CEYLON GRAPHITE CORP (CVE:CYL)



8 October 2019

Mining	
52-WEEK HIGH	¢0.20
52-WEEK LOW	¢0.09
PRICE	¢0.10
MARKET CAP MLN	¢5.48

Share Price

Major Shareholders Jacob Capital Management: 47% Shares in issue 54,766,181 Avg Three-month trading volume Primary Index CVE

Company Information

Address: 1100-1111 Melville Street, Vancouver, BC V6E 4A6, Canada Website: www.ceylongraphite.com

Analyst Details

Christopher Ecclestone christopher@proactiveinvestors.com

Ceylon Graphite Building of the mine advances

Summary

Ceylon Graphite Corp (CVE:CYL) is listed on the TSX Venture Exchange. The company is engaged in the development of graphite mines in Sri Lanka. It has received environmental approvals for its K1 mine and has recently gained an industrial mining licence with first production likely in early 2020.

The mining licence is a notable triumph as its only the fourth one issued since the country's independence in the 1960s.

The company holds exploration rights over a land package of around 121km². These rights cover areas of historic graphite production from the early twentieth century and represent a majority of the known graphite occurrences in Sri Lanka.

Positives and negatives

- Environmental approval and mining licences for K1 project are in hand
- The mine build is advanced and mining is most likely to begin in early 2020
- The price of most categories of graphite have picked up since 2017 but with some slight easing in 2019
- Ceylon Graphite has accumulated a large land package with significant evidence of past production from the glory days of Sri Lanka as the world's prime producer of graphite
- Except for Syrah, most entrants are moderately sized and should not "spoil" the market
- The travails of Syrah (necessitating its production cuts) are curiously positive for the rest of graphite developers
- China has now switched over to being a graphite importer
- Graphite price movements and stockpiled quantities remain essentially at the discretion of the Chinese
- Trump Administration has recently declared Graphite to be a metal critical to US interests

Investment thesis

Battery metals have gone off the boil since 2017's frenzy but graphite has held up exceptionally well, largely because it is not (yet) dominated by the potential for electric vehicle (EV) usage. With a plethora of other usages in a wide range of industries, its dynamic is not driven solely by EV sentiments but rather by supply considerations.

Chinese cutbacks in production (for environmental reasons) and limitations on needle-coke supply (for artificial graphite) have underpinned prices when otherwise they might have trended lower with lithium & cobalt.

However, all has not been rosy on the supply front with the over-dimensioned Balama mine of Syrah looming over the marketplace and suppressing prices.

Despite all this, the EV revolution rolls on in the background and graphite is the key component in the lithium-ion battery configuration that had been pushed to the side during the hype over other battery minerals.

Ceylon Graphite is dedicated to production and has been collecting licences and advancing underground work towards achieving that goal. K1 is now on the fast track and then M1 should be following on with production rising incrementally in a non-market-disruptive manner.

Ceylon Graphite aims to be the "silent achiever" in the graphite space.



Bharat Parashar, Chief Executive Officer has 40 years of investment banking experience and has executed numerous debt and equity transactions, raising more than US\$8 billion for corporations and governments.

Christian Derosier is an independent consultant who has headed up assignments for dozens of Canadian and international exploration and mining companies around the

Abbey Abdiye Chief Financial officer is a chartered professional accountant. He is responsible for all financial, fiscal management, regulatory compliance matters and financial reporting.

This is an important step. Historically the GSMB has granted just four IMLA licences for graphite mining in Sri Lanka including the Sarcon/Ceylon Graphite licence

The waiting game

Most of the graphite space is playing a waiting game. Developers are in a holding pattern and exploration has gone on hold (though the discovery of new resources is not necessary). The problem for the space is the oversupply created by Syrah having built its mine at a size that far exceeds current market needs. This has not only put a lid on prices it has also imposed a dampener.

Curiously, a few small players have been able to keep moving despite this stasis amongst the mid- and large-size players because they have projects that can move through the specialised niches in the space and have capital expenditures that are not dependent upon massive funding.

In the current market for *all* mining projects, nothing succeeds like production (except if you are Syrah) and so small graphite players perversely have more chance of navigating the tough markets with their shallow funding pools than those trying to tap more significant funds.

