

## Northern Graphite (NGC CN)

### Initiation: small mines qualify faster as new CEO grows into downstream

RECOMMENDATION: BUY

PRICE TARGET: C\$1.00/sh

RISK RATING: SPECULATIVE

#### SHARE DATA

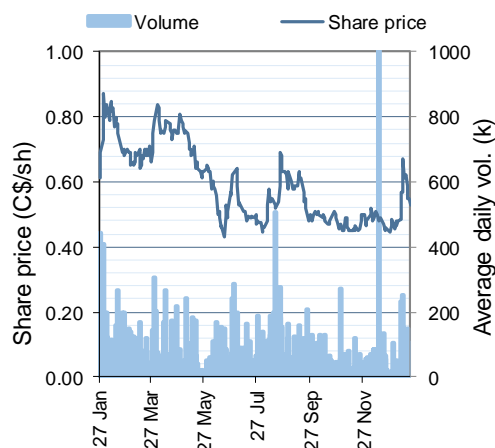
Shares (basic, FF FD)	121 / 145
52-week high/low (C\$)	0.87 / 0.43
Price (C\$/sh) / mkt cap (C\$m)	0.58 / 70
Net cash (debt) (C\$m)	(9.3)
1.0xNAV8% @ US\$1500/t (C\$m)	273
1.0xNAV5% FD (C\$/sh)	1.00
P/NAV (x)	0.44x
Average daily value (C\$k, 3M)	41.3

#### FINANCIALS

	CY23E	CY24E	CY25E
Production (000t CG)	13	36	44
Revenue (C\$m)	26	74	92
C1 Cost (C\$/t graphite)	1,393	1,726	1,207
Income (C\$m)	(3.6)	6.2	14.9
EPS (USc)	-	5.1	12.3
PER (x)	-	11.3x	4.7x
CFPS (C\$)	(6.9)	(11.8)	18.5
FCF yield (x)	-12%	-20%	32%
EBITDA (C\$m)	3	19	34
EV/EBITDA (x)	30.1x	5.6x	2.0x

#### NAV/sh @ \$2500/t

	3Q22E	3Q23E	3Q24E
1xNAV5% FF FD (C\$m)	188	331	480
1xNAV5% FF FD (C\$/sh)	1.30	2.29	3.32



Source: Fidessa

#### One small mine growing to two with room to grow

Northern Graphite's Lac Des Iles (LDI) mine in Quebec, acquired (along with graphite IP) from Imerys last year, makes Northern the only North American graphite producer with 15ktpa production, and potential 10Y life extensions after a 4Q22 satellite acquisition). Namibia offers low-cost +30ktpa restart, which once complete would make the Company the third largest ex-China graphite producer. Namibia's large resource means it can start small selling to conventional markets (LDI books >US\$1,500/t, ~2x peers) as it qualifies for fast-growing EV markets, potentially supporting expansion to 170ktpa. The undeveloped Bissett Creek in Ontario offers 40ktpa start-up potential and is expandable to 80-100ktpa, for 50ktpa short-term, and 300ktpa LT potential.

#### Imerys' playbook, base-load large flake and small-mines for the win

The hotly contested reality is that graphite mines can only qualify for EV sales post-production, with working capital blow-outs during the period of unqualified-fines sales and difficulty securing debt leading to equity dilution. With expensive juniors forced to oversize mines, Northern's advantage is that its LDI/Namibian small-mine approach, and the Ontario development project, have the large-flake and the customers to make money while they qualify. Imerys spent >8 years in the space, having conducted a global search for the best product armed with customer knowledge; those assets and IP are now part of Northern Graphite.

#### How you go downstream means more than 'excel' super-profits

In excel, downstream makes super profits according to miners, with little risk. In reality, battery makers commonly have single digit margins, and a whole lot of technical IP. In our view, to avoid equity dilution as proprietary downstream tech ramps up (peers some 5Y behind schedule), the best plays are those that JV with spherical coated graphite (SPG) or battery anode material (BAM) manufacturers. Northern has just JV'd with Graphex, the 3<sup>rd</sup> largest natural-graphite BAM producer globally, for a potential facility in Quebec, to build on Graphex's USA facility under construction now.

