabriel is a Chartered Accountant and member of the Australian Institute of Company Directors with over 20 years' experience in the commercial sector. Over the last 15 years he has held positions of Director, Company Secretary and Chief Financial Officer in both public and private companies with operations in Australia, United Kingdom and the United States. Gabriel has a Bachelor of Commerce degree with a double major in Accounting and Finance and is a Member of the Institute of Chartered Accountants.

Ian Murray – Non-Executive Director. Ian has held senior management positions for companies such as KPMG, Price Waterhouse, Bioclones, DRDGold Ltd, and Gold Road Resources. More recently, as Chief Executive Officer and Managing Director, he successfully delivered Gold Road Resources' (GOR) Gruyere Project, and has significant African experience through DRDGold.

Jeff Dawkins – CFO & Company Secretary. Jeff has over 20 years of industry experience in senior finance positions with companies including Lynas Corporation, Archipelago Resources, Peak Resources Limited, Blackham Resources Limited, and Battery Minerals Limited. Jeff adds experience in project finance and asset development, including Tanzanian experience though Peak Resources and an understanding of the energy minerals sector from his time at Battery Minerals.

GRAPHITE PEERS ON ASX

A table comparing relevant graphite peers listed on the ASX is shown in Figure 24.

Figure 20: Comparison of ASX Listed Graphite Companies Listed on the ASX

	Black Rock Mining	Bass Metals	Graphex Mining	Hexagon Resources	Kibaran Resources	Sovereign Metals	Syrah Resources	Triton Minerals	Volt Resources	Walkabout Resources
ASX Code	**BKT**	**BSM**	**GPX**	**HXG**	**KNL**	**SVM**	**SYR**	**TON**	**VRC**	**WKT**
Project Location	Tanzania	Madagascar	Tanzania	WA	Tanzania	Malawi	Mozambique	Mozambique	Tanzania	Tanzania
Prject Name	Mahenge	Graphmada	Chilalo	McIntosh	Epanko	Malingunde	Balama	Ancuabe	Bunyu	Lindi
Market Cap (A$m)	38.7	33.5	19.2	40.9	26.6	32.3	368.0	38.0	29.1	58.0
Cash (A$m)	0.6	2.0	0.2	4.5	0.0	4.5	2.1	1.2	-0.3	4.5
Debt (A$m)	0.0	0.0	7.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0
EV (A$m)	38.0	31.5	26.0	36.3	26.5	27.9	365.9	36.8	30.6	53.5
Producer (Y/N)	N	N	N	N	N	N	Y	N	N	N
Reserves										
Tonnes (Mt)	69.6	-	5.3	-	-	9.5	113.3	24.9	2.8	5.5
Grade (% TGC)	8.5%	-	10.9%	-	-	9.5%	16.4%	6.2%	6.3%	17.9%
Contained Graphite (Mt)	6.0	-	0.6	-	-	0.9	18.5	1.5	0.2	1.0
EV/t Reserves ($/t)	**6.3**	**-**	**45.0**	**-**	**-**	**30.9**	**19.7**	**23.9**	**172.8**	**54.2**
Resource										
Tonnes (Mt)	211.8	9.2	53.5	21.3	30.7	14.5	1,423.0	46.1	446.2	41.8
Grade (% TGC)	7.8%	4.2%	5.6%	4.5%	9.9%	9.7%	10.0%	6.6%	5.0%	10.7%
Contained Graphite (Mt)	16.6	0.4	3.0	1.0	3.0	1.4	147.0	3.0	22.4	4.5
EV/t Resource ($/t)	2.3	82.4	8.7	37.7	8.7	19.8	2.5	12.1	1.4	11.9

Source: Patersons Securities, company reports, Iress

APPENDIX 1: AN OVERVIEW OF GRAPHITE

What is Graphite?

Graphite is one of two forms of naturally occurring pure carbon (the other form is diamonds). Graphite has a planar molecular structure which forms in layers. The carbon atoms are held together by strong covalent bonds, while the layers the atoms form in are held together by weak van der Waals bonds. Given the weak bonds versus the strong covalent bonds, the layers can be easily disrupted giving graphite its greasy lubricant properties. It exhibits both metallic and non-metallic properties making it suitable for many applications. Key graphite characteristics and properties include:

- Electrical and thermal conductivity;
- Inertness;
- Lubrication; and
- Resistance to high temperatures.

The uses and applications for graphite are summarised in Figure 21.