As we noted in our original launch of coverage earlier this year, Ceylon Graphite is one of those still with forward momentum. Indeed, since that time it has secured mining licences for its K1 project and is well advanced with shaft construction; all of this has been achieved on a very tight budget.

In this update, we shall look at the progress made and how things might pan out into 2020 for the company and its projects.

Key progress on licences

In late August the company announced that its wholly-owned subsidiary Sarcon Development (Pvt) Ltd had been granted an industrial mining licence category A for its K1 project at Karasnagla from the Geological Survey and Mines Bureau (GSMB). The GSMB is the mining regulator in Sri Lanka. An industrial mining licence category A (IMLA) is the highest category licence in Sri Lanka and grants exclusive rights to mine, process and trade in graphite mined within the area specified in the licence. It also allows for underground multi-borehole blasting, commercial production, use of all mining machinery and equipment and the export of graphite.

This is an important step. Historically the GSMB has granted just four IMLA licences for graphite mining in Sri Lanka including the Sarcon/Ceylon Graphite licence. Ceylon Graphite managed to achieve this licence in a relatively short time.

An uncommon achievement

The graphite mining approval granted to the K1 project is only the fourth issued by the Sri Lankan government. The others were to:

- Graphit Kropfmühl, a prominent German group on the graphite industry, which has a position via Bolgala Graphite
- Sakura, for the Ragadera mine. This was in a joint venture with the Canadianlisted Elcora; however, this relationship is currently the subject of a shareholder dispute
- First Graphene (formerly First Graphite and before that MRL) which is an ASX-listed entity under the ticker FGR. This company also works with the government-owned Kahatagaha Graphite Lanka Limited.

Background to the K1 project

The K1 project is Ceylon Graphite's prime development focus. The K1 site was selected for its historic crystalline graphite production as it contains several abandoned mine shafts and adits and has ample dump material.

In May of 2017, the company announced assays conducted on a "pre-drilling" grab sample of historic dump material (graphite and quartzite) including substantial rock fragments of graphite from the K1 site. Samples of dump site material from history production yielded 86.63% carbon, and samples were subject to weather and oxidation from more than 50 years.



K1 also has a drill rig on the property and shaft & adit refurbishment is currently underway. There is no NI 43-101 compliant resource currently on this asset.

In April of 2018, the company announced the discovery of two new large graphite veins at a depth of more than 200 ft at the K1 site. Each vein is around 18 inches (46 cm) across and is situated in the ceiling of a drive on the north side of the tunnel (shown in the picture below). Samples were taken from the veins and sent to the country's Geological Survey and Mining Bureau for carbon testing. Laboratory tests indicated a Cg level of 89.2%. These samples were sent to laboratories for micronisation to 20 microns and then spheronisation tests.

Graphite Vein at K1



Further work resulted in an announcement in September 2018 that assay test results of samples from the large, untapped natural graphite vein discovered in late August 2018 at its K1 site came in at 97.61%. K1 has now yielded six sizeable veins over a relatively short period of work.

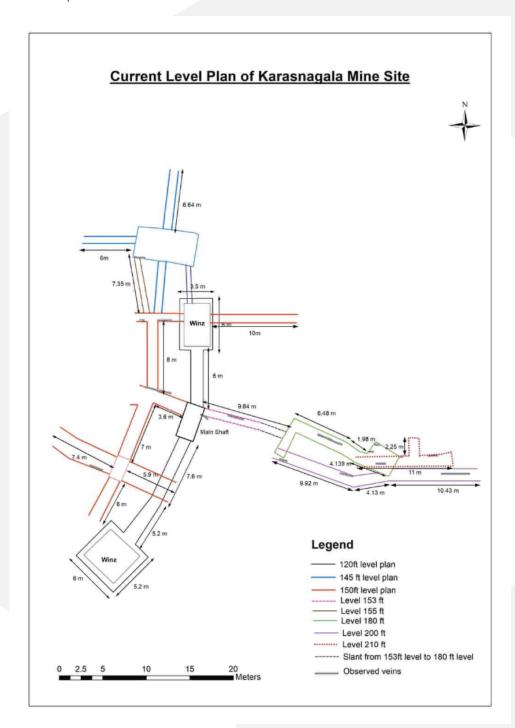
The company's geologists expect there to be additional similar sized or larger veins at lower depths and the company continues to actively pursue its aggressive exploration plan at its K1 site while rehabilitating the main shaft.