#### Initiate with BUY rating and C\$1.00/sh price target

Based on LDI at 1xNAV, applying progressive discounts for the Mousseau W satellite (0.75xNAV), Namibia (0.6xNAV), and Bissett Creek (0.5xNAV), net of cash/debt and central G&A we initiate coverage with a BUY rating and C\$1.00/sh PT. These quantifiable 'starter' operations unlock (i) EV qualification (ii) anode manufacturing to (iii) support funding for expansions / new mines. In fact, although we exclude Namibia and Bisset expansion cases for now, and downstream, it is these that drive our medium-term thesis. That segues nicely into upcoming catalysts being Namibia expansion PEA, LDI satellite permitting / studies, Bissett engineering refresh including expansion optionality, and downstream BAM studies, all alongside execution of the Namibia restart. A key win, as is increasingly common albeit hard to value, would be attracting a potential government or OEM investment partner also.

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## Two-mine graphite producer with best-in-class knowledge from existing production

Northern Graphite operates the open-pit Lac des Iles mine, running at 10-15ktpa against 25ktpa nameplate, 180km northwest of Montreal, Quebec, and currently the only producing graphite mine in North America. With reserves scheduled to be depleted by 2025, the main focus of NGC for the LOM extension at LDI is the delivery of a technical report for the recently acquired Mousseau West property, located 80km from LDI, and suitable for hauling ore to LDI's plant where it will be processed. Mousseau West's 4.1Mt @ 6.2% Cg could extend the LOM at Lac Des Iles by up to 10 years. This serves well Northern Graphite's strategy which involves (i) the restart of its newly acquired Namibian operations, at a producing rate of 31ktpa of graphite concentrate, progress detailed engineering studies for a further expansion to produce 100-170ktpa, (ii) the update of the existing technical report for the Bissett Creek project in Ontario outlining 40ktpa with long-term 80-100ktpa potential, arrange the financing package and initiate construction work later this year. The final leg of the journey, downstream production of battery anode material, has just commenced via a three-way agreement between technology supplier Graphex, and parties in Quebec, for a downstream facility in Quebec able to produce up to 200ktpa of BAM.

After the restart of the operations in Namibia, Northern Graphite could be the 3<sup>rd</sup> largest graphite producer outside of China, with ~45,000t production capacity, with engineering studies to bring the future group's total production up to a staged 300,000tpa. NGC's phased transformation strategy is simple, clear, and most importantly feasible: **Step 1.** Ramp up the production and prolong the LOM of LDI and Namibian operations, **Step 2.** Progress the engineering for its North American and Namibian assets production expansion and **Step 3.** Initiate mining at Mousseau West, build a big new plant at the Okanjande deposit in Namibia and initiate the construction of Bissett Creek.

Figure 1: Asset overview and locations (A) LDI plant, Quebec and (B) Okorusu Plant, Namibia

