

Prized Mahenge graphite draws high-grade leaders

Tanzania project could set a standard with its approach to delivery, and expansion

TOP-SHELF PROJECTS CUSTOMARILY draw high-calibre leaders to convert potential into maximum value, and Mahenge in Tanzania is no exception. A graphite venture now funded through to completion of a definitive feasibility study, it has this year attracted new investor support but also, crucially, the right executive team to guide it into production.

Chairman Richard Crookes and CEO John de Vries bring deep financial, technical and operational expertise to Black Rock Mining (ASX:BKT), which this year put out a glowing preliminary feasibility study (PFS) that underlined Mahenge's capacity to produce graphite at high margins due to its excellent grade and mining characteristics (low strip ratio).

Experienced mine finder and developer-turned-financier, Crookes complements ex-Western Mining Corp mining engineer and manager de Vries' 'domain' expertise. "We know what a good mine looks like," says de Vries. "We're both here to build a mine: success is the opening day."

Mahenge, with its 16-million-tonne JORC graphite resource (203Mt grading an average 7.8% total graphite contained, or TGC) and 48.3Mt ore reserve (8.7% average TGC), certainly has the makings of a good mine. Maybe a great one.

Mahenge looks capable of yielding an exceptionally high-quality concentrate



Supporting an operation initially producing 80,000tpa of graphite, the project bootstraps itself through two more expansions to a final run rate of 240,000-250,000tpa, for more than 30 years, in what de Vries sees as the "oldest trick in the book ... crawl, walk run". The JORC reserve also looks capable of yielding an exceptionally high-quality concentrate (98-99% pure) with about 68% of flakes in the material large-size and above.

A projected life-of-mine strip ratio of only 0.8:1, the high grades and helpful metallurgy should underpin sector bottom-quartile costs of around US\$382/t versus credible pricing in the US\$1,200/t range for battery-grade product.

Black Rock has already taken the unusual but rewarding step of getting a Mahenge-based graphite anode product independently tested in the US to show it can outperform established commercially sold material in cycle charge and discharge trials. This year's extended 300-cycles test – the consumer product benchmark – is a solid early pointer to Mahenge's future as a potential source of LiB battery-grade graphite and puts Black Rock in rare space as a project developer.

"We believe we simply have the best natural flake graphite, and have done the work to prove it," de Vries says. "Our DFS will qualify what we see as US\$375/t opex, but at that level even if we do end up selling Mahenge graphite for \$800/t, we still have a valid investment case. If it becomes an energy materials mine and we sell at \$1,200/t, it's an absolute stunner with 60% operating margins."

Black Rock's deliberate strategy of seeking to build a US\$90 million mine with enough production (at those margins) to rapidly repay project finance and establish strong cash flow, while establishing a firm foothold in the global market, gives it a scalable and – on paper at least – compelling investment case that embodies what de Vries calls a "Goldilocks" approach to project development.

That is, not too big to create a capital roadblock, and not too small to

leave the owner short of the cash flow required to quickly get to growth.

"It gives us incredible capital efficiency from an investment point of view, and it means we grow this thing as the market grows," de Vries says.

"We don't distort the market by bringing on a large increment of production, and we generate the cash to fund phase two and three [tripling output to circa-240,000tpa]."

The project scope might be just right, but Black Rock's PFS projected IRR of 45.1% and NPV of US\$905 million, inclusive of 16% free carried (\$1.6 billion with the product basket pricing of a sector peer) are eye-catching and significant by any measure. By contrast, Black Rock's current market capitalisation of sub-A\$30 million is demonstrably on the small side relative to peers.

Still, after a big transition year in 2017 with delivery of the PFS, changing of the management guard, replenishment of finances (plus-A\$5 million in the bank), and the successful early product testwork combined with an MoU signing with Japanese graphite supplier, Meiwa Corporation, it will be all hands to the DFS wheel for Black Rock in 2018 as it advances toward producer status – possibly in 2019.

The company will focus on three work streams: firstly, drilling out the planned pit shell for the first five years of production, along with detailed planning and scheduling. This work will also underpin comprehensive mill performance characterisation and design of the plant.