Samples were also sent to the leading graphite testing laboratory, Dorfner Anzaplan, in Germany; Dorfner Anzaplan certified that graphite from the K1 meets the specifications of **marketable battery-grade graphite**. They also confirmed that the graphite obtained from the K1 project is upgradable and has a carbon content of about 99.96%. The test results show that K1 can supply high-quality graphite that lithium-ion battery manufacturers can use in their products.



The mine build at K1

At that mine, the company has already refurbished the shaft down to 150 feet from where it can access other parts of the old mine. Below is a plan of the mine.



Reactivation of the mine is an exceedingly low capital expenditure (capex) operation n Sri Lanka. Every 100 feet of shaft refurbishment only costs around US\$40,000. Below can be seen the entrance to the rehabilitated shaft.



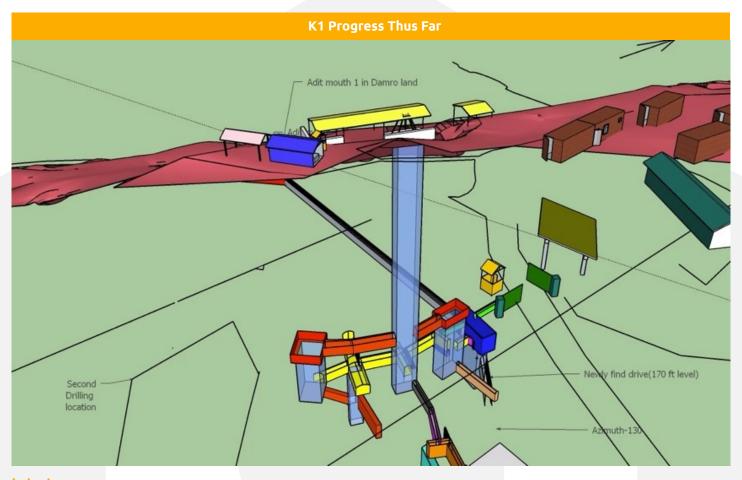


Once the facility is ready for production the further processing of the high-grade material will be undertaken by one or various sources inside or outside Sri Lanka. To this end, the company is engaged in talks with several groups at this time, including the potential for a joint venture (JV) with a local processor.

We would emphasise that the company is *not* looking to get into the business of spheronisation in the short-term.

Management estimates the operating expenditure (opex) to be slightly less than US\$200 per tonne of graphite. As noted, Sri Lankan vein graphite sells at around USD\$2,300 per tonne in its raw form. Even if the upgrading to battery-grade graphite costs US\$100 per tonne (and that is a far cry from reality), with the selling price of the upgraded material in the US\$5,000 per tonne range the economics are very favourable for Ceylon Graphite.





Latest progress

The K1 main shaft is currently down to a depth of 155 feet and with winzes and other adits reaches down to 240 feet. The plan in the short term is to add another 40 feet to the main shaft.

Other planned constructions are a powder magazine, collaring of the shaft and a horizontal adit into the hillside to meet the shaft for egress of ore.

The costs of these site enhancements, additional shaft depth and work on M1 between now and the end of the first quarter of 2020 (Q1-20) are between US\$500,000-\$700,000.



K1/M1	000000
Capex	US\$
Purchase Damro Land	70,000
Complete Shaft Concrete Work	25,000
Buildout Adit	30,000
Build Explosives Magazine	5,000
New Winch and head frame	52,500
Site Preparation/concreting Adit entrance	30,000
New Ventilation/Blower	3,000
Underground mining Equipment	75,000
K1 labor cost to company	60,000
K1 Working capital for operations	60,000
Back office expenses	48,000
M1 Labor cost to company	60,000
M1 Working Capital for Operations	60,000
M1 IMLA/IEE Expenses	15,000
IEE Sundry Expenses	10,000
GSA - Corporate	90,000
Travel	21,000
Contingencies	29,000
Total Expense	743,500

Production outlook

Initial production might be expected in mid-Q1 of 2020. This is expected to be 20 tonnes per month (tpm) at a grade of 95% Cg. The exceptional grade is because of the highly focused nature of graphite vein mining.