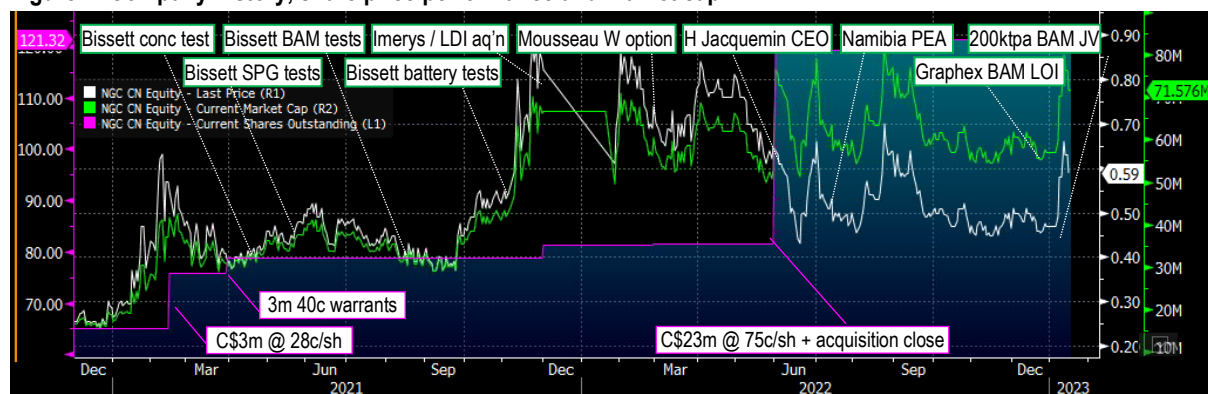


## History – taking off after asset acquisition and new management

Prior to 4Q21, Northern Graphite was ‘just another’ one-asset pre-revenue graphite company, contemplating how to progress its Bissett Creek asset in Ontario post an updated 2014 FS. That FS saw a 25ktpa start up for C\$100m at the time, bootstrapping to 45ktpa, with a 728kt graphite inventory vs. 1.2Mt of M&I resource able to support a second line and expand this to >80ktpa if demand was there. With Bissett having exceeded the quality requirements for refractory and expandable graphite markets (ie non-EV) in 2015, it presented a synergy with Imerys’ producing Lac Des Iles (LDI) mine in Quebec, itself focussed on similar markets. In 4Q21 Northern acquired both LDI and the dormant Okanjande graphite deposit / Okorusu processing plant in Namibia for US\$40m, positioning the company as the only North-American, and soon to be world’s 3<sup>rd</sup> largest, non-Chinese graphite producer, funded with US\$36m of debt/royalty/stream and US\$15m equity.

Post May 2022 close, Hugues Jacquemin, former CEO of the Imerys Graphite and Carbon Division, joined as CEO in June 2022, immediately closing Northern’s option to acquire Mousseau West to extend the LDI mine life (80km away). Hugues didn’t waste time, updating the Okanjande (Namibia) PEA in 3Q22 for a 31ktpa restart for just US\$15m, but with a contained 2Mt of graphite making expansions to 100-170ktpa feasible, similar to Bissett Creek. The ‘end of the beginning’ fell into place in December as Northern signed an LOI with Graphex Technologies where Northern Graphite would provide the graphite concentrate and Graphex would contribute the technology to produce spherical coated graphite (SPG) battery anode material (BAM) for the EV market. This was followed by the January agreement from both Northern and technology partner Graphex to work with Innovation et Development Manicouagan (IDM) at Baie-Comeau, Quebec, on a 200ktpa downstream BAM facility using graphite from Northern’s mines.

Figure 2: Company history, share price performance and market cap



Source: Bloomberg

## Why Northern? Small-scalable mines and tech-JV trump big-mines and proprietary tech

There is no shortage of graphite globally. The large deposits located in infrastructure starved Mozambique and Tanzania represent vast in-ground resources, but Ontario and Quebec, Madagascar, Nordics and South Australia all have good deposits. There are three issues to bringing these into production; (i) for those seeking EV sales, the built plant needs to be qualified, which can’t be done pre build of course, leading to lengthy build-ups of inventory at worst, or low-value sales of uncontracted / unqualified graphite at best, exemplified by Syrah in Mozambique; (ii) debt funding for such mines, given the above issues and political/supply chain risk, and (iii) moving downstream with proprietary technology, which inevitably comes slower and with much more risk than using existing spheronization / coating / anode technology. The obvious solution (which Northern is executing) is to start with a small mine to qualify, and JV with downstream manufacturers to gain exposure to the SPG / BAM technology. However, most juniors refuse to start small for two reasons; (i) sub-economic if large scale infrastructure is required in remote hard-rock mines in Africa, and more commonly, (ii) reticence to publish a stage one mine plan with NPV far under inflated market caps. And pretty well, that is where the market is stuck now.