Figure 21: Graphite Applications

	Natural		Synthetic	
	Amorphous	**Flake**	**Primary**	**Secondary**
Batteries		X	X	X
Conductive Coatings		X	X	X
Electrodes				X
Expandable Graphite		X		
Foundry Coating	X	X		
Friction Materials	X	X	X	X
Fuel cells		X	X	X
Flexible Products		X		
Graphite Shapes	X	X	X	X
Lubricants	X	X		X
Pencils	X	X		
Plastics		X	X	X
Powdered Metals		X	X	X
Refractories	X	X		X
Recarburisers	X			X

Source: Roskill, Patersons Securities

Types of Graphite

There are three types of natural graphite which are categorised by a variety of different properties including flake size, crystallinity (ie structural order within the graphite), grade (purity of the graphite). The three types are amorphous, flake and vein graphite. In addition to the natural graphite types, there is also synthetic graphite which is manufactured from petroleum coke (specifically needle coke) through a graphitisation process.

Figure 22: Graphite Types & Properties

	Flake	Amorphous	Vein	Synthetic
Description	Flake graphite has a crystalline structure and is produced in the graphitic carbon range of 80% - 98%	Amorphous graphite does not have a crystalline structure and is produced in the graphitic carbon range of 70% to 75%. Amorphous graphite is a seam mineral and is typically higher in ash than other forms of natural graphite.	The rarest and most valuable form (on a cost per tonne basis) is vein graphite. Lump or vein graphite is predominately produced in limited tonnages but at a very high grade (over 98% graphitic carbon).	
Main Sources	China, Mozambique, Brazil	China	Sri Lanka	China, USA, Europe, India
Advantages	Low cost, low impurities, crystalline structure, porosity.	Low cost.	High graphite content	Consistent quality, very low impurities.
Disadvantages	Inconsistent quality.	Weak crystalline structure, high impurities.	Small economic sources , high cost.	Highest cost, highest pollution.
Metallurgical	Y	Y	Y	N
Batteries	Y	N	N	Y
Technical	Y	N	N	Y
Other	Y	Y	Y	Y

Source: Syrah Resources

Amorphous Graphite

The most abundant form of graphite is amorphous graphite, and it is also the lowest grade with a very small crystal size. Amorphous graphite is used for lower value graphite products such as pencils, brake pads, rubber additives and refractory products such as crucibles, ladles, moulds and troughs as it can withstand very high temperatures. The electrodes used in stell processing electric arc furnaces are manufactured from amorphous graphite. Amorphous graphite is also used in the production of seel, raising the carbon content and thereby increasing its strength.

Amorphous graphite tends to be much less reflective in both large a small grained sizes. Therefore, it has a darker colour, bordering on black, while other natural graphite has a colour closer to silver-grey. Amorphous graphite is the lowest priced graphite and it accounts for approximately half of the overall natural graphite market.

Flake Graphite

Flake graphite has larger crystals than amorphous graphite and is found in metamorphic rocks. Flake graphite is one of the more desirable types of graphite, as the crystal size allows it to be used in higher end applications. Flake graphite is used in the anodes of lithium-ion batteries as the purity and particle size is suitable for anode production. Flak graphite comes in four basic sizes: jumbo, large, medium and fine. The industry standard for flake size is as follows:

- **Jumbo:** +35 mesh or +500 microns
- **Large:** -35 mesh by 50 mesh or -300 microns by 500 microns
- **Medium:** -50 mesh by 80 mesh or -150 microns by 300 microns
- **Fine:** -80 mesh and finer.

To add to the confusion, conventional wisdom would suggest that high purity large flake graphite would be the most desirable graphite product. However, each industry has specific requirements for its graphite, ie for some industries purity is more important, while for others, flake size is more important.

Spherical graphite is a battery grade graphite that is made from fine to medium flake graphite which is processed to turn the flake shape from flat to spherical. Spherical graphite is used exclusively by the battery industry and commands a premium price due to its relatively high processing costs. As a comparison, spot price of jumbo flake graphite in China was around US$1,361/t in late 2017, while uncoated spherical graphite averaged around US$3,100/t; coated spherical graphite price was US$8,193/t in 2017.