By the end of 2020, it would be expected that production would be running at around 200tpm and then up to 300-400tpm by the end of 2021.

The company has estimated an off-take price of US\$2,500 per tonne of raw Sri Lankan graphite and US\$4,500 - US\$5,000 for upgraded battery marketable graphite.

The product would be shipped to end-users or processors in container loads at a transport cost of around US\$1,200 per unit.

Geology

It is useful to reiterate the reasons why Sri Lanka is one of the most attractive graphite provinces. The country has long been known to be underlain up to 90% by Proterozoic high-grade metamorphic rocks with Proterozoic sediments, particularly along the coastal regions. Vein graphite is known under various names including crystalline vein, Plumbago, Sri Lankan graphite, and Ceylon graphite. The name "Sri Lankan" and "Ceylon" are commonly used for vein graphite since the island is the only area to produce this material in commercial quantities.

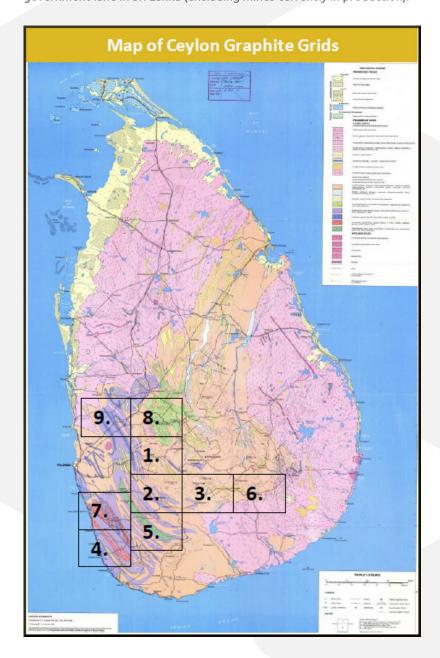
Of all the natural graphite materials vein graphite is probably the most difficult to describe geologically and various theories of its origin have been presented. As the name suggests, vein graphite is a true vein mineral as opposed to a seam mineral (amorphous graphite) or a mineral that is disseminated throughout the ore rock (as in flake graphite). Seam minerals have some unique properties including their being non-contemporaneous with the country rock, steeply inclined (vein orientation), and subjected to filling by a host of minerals, especially those of hydrothermal origin.



According to the US Geological Survey Sri Lanka currently produces a very small amount of graphite, about 4,000 tonnes (metric tons) per annum. Sri Lanka's graphite is a unique product. The country produces lump and vein graphite and is the world's only source of these particular materials. Lump and chippy dust graphite are the highest-value graphite products found globally. These unique and comparatively higher margin vein (lump) deposits currently make up less than 1% of the world graphite production. In 2018, prices for Sri Lankan vein graphite averaged US\$2,300 per tonne - significantly higher than prices reported for other products, such as flake or amorphous graphite.

Ceylon graphite's assets

Total land package: 121 km2 (121 grids at 1x1 km) that comprises most of the geologically identified graphite resources on government land in Sri Lanka (excluding mines currently in production).





The projects and the number of grids of which they are comprised are:

- 1. Avissawella 3 grids
- 2. Rathnapura 25 grids
- 3. Balangoda 1 grid
- 4. Ambalangoda 8 grids
- 5. Morawaka 2 grids
- 6. Nuwaraeliya 2 grids
- 7. Mathugama 24 grids
- 8. Kegalle 22 grids
- 9. Attanagalle 29 grids
- 10.Malsiripura 5 grids

Ceylon Graphite has exclusive exploration licences on the majority of the most prospective areas, identified in consultation with the Sri Lankan Geological Survey and Mining Bureau (GSMB)

Next up - the M1 (Malsiripura) project

M1 is located at some 40 miles distant from K1.

In early October the company intends to apply for a mining licence for this project. The process is expected to take six months at least.