Syrah represents a case study; a maiden MRE in 2012 is arguably the ‘best’ (biggest and highest grade) globally. However, proposed initial production of 380ktpa included >200ktpa of fines (for EV/spherical) represented about 50% of the current market demand. Early over-supply into non-contracted / pre-qualification markets has carried on for >5Y as the downstream DFS only approaches completion this year, some 5Y after initial production targets.

Combined with security incidents, this led to production at perhaps half nameplate, with FOB cash costs of US\$615/t >2x US\$286/t forecast, achieving a price of US\$688/t CIF (or perhaps US\$500/t FOB), half the US\$1,000/t DFS FOB price. Despite DFS capex estimated at US\$138m, Bloomberg shows US\$523m of equity and US\$99m of debt, hence the market cap rise to A\$1.5bn came with a ~40% drop in share price after dilution from six post-DFS equity raises. Syrah's downstream anode material is reliant on proprietary technology, leaving that risk still ahead. The lessons we see are (i) start small to avoid oversupply and/or working capital blow outs, (ii) qualify the product, (ii) then expand.

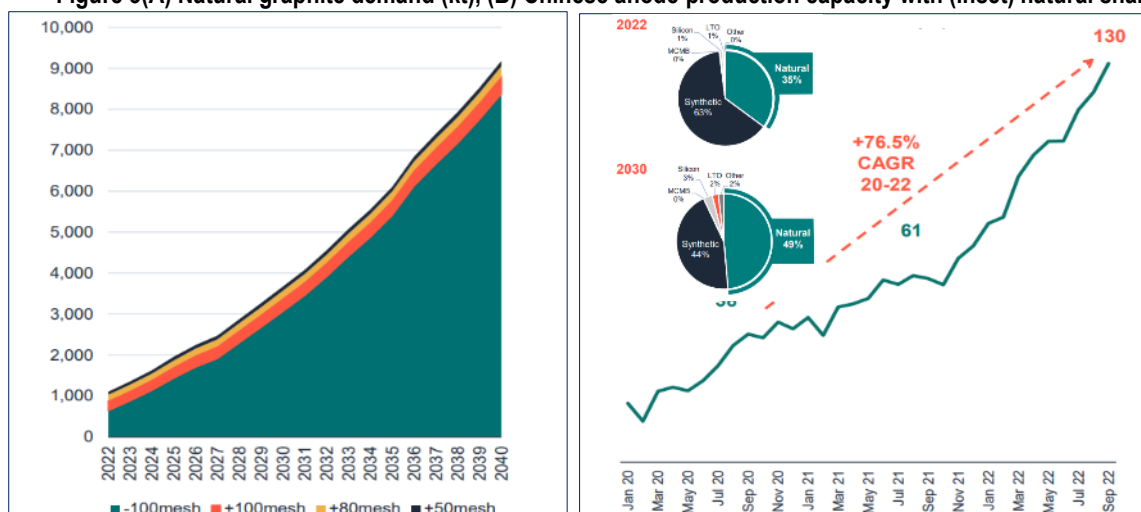
Northern Graphite is uniquely positioned to avoid these structural pitfalls given its (i) existing 15ktpa has the company 'in the game', building knowledge of everything from production pitfalls to downstream networks; (ii) Namibia, as a 'fix up' with low startup capex of ~US\$20m for 30ktpa given part-built status and soft oxide ore, allowing sales into coarse-flake markets while qualifying fines for (iii) expansion to potential 100-150ktpa. Next (iv) Bissett Creek in Ontario offers a similar start at 'only' 40ktpa, with sufficient resource to lift to ≥80ktpa should demand be there. Finally, (v) the Graphex / Quebec JV opens the door to downstream, but with existing technology from Graphex removing substantial risk, a stable location and grid power vs. peers proposing downstream plants in Africa, and a potentially supportive funding partner in Quebec.

Uniquely, Imerys did extensive research before selecting its assets, specifically for premium coarse flake markets dependent on parameters such as expansion ratio and crystallinity, making the products from both LDI and Namibian operations suitable for both the refractory and EV markets. Next, part of the asset purchase agreement from Imerys was Northern Graphite to inherit their existing customer base. Finally, new CEO Hugues Jacquemin is the former head of Imerys' graphite division which in our view gives NGC a strategic advantage compared to peers who do not have producing assets and market expertise when/if they reach this stage.