Vein / Lump Graphite

Vein graphite, also called lump graphite is formed from the direct deposition of solid, graphitic carbon in subterranean high temperature fluids. Vein graphite is easy to mould and can be formed into solid shapes without the aid of a binder. It accounts for less than 1% of the broader graphite market and is only currently mined in Sri Lanka. The grade of vein graphite is typically above 90% TGC with a purity of 95 to 99%. As such, recovery costs are typically lower than for flake or amorphous graphite. Vein graphite s used in thermal and high friction applications such as brakes and clutches. It is also used in applications requiring high thermal and electrical conductivity.

Synthetic Graphite

Synthetic graphite is a separate type of graphite again, and is similar, but different to, the three natural graphite types. It typically comes in two forms – electrodes and graphite blocks. Synthetic graphite is significantly more expensive than natural graphite as it is purer in terms of its carbon content. Producing synthetic graphite also creates a by-product referred to as secondary synthetic graphite, which is typically in a powder form. Secondary synthetic graphite is one of the cheapest forms of graphite and some forms of it can compete with natural graphite in uses such as brake linings and lubricants.

Graphite Demand – Batteries the Key Driver of Growth

Total world graphite consumption was around 2.4 Mt in 2017, including approximately 1.55 Mt of synthetic graphite and 900 kt of natural graphite. Industry specialist, Roskill forecasts demand for graphite to grow by a CAGR of 6.1% to around 4.35 Mt in 2027, with the proportion of synthetic graphite expected to fall from around 63% at present, to 59% in 2027, primarily as larger amounts of natural flake graphite are consumed in batteries as feedstock. Graphite consumption by application is shown in Figure 23.

Key applications of graphite are as follows:

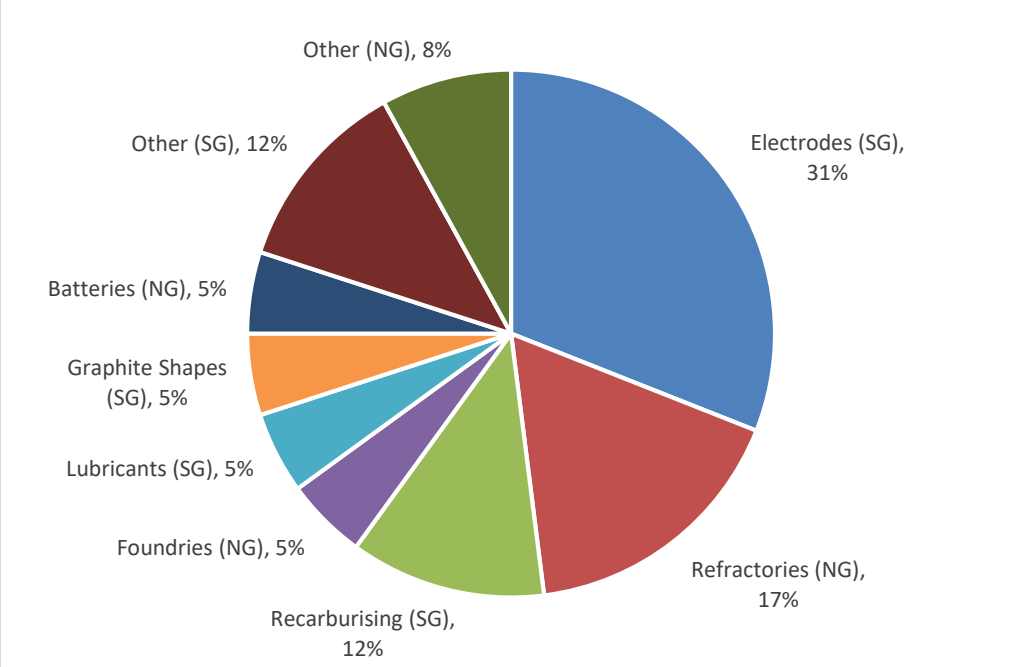
- **Electrodes.** The main market for synthetic graphite is for UHP electrodes, which are in turn used for steelmaking in EAF furnaces. Production of EAF steel is expected to grow by 5.6% pa between 2017 and 2027 driven by rising iron ore prices, increasing steel scrap, and a Chinese commitment to the more environmentally-focussed EAF steelmaking method. Roskill estimates synthetic graphite demand for electrodes will grow by 6% pa to 1.39 Mt in 2027.