The M1 project is located at about 120 km north-east of Colombo, the capital of Sri Lanka. Within 30 kilometres of the licence area are the larger regional centres of Kurunegala and Dambulla. The smaller village of Melsiripura, located some 15 kilometres south from the mining property, acts as a support base.

The area had not been subject to any modern exploration work before 2012. In that year, the acquisition of 75% of licence EL/211 by Bora Bora Resources (ASX:BBR) from Australia spurred an exploration programme. The lands surround the aforementioned Kahatagaha Kolongaha graphite mine.

BBR's programme comprised a compilation of all previous data by the Geological Survey and Mine Bureau of Sri Lanka, a helicopter-borne magnetic and VTEM survey, road building, trenching, followed by a 5,000 metres drilling programme, assaying and a bench metallurgical test. Exploration ceased in 2016. Ceylon Graphite picked up the property in mid-2018.

Numerous narrow veins and some meter-scale massive graphite veins were intersected. The mineralised zones encountered during the drilling programme have returned several high-grade intersections of crystalline graphite. The digitalisation of the drill results with the assays showed the presence of several mineralised zones comprising high-grade veinlets and veins (80% to 98.6% Cg) and disseminated to semi-massive graphite mineralisation (5% to 50% Cg).

In May 2018, the company commissioned a senior mine geologist to prepare a mineral estimation based on the 2015 borehole data. The consulting geologist interpreted the presence of four E-W (east-to-west) orientated veins (Kahatagaha vein-type) that gave a mineral resource of 76,574 tonnes with no specified Cg grade. The sinking of a shaft on the south vein and the boring of a north-northeast orientated adit were recommended.

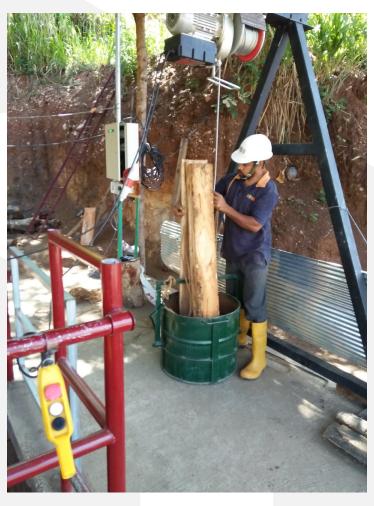
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Progress on the M1 mine build