## Graphite macro – too early was wrong, but the pioneers are laying a path for the market

Premium large-flake represents the past, while emerging fines for EV use is the future, with a 76% CAGR in Chinese anode production between 2020 and 2022 alone as lithium-ion batteries will become the primary demand driver (Figure 3A). Projected 2030 demand for natural graphite is expected variably forecast at 3.5-4Mt annually (Figure 3B), a 288% increase over 2022 levels, and as Syrah's CFO has commented, and their own history demonstrates (<50% nameplate 11 years post maiden resource), the narrative that many large feasibility-stage graphite projects can be brought in production in a short-term period is a fallacy, pointing out to an upcoming shortage in the graphite market supporting the view of a higher price environment. This is further supported by 2022 geopolitical agendas given the near stranglehold China has on downstream graphite processing, and deteriorating security situation in Mozambique. Currently, 30 out of the world's 45 graphite mines are in China, providing >65% of the global natural flake, and 100% of spherical graphite. Northern's strategy reflects this shift as the company has existing coarse-flake customers to provide cash-flow during qualification as ultimately the demand shifts toward fines, with lower-value (c. 1/3 the price at spot) offset by early forward integration journey underway now.

Figure 3(A) Natural graphite demand (kt), (B) Chinese anode production capacity with (inset) natural share



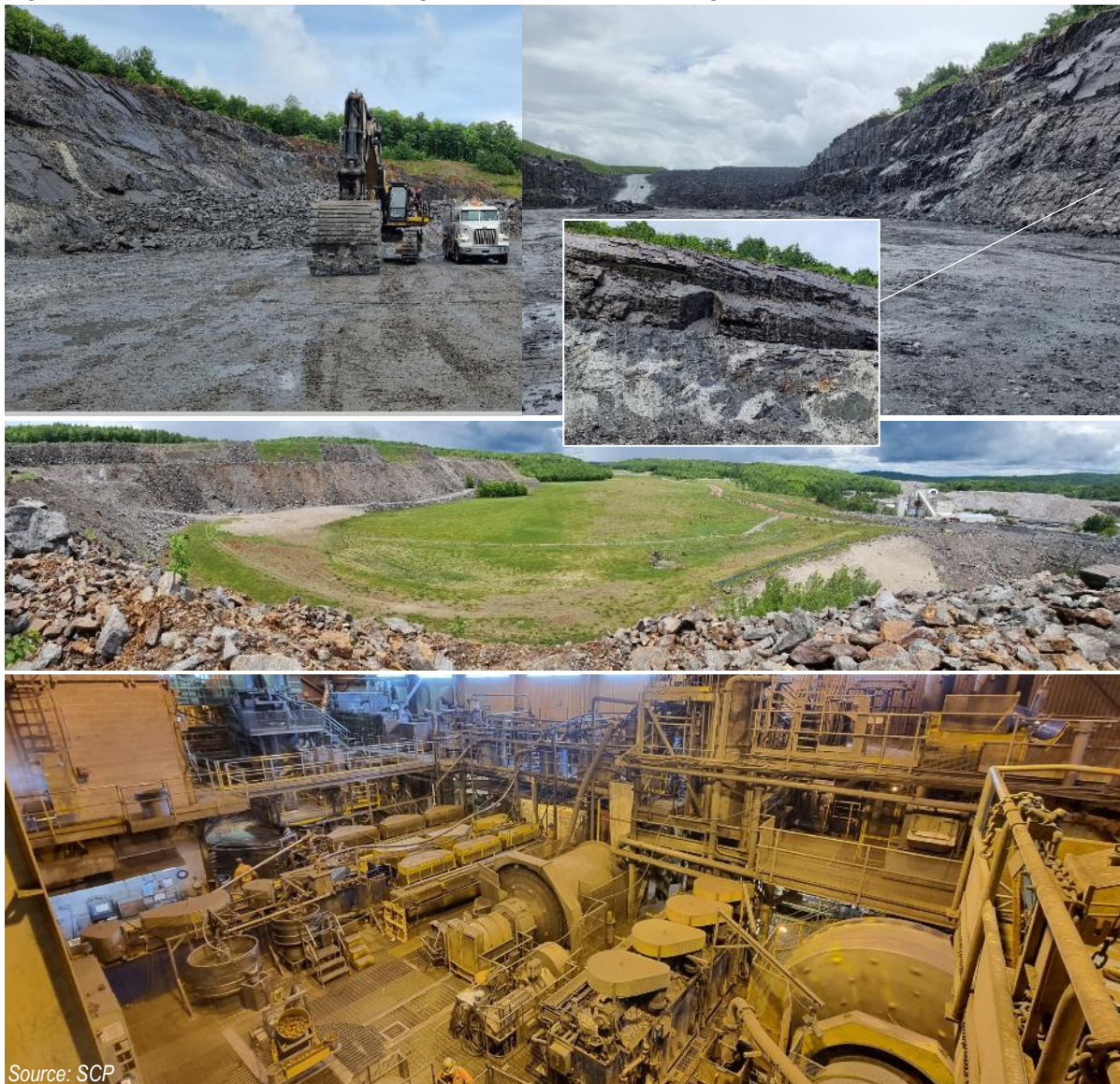
Source: Syrah resources after ICCSino and 3Q23 Benchmark Minerals