- **Batteries** are forecast to become the largest graphite market by 2027, and are expected to account for 26% of total graphite consumption in 2027. In 2017, the battery sector consumed approximately 180,000 tonnes of graphite (around 72% of this was natural graphite), and based on Roskill's forecasts, batteries will consume around six times this in 2027. Graphite demand will growth is expected to be slightly slower than the lithium-ion battery market itself due to gradual reduction in consumption of graphite per MWh of battery output thanks to technology improvements. The unknown in this positive battery outlook is just how much graphite will be synthetic and how much will be natural, as synthetic graphite is concentrated in China, and gives a more consistent, higher purity graphite product than natural graphite.

- **Refractories** are currently the largest market for natural graphite, accounting for around 20% of total graphite demand, and the second largest graphite market behind synthetic graphite electrodes. However, as China's growth slows, so too will global steel production, and Chinese steel production appears to be plateauing as a result. Despite this, the electrode market will likely grow as China steel production migrates from blast furnaces (refractories) to electric arc furnaces which require higher levels of synthetic graphite for their electrodes. Roskill estimates graphite use in refractory applications will grow by just 1.1% pa over the next decade.

- **Building materials** is becoming an increasingly important market. Chinese building standards now require the use of flame retardant building materials in construction, and it has also banned the use of brominated flame retardants, and while asbestos is still used in China, it is not a viable option for exports. When it is treated with acid and heat, graphite places split and increase in volume by up to 300 times. This is known as expandable graphite and it can be pressed into sheets and used as a flame retardant in building materials. At a conference in December 2017, China National Building Materials estimated that "China needs 40 million tonnes of fire retardant building material per annum, which will contain 5% expandable graphite". This represents an annual requirement of 2 million tonnes of expandable graphite material for building materials alone. This market is potentially over ten times larger than the current lithium-ion battery demand, and is striking when compared to the current estimated demand in this market of around 25,000 tonnes in 2017.

Figure 23: 2016 Consumption of Graphite by Application



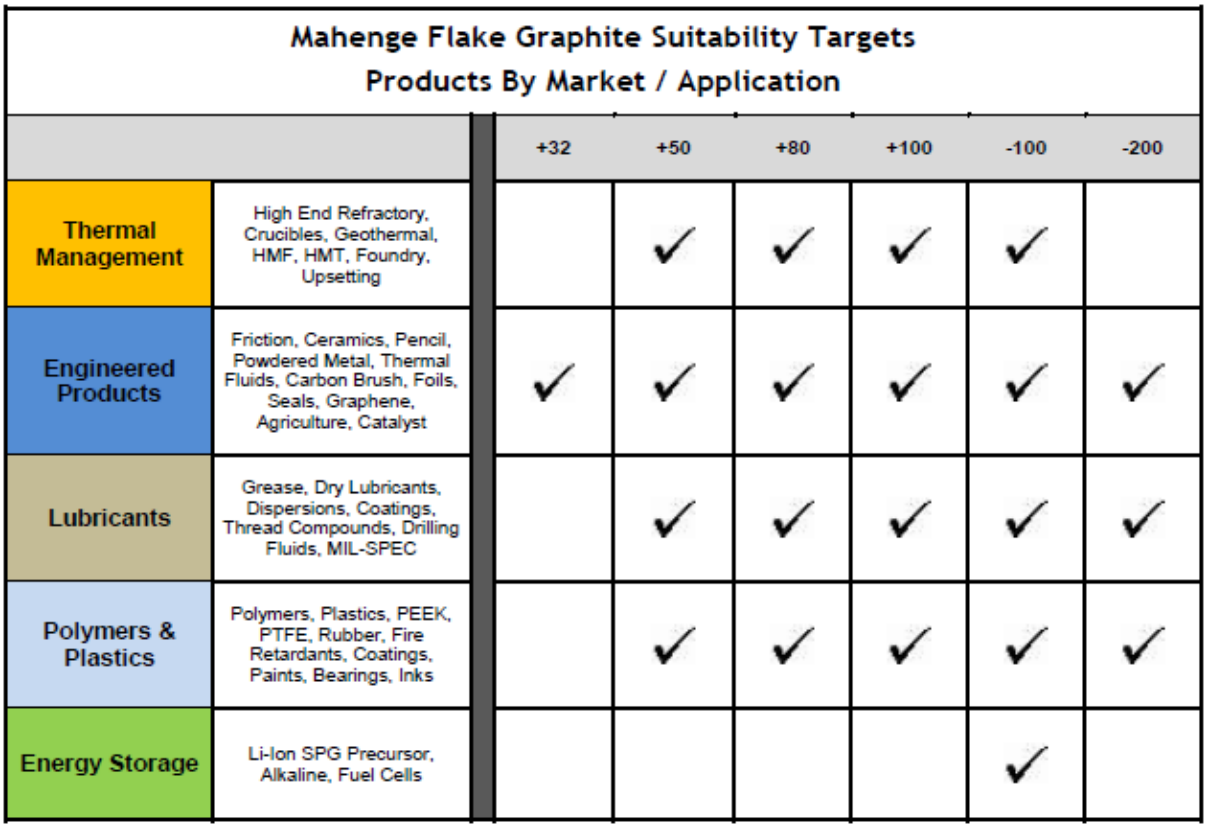
Source: Roskill, company reports. SG = synthetic graphite; NG = natural graphite