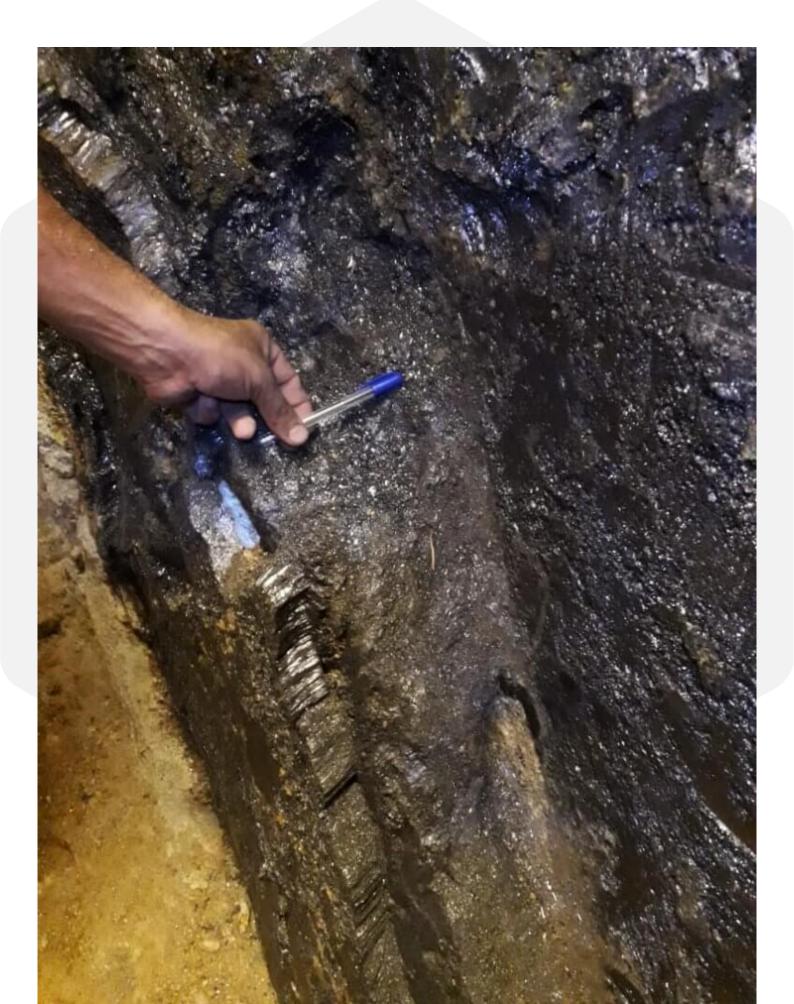




In an NI43-101 report published in August 2018 the consultants (CDGC of Quebec), using a low cut-off grade of 2% Cg, calculated a mineral resource of 159,544 tonnes averaging 8.15% Cg. This scenario was identified as the base case for an indicated mineral resource of 37,234 tonnes at 9.79% Cg and 122,309 tonnes at 2.76% Cg classified as inferred mineral resources. These mineral resources contained all the known lump veins grading between 80.20% and 98.60% Cg over thicknesses ranging from a few centimetres to 0.72 metres (m). Their length ranges from a few metres to a maximum of 75 m. A total of 13,000 tonnes of carbon graphite is contained within the mineralised envelope.

The company announced in May 2019 that the needle type crystalline graphite vein it had discovered 10 feet down-hole at its M1 site had increased 2x in size with depth (shown below at 20/25 feet).







The discovery of the widest graphite vein found to date was made in the course of driving a new ventilation shaft at the M1 site and has continued to grow in width as the digging progresses deeper into the rock.

In recent exploration work, the company has discovered very high-grade graphite occurrences. In late August 2019, it announced that it has received assay results of laboratory testing of graphite samples taken down-hole in the shaft at the M1 site. This new test result indicated an exceptional grade of naturally occurring carbon content (Cg) of 99.2%. The laboratory testing was done by the Sri Lanka Government's Geological Survey and Mines Bureau's laboratory.

In line with the company's approach that exploration is best undertaken with development the shaft construction proceeds at M1. This is already down to 70 feet. The capex budget previously cited earlier in this note includes the costs of the initial works at M1 also.

Below can be seen the entrance to the M1 shaft.

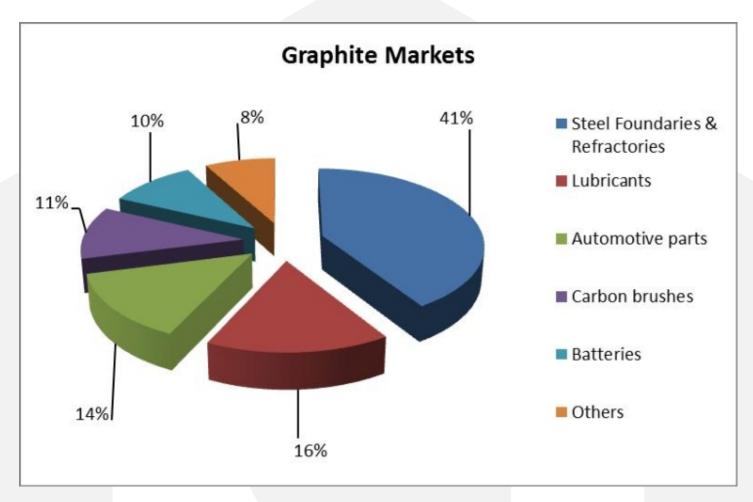


Graphite - a critical metal

he mineral is considered as one of the more strategic elements in some surveys coming out of leading industrial nations, though this is relatively new as its main uses were for cathodes (as in aluminium smelting) and steel-industry crucibles which, while important, scarcely rank as strategic uses.

Below can be seen the current usages for graphite:





The proven usage that has generated most excitement in recent times is that of batteries, primarily nickel-metal-hydride and lithium-ion batteries. The demand is not phantom by any means as it has been a prime driver of graphite demand since the late 1980s. The underlying reason for this growth was the expansion in the usage of portable electronics, such as portable CD players and power tools. Laptops, mobile phones, tablet, and smartphone products have increased the demand for batteries. Electric vehicle batteries are anticipated to increase graphite demand.