## Lac des Iles: short life to extend with new satellites, brings peer leading sector knowledge

We visited Lac des Iles, 180km northwest of Montreal in Quebec, last summer. This is North America's only producing graphite mine which has been operating for >20Y. The residual 3Y life at 15kt pa can be extended at lower production rates. Pit 2, the last to be mined, hosts 600kt @ 7% Cg. While applications for licences north of this pit carry on, the company has acquired a 4.1Mt @ 6.2% Cg satellite resource 80km away at Mousseau West, most recently initiating permitting and feasibility studies. Detailed later, we expect Mousseau West could substantially boost the company's published NPV<sub>8%</sub> of C\$33m, adding up to 10 years to LDI's mine life. Mousseau West has similar ore to LDI, both in terms of grade and flake size, providing an opportunity for a seamless transition to process ore through the existing plant, potentially even supporting a lift to nameplate 25ktpa, with minimal capex and low environmental footprint by not having a tailings facility and a process plant at Mousseau West.

The mine operates well beneath nameplate, mining only on day-shift to target 'snakey' ore (metamorphosed lake sediments (Figure 3B inset), minimising dilution which sees 6.5-7.5% ROM vs. 7% reserve grade. A single loader and three trucks are sufficient to mine at current ~7:1 strip. A SAG/ball mill sees 3mm primary grind ahead of flotation with nine cleaner stages progressively introducing polishing / regrind. The plant is ultimately a recovery / size / purity trade off, with size/purity dropping if recovery pushed too hard, ie purity can be lifted from 95% to 97%, but at the expense of recovery. Purification over 97% requires removal of internal impurities, which makes sense post milling / shaping on reduced grain size anyway. Concentrate is mainly sold in 1t bulk-bags, with a small number of industrial customers making up the majority of demand, plus a long-tail of smaller customers.