Figure 24: Forecast Natural Graphite Demand by Application and Region in 2027 in kt

Application	Asia	Europe	North America	South America	Other	Total (kt)
Batteries	564	26	24	27	61	**702**
Refractories	329	40	23	21	16	**429**
Foundries	64	28	22	13	10	**137**
Friction Products	30	14	10	9	4	**67**
Lubricants	37	10	6	5	5	**63**
Recarburising	23	3	3	22	3	**54**
Graphite Shapes	11	3	2	1	2	**19**
Other	78	17	13	22	7	**137**
Total (kt)	**1,136**	**141**	**103**	**120**	**108**	**1,608**

Source: Black Rock Mining, Roskill, Patersons Securities

Figure 25: Market Segmentation for Mahenge Product



Source: Black Rock Mining

Black Rock Mining Limited (BKT.AX)	Price	$0.08
Valuation	**$m**	**$/sh**
Mahenge Graphite Project, risked at 50%	486	0.33
Exploration	0	0.00
Net Cash (Debt)	(94)	(0.06)
Corporate Costs	(35)	(0.02)
Total Valuation	**356**	**0.24**

Reserves & Resources			
0	TGC Grade (%)	Contained Graphite (Mt)	
Measured	25.4	8.6%	2.2
50	88.1	7.9%	6.9
80	98.3	7.6%	7.5
100	**211.8**	**7.8%**	**16.6**

Ratios	2018A	2019F	2020F	2021F
P/E (x)	-16.8	-14.5	-11.0	-3.7
Enterprise Value	25.6	31.9	39.9	46.1
EV/EBITDA (x)	-15.9	-14.1	-14.3	-30.0
EV/Free Cash Flow	(4.8)	(5.0)	(6.4)	(0.4)
PFCF (x)	(6.3)	(6.4)	(6.6)	(0.4)
DPS (cents)	0	0	0	0
Div. Yield (%)	na	na	na	na
Franking (%)	na	na	na	na

Directors & Management	
Name	**Position**
Richard Crookes	Executive Chairman
John de Vries	Chief Executive Officer
Gabriel Chiappini	Non-Executive Director
Ian Murray	Non-Executive Director

Top Shareholders	Shares (m)	%
Stephen Copulous	109.2	20.3
Harry Hatch	20.2	3.7
Anthony Hall	13.8	2.6
Westpark Operations P/L	10.6	2.0
Daniel Turner Capital P/L	10.0	1.9
Top 5 Shareholders	**163.7**	**30.4**

Year End 30 June

Commodity Assumptions	2018A	2019F	2020F	2021F
US$/A$	0.77	0.72	0.73	0.73
TGC (US$/t)	-	1,251	1,200	1,200

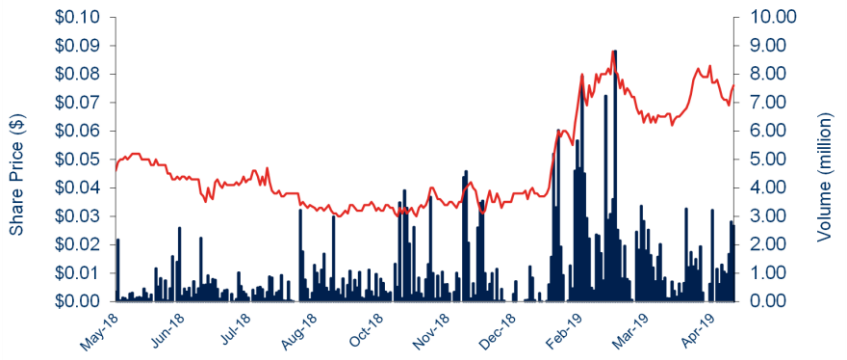
Production Summary	2018A	2019F	2020F	2021F
Ore milled (kt)	0	0	0	0
Head Grade (% TGC)	n/a	n/a	n/a	n/a
Recovery (%)	n/a	n/a	n/a	n/a
Production (kt TGC)	0	0	0	0