Natural and synthetic graphite are used to construct the anode of all major battery technologies. The lithium-ion battery uses roughly twice as much graphite as a lithium carbonate battery. As an example, a lithium-ion battery in a fully-electric Nissan Leaf contains nearly 40 kg of graphite. An oft-quoted statistic is that the average lithium-ion battery in a mobile phone or laptop has ten times as much graphite as there is lithium.

A lot of the more bulk uses of graphite use the more prolific grades; hence the lack of crisis mode in government circles in the West with relation to this mineral.

Graphite – the ups & downs

While graphite shows little potential for the same type of price squeeze that has propelled other battery metals higher, there is a distinct feeling that major Western end-users want to see a non-Chinese graphite supply (and downstream value-added chain) industry evolve so they will not be vulnerable to Chinese policy gyrations or attempts at market manipulation.

The turn in graphite prices occurred in mid-2017 with the price of large flake (+80 mesh) graphite increasing by around 30% in the space of a few months,

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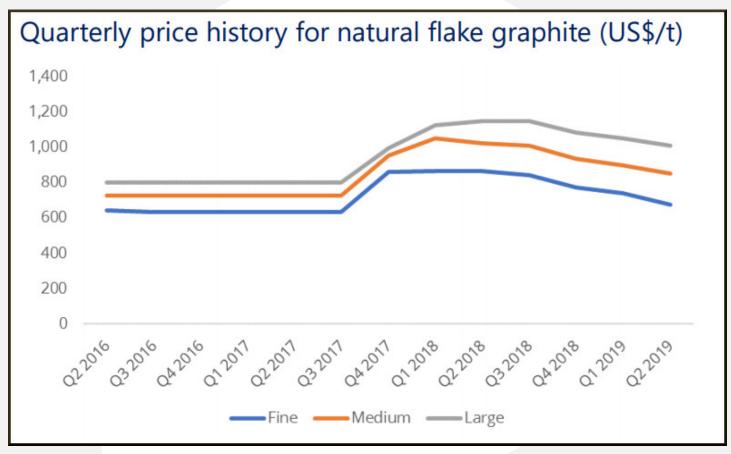


again breaching the key US\$1,000/tonne (FOB China) level. The move was driven by tightness in the supply of large and XL flake graphite and some speculative investment.

European and North American prices usually trade US\$50-100/tonne higher than China FOB, most of the time. XL flake (+50 mesh) prices have also risen significantly while smaller flake sizes have experienced more moderate price increases.

Since the price uplift of 2017/18 the mineral in all its categories has largely flatlined:

The Price Trend over Recent Years



Source: Fastmarkets

Graphite - looking past the drama

In early September the graphite market was rocked by an announcement that should have been a surprise to nobody. This was when ASX-listed graphite miner Syrah Resources said it would slash fourth-quarter output, sending its shares plunging more than 40%, as cuts in Chinese electric vehicles subsidies hurt demand for batteries using the material.

Syrah said it would reduce production in October-December to about 5,000 tonnes per month. It previously said fourth-quarter 2018 natural graphite output would be 33,000 tonnes, sourced from its sole facility producing the material at Balama in Mozambique.

One would think the response of the industry would be regret at this development but most developers in the graphite space see problems at Syrah as potentially signalling hope for their own projects. The demise of Syrah



would certainly liberate the prospects of many medium-sized projects from the overshadowing caused by Syrah's massive overcapacity and price-numbing effect.

In the graphite arena, several companies were modelling projects above 50,000 tonnes per annum (tpa) because of their perception that massive throughput was the only way their economics made sense. In doing so they ignored the effect this would have on prices and the challenge of selling large volumes of small flake and fines. Syrah was the poster child for this strategy (with Zenyatta, of old, being of a similar disposition). This led us to style Syrah as the Molycorp of graphite, with all that implied. Most players have sizeable resources but now realise that they should only produce what the market can bear.

To a certain extent, the removal of Syrah would have a liberating effect on the graphite space rather than a negative impact.