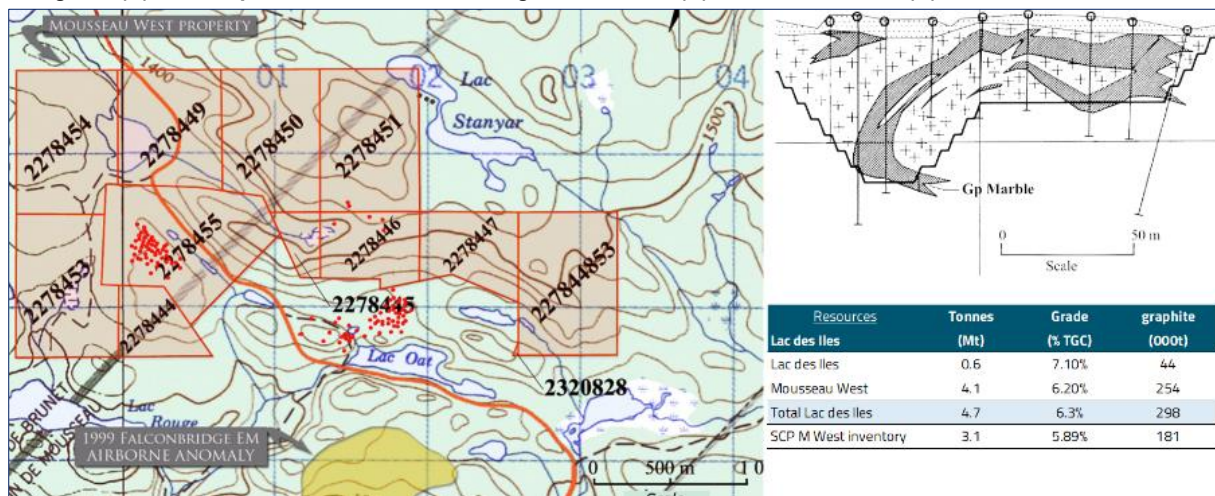
Figure 4(A/B) LDI Pit 2, (C) waste storage at LDI with plant in background and (D) LDI plant



Source: SCP

**Mine life extensions:** production at 15ktpa would consume ~60kt of ore per quarter. Reserves of 593kt @ 7.2% stated pre-acquisition in 1H21 ostensibly support a mine life to 2023, extending into 2024 with stockpile treatment, matching the 1Q22 43-101. To address this, Northern Graphite has (i) slowed mining by ~50% by operating a five-day roster on day-shift only, averaging 40kt ROM ore per quarter over the last two quarters, or producing an average of 11ktpa. This could potentially extend the mine life until around 2025. Next, (ii) in 3Q22, the company acquired the Mousseau West project 80km away. With a resource of 4.7Mt, 75% reserve conversion or a 3.1Mt reserve would support >10Y at 15ktpa or 71kt/quarter at SCP diluted 5.9% grade. In fact, 2.7Mt of the resource has already been drilled out on 25m centres with no requirement for additional definition work. The company is targeting to uplift the production to 25ktpa in the LT, but ahead of a reserve, permit and mine plan, we conservatively model 15ktpa / 11Y life for now. Next steps are to secure permits for mining there, which benefits from no requirement to permit a plant or tailings pond, only a quarry.

**Figure 5(A) Plan map of Mousseau West drilling and licences, (B) cross section and (C) LDI + M West resource**



Source: 2013 43-101 reports, 2021 LDI resources, SCPe M West inventory

**Valuation:** We base our overall economics on the 1Q22 technical report, but from 4Q22 onward, showing a C\$13m NPV vs. C\$22m published. The key delta thereafter is that we add 3.7Mt @ 6.0% inventory from Mousseau West, a diluted subset of the 4.1Mt @ 6.2% existing resource. Simply charging transport at C\$0.20/t/km, and applying a 3:1 strip for aggregate slight improvement in cash costs adds C\$39m to our NPV for C\$52m combined.

Just like Namibia Stage 1 / expansion, we see Lac des Iles as a 'useful' value add, but ultimately a steppingstone to support both downstream, and up-scaling via the Bissett Creek operation. While small on NPV, we like that the operation is big on IP, creating a foothold in Norther America, and willing and growing customer base.