Profit & Loss (A$m)	2018A	2019F	2020F	2021F
Total revenue	0.0	(0.0)	0.0	0.0
Operating costs	0.0	0.0	0.0	0.0
Exploration expensed	0.0	(0.1)	(0.3)	(0.5)
Corporate & admin	(1.0)	(1.2)	(1.4)	(2.5)
Other expenses	(1.0)	(1.6)	(1.6)	(2.3)
EBITDA	**(2.0)**	**(2.8)**	**(3.2)**	**(5.3)**
DD&A	(0.0)	(0.0)	(0.0)	0.0
EBIT	**(2.0)**	**(2.8)**	**(3.2)**	**(5.3)**
Net interest income (expense)	0.0	0.0	(0.5)	(5.9)
NPAT (underlying)	**(2.0)**	**(2.8)**	**(3.7)**	**(11.1)**
Diluted EPS (cps)	**(0.5)**	**(0.5)**	**(0.7)**	**(2.1)**
DPS (cps)	**0.0**	**0.0**	**0.0**	**0.0**

Cash Flow (A$m)	2018A	2019F	2020F	2021F
EBIT (Cash Flow)	(2.0)	(2.8)	(3.2)	(5.3)
Depreciation - Cash Flow	(0.0)	(0.0)	(0.0)	0.0
Net Interest Paid	0.0	0.0	(0.5)	(5.9)
Tax Paid	0.0	0.0	0.0	0.0
Other Operating Cash Flows	0.0	0.2	0.0	0.0
Operating Cash Flow	**(2.0)**	**(2.6)**	**(3.7)**	**(11.1)**
Capital expenditure	(0.0)	(0.0)	0.0	(103.2)
Exploration expenditure	(3.6)	(3.8)	(3.3)	(3.3)
Free Cash Flow	**(5.6)**	**(6.4)**	**(7.0)**	**(117.6)**
Dividends	0.0	0.0	0.0	0.0
Equity Raised	4.4	5.7	0.0	0.0
Debt drawn (repaid)	0.0	0.0	10.0	115.0
Net Change in Cash	**(1.1)**	**(0.8)**	**3.0**	**(2.6)**
Cash at Period End	1.8	1.0	4.8	8.5
Net Cash (Debt)	**1.8**	**1.0**	**(5.2)**	**(116.5)**

Balance Sheet (A$m)	2018A	2019F	2020F	2021F
Cash	1.8	1.0	4.8	8.5
Total Assets	**18.8**	**22.6**	**29.4**	**139.2**
Creditors	0.5	0.5	0.5	0.5
Current Borrowings	0.0	0.0	0.0	0.0
Non-current Borrowings	0.0	0.0	10.0	125.0
Provisions	0.0	0.0	0.5	6.4
Total Liabilities	**0.5**	**0.5**	**11.0**	**131.8**
Shareholders Funds	**18.3**	**22.2**	**18.4**	**7.3**

Recommendation History



Date	Type	Target Price	Share Price	Recommendation	Return
02 Jun 16	Research Note	0.12	0.05	SB	
21 Jun 16	Hot off the Press	0.12	0.06	SB	25.0%
01 Sep 16	iraphite & Lithium Sector Repo	0.12	0.15	SB	150.0%
13 Oct 16	Ceased Coverage	0.00	0.00		-100.0%
	Current Share Price		0.08		

Stock recommendations: Investment ratings are a function of Patersons expectation of total return (forecast price appreciation plus dividend yield) within the next 12 months. The investment ratings are Buy (expected total return of 10% or more), Hold (-10% to +10% total return) and Sell (> 10% negative total return). In addition we have a Speculative Buy rating covering higher risk stocks that may not be of investment grade due to low market capitalisation, high debt levels, or significant risks in the business model. Investment ratings are determined at the time of initiation of coverage, or a change in target price. At other times the expected total return may fall outside of these ranges because of price movements and/or volatility. Such interim deviations from specified ranges will be permitted but will become subject to review by Research Management. This Document is not to be passed on to any third party without our prior written consent.

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