Other factors

There is a 6% royalty payable on industrial minerals not exported and 7% royalty payable on exported industrial minerals These payments are not required until mining operations commence and are then payable from sales or determined market value of mine output.

Management

Bharat Parashar is the chairman & chief executive officer and a director. He was formerly the managing director and co-head of Salomon Smith Barney's investment banking business in South and South-East Asia. He has 36 years of investment and corporate banking experience in Asia, including as chief executive for American Express Bank in India and the head of Chemical Bank's investment banking business in Asia (ex-Japan). He executed numerous debt and equity transactions, raising more than US\$8 billion for regional corporations and governments.

Dr Christian Derosier is the senior consulting geologist. He has served as a director of the Prospectors and Developers Association of Canada and served as a vice president and the president of the Quebec Prospectors Association. He has founded several Canadian junior exploration firms and served as their director and president. He has more than 40 years of exploration experience working on and heading up exploration programmes for Canadian and international exploration and mining companies in countries such as Canada, USA, Columbia, Peru, Chile, Argentina, Venezuela, Ecuador, the People's Republic of China, Belgium, France, Cameroon, Guinea, Ghana, Madagascar, Morocco, Algeria, Tunisia, Mali, Niger, Nigeria, Haiti, and Guyana.

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Risks

It is important to highlight general and specific risks which, in the case of Ceylon Graphite, we perceive as being:

- Graphite price weakness
- Financing difficulties
- · Country risk in Sri Lanka
- Excessive supply from too many projects coming online mid-term

Price weakness is less a case of potential demand faltering (which is highly unlikely) but rather of some sort of malevolent price-spoiling action emanating from China. If it did it would be self-harming in the first instance.

Financing is a perennial issue in mining markets but with a mine in Sri Lanka up and running (and on minimal capex) the company would be moving into that sweet spot where it does not need more money *per se* but has the luxury, as a producer, of being able to expand from cash flows or funding from off-takers that now realise that the company is "real".

Exotic locations like Sri Lanka come with their tribulations, but the civil war in the country is now retreating further into the past. Also left behind are



With K1 advancing towards production and M1 following in its wake, Ceylon Graphite would be achieving a first amongst listed entities in having not one but possibly two graphite mines producing by the end of 2020

the strange nationalist/socialist economic policies that ruled for decades after independence. The lessons have been learnt that these did not help the mining sector in particular.

As noted many of the remaining graphite projects won't be going anywhere due to excessive capex numbers attached to their aspirations. Syrah will most likely be the only "big" producer to come to market with the other likely entrants being non-disruptive smaller capex developers. Thus Ceylon Graphite is likely to be part of a small band of producers, rather than trampled in a rush of bigger players.

Conclusion

The mantra at Ceylon Graphite is production, production and production. Management is not interested in going through the motions of endless drilling and reporting to avoid the inevitable; they too want to get into production as soon as possible. It is only those in production, after all, that can benefit from price spikes or improved demand.

Graphite was not the first battery metal to have its "day in the sun"; lithium was a first-mover late last decade then fizzled. Graphite, however, had its boomlet in 2012-13 and then went back into quiescence; however, prices snapped out of their doldrums in 2017 and have remained at reasonable levels since.

Ceylon Graphite mercifully missed the first go-around in the market so was not scarred by that event. It arrived fresh and could learn from the mistakes of others.

While graphite shows little potential for the same type of price squeeze that has propelled other battery metals higher, there is a distinct feeling that major Western end-users want to see a non-Chinese graphite supply (and elaboration) industry evolve so they will not be vulnerable to Chinese policy gyrations or attempts at market manipulation.

With K1 advancing towards production and M1 following in its wake, Ceylon Graphite would be achieving a first amongst listed entities in having not one but possibly two graphite mines producing by the end of 2020.



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Londor

+44 207 989 0813 The Business Centre 6 Wool House 74 Back Church Lane London E1 1AF

New York

+1 347 449 0879 767 Third Avenue Floor 17 New York NY 10017

Vancouver

+1 604-688-8158

Suite 965 1055 West Georgia Street Vancouver, B.C. Canada V6E 3P3

Sydney

+61 (0) 2 9280 0700 Suite 102 55 Mountain Street Ultimo, NSW 2007