And Black Rock wants to get more product samples in the hands of prospective customers.

"The graphite we have seen is unique – nobody else can get near our grades – and our float properties are excellent," de Vries says.

"We need to get a complete handle on the milling over that first five years so we have control over the engineering fundamentals and so the mill does what is supposed to do, and we know what it's going to cost.

"The other thing it does is gives us a chance to go to our customers and



say, here is the concentrate variability we can expect over the first five years, and it's representative of the LOM.

"The DFS is going to be very, very tight scope of work. It is about de-risking. We want to bring the project in on budget, on schedule, and try to be as boring, and as consistent and predictable, as possible. To do that you've got to do some good engineering."

Infrastructure-wise, Black Rock envisages using onsite diesel gen-set power until a grid connection is possible. Water is plentiful, and the project is about 65km (by road) from the TAZARA rail line that runs to Dar es Salaam.

At a time of increasing uncertainty about the future of conventional wet tailings management in the industry, de Vries suggests Mahenge's hard-rock (graphitic schists, marble, and biotite) host setting could also prove advantageous in the long run. "I can go to dry stacking fairly easily," he says. "Managing a tailings dam with a lot of clay in it in a tropical environment is hard work and can become very expensive. I think all the saprolite plays could find themselves with problems in five years' time."

While the picture on the ground at Mahenge is good, and seemingly getting better, the macro view of Tanzania has darkened this year due to the well-documented row between Acacia Mining and the Tanzania Government over royalty payments.

De Vries is unperturbed, highlighting permitting delays and hurdles in other jurisdictions – including mature mining states in Australia, Canada, the US and elsewhere – as being symptomatic of weightier challenges than those in many African countries, in places where most investors feel comfortable.

Resolution of the Acacia dispute seems to be in sight. De Vries says it will be a "control-alt-delete" event for stalled investment in Tanzania's mining sector. But fundamentally, he says

Tanzania has transparent mining approval processes and investment cases such as Black Rock's were already factoring in government free-carried and royalty changes in the country's revised mining code.

Black Rock is working through submission of an environmental impact statement and application for a mining licence under existing legislation and the current national mining framework.

More macro still, de Vries sees continuing growth in EV battery minerals demand in 2018, with runaway pricing on supply constraints, creating substitution openings, the main potential concern for suppliers of natural graphite and other energy materials.

For graphite specifically there is also improving sentiment suggesting demand for building fire-retardant expanded foam-block insulation could mushroom.

"The interesting spec on that material from our point of view is it's 99% purity [graphite] that's needed.

"So our concentrate just goes straight into that expanding market."

Projected demand volume estimates vary from 250,000tpa to more than 1Mtpa of high-grade flake graphite within five years.

De Vries says environmental and regulatory constraints on Chinese graphite production continues to keep significant production sidelined – possibly longer term – which is driving up prices for the commodity.

Meanwhile, synthetic graphite production costs continue to tip the competitive-price scales in favour of natural graphite, a situation few expect to change any time soon.

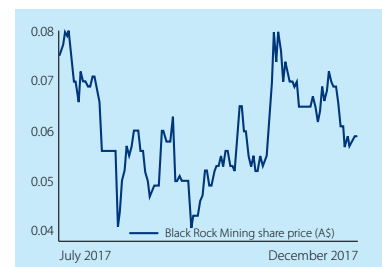
"The overall picture is one of very significant annual growth in demand from the building cladding and lithium-ion battery markets at a time when production of natural flake graphite and synthetic substitutes is actually decreasing," de Vries says.

Mahenge has a 16-million-tonne JORC graphite resource (203Mt grading an average 7.8% TGC)

'We know what a good mine looks like'

– JOHN DE VRIES
CEO

BLACK ROCK MINING AT A GLANCE



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MARKET CAPITALISATION

A\$24.8 million (December 6)

QUOTED SHARES ON ISSUE

443.7 million

MAJOR SHAREHOLDERS

Stephen Copulos (24.63%)