**Table 1. Lac des Iles economics / valuation from CY22 43-101, and SCP from 4Q22 onward, with M. West scenario**

Lac des Iles	NGC		SCP	
	LOM	LDI	+ MW	= Total
<b>1Q22 / LOM vs. SCP forecasts</b>				
Mining inventory (kt)	621.0	606	3,075.4	3,681
Grade (% TGC)	7.1%	6.7%	5.9%	6.0%
Strip ratio (x)	4.9	5.1	3.0	3.7
Throughput (000t pa)	148	221	286	266
Recovery (LOM, %)	89.2%	89.2%	89.2%	89.2%
<b>Production (kt pa)</b>	<b>9.7</b>	<b>13.2</b>	<b>16.2</b>	<b>14.5</b>
Mine life (yrs from 1Q22)	4	3.5	11	14.5
Mining cost (C\$/t)	8.5	7.0	6.9	6.9
Proc. cost (C\$/t)	6.8	30.2	29.6	29.7
G&A (C\$/t)	2.4	10.1	9.9	9.9
Hault cost mine to plant (C\$/t/km)	-	-	0.2	-
LOM capex (C\$m)	8.7	11.4	13.5	24.9
C1 Cost (C\$/t graphite conc.)	1,072	1,384	1,285	1,316
<b>NPV8%-2000 (C\$m)</b>	<b>21.8</b>	<b>12.9</b>	<b>39.4</b>	<b>52.3</b>

Source: Northern Graphite, SCP estimates

## Namibian Operations: small-mine restart, large-mine expansion available

We visited Northern Graphite's Okanjande graphite deposit and the Okorusu plant early last year – a previous fluorspar mill which Imerys retrofitted to process graphite ore. Imerys selected the asset after a worldwide search, not just for flake size and purity, but bulk density, expansion ratio, crystallinity and more. As first-class flake graphite, it offers the triple win of (i) supplying existing Lac des Iles customers if required, (ii) making good margins on small early production, and (iii) like any large-flake mine, has the ability to grind down to EV supply smaller flake. A fourth win is oxides at surface which allow cheap early-years mining. The top-down goal here is to supply EU flake-markets at the outset, qualifying fines before expanding the operation.

**Location and infrastructure:** Rio Tinto / Rossing (uranium) owned and drilled the Okanjande deposit in the 1990s and built a full pilot plant on site. It was subsequently acquired by a local company who also acquired a Fluorspar mine and an adjacent plant from Solvay which could be retrofitted to produce graphite. Imerys entered into a JV with the local company and invested \$50m in getting the operation going, but only ran the mine until end 2018 before putting it on care and maintenance after operational issues and a refocus on North American operations. The mine is 80km from the mill which has access to grid power and is approximately five hours away (388km) from the deep-water port of Walvis Bay, providing access to European and North American markets.

**Resource:** Okanjande is a sedimentary deposit hosted in a high-grade metamorphic quartzite with graphite forming a crystalline flake ore. The deposit contains 6.4Mt @ 4.1% TGC in oxides, a small 1.3Mt @ 4.3% transition horizon, and substantial 31Mt @ 5.3% fresh-rock ore body. The weathered ore is very friable, with a bond work index of only 11-12, while even fresh ore is very soft with a 10-11 BWI, reflective of the graphite content. According to the current 10-year mine plan, the weathered material will be mined first during the initial 5 years, followed by the fresh, hard-rock ore, which will require the design and build of a waste-rock dump at Okanjande and the expansion of the tailings storage facility at Okorusu to be able to handle acid generating material, with an estimated self-funded capex of US\$5m.

**Table 2. Resource estimate for Namibian operations**

Okanjande - Namibia			
Okanjande fresh rock (M&I)	24.2	5.33%	1,290
Okanjande Weathered rock (M&I)	5.9	4.21%	248
Okanjande fresh rock (inferred)	7.2	5.02%	361
Okanjande Weathered rock (inferred)	0.5	3.45%	17
Okanjande transitional (M&I)	1.2	4.35%	52
Okanjande transitional (inferred)	0	3.20%	3
<b>Total Okanjande</b>	<b>39.1</b>	<b>5.0%</b>	<b>1,972</b>
Okanjande PEA invent'y	6.1	5.27%	321

Source: Northern Graphite

**What is different this time:** Imerys started mining Okanjande in 3Q17, continuing until 4Q18 before. However, despite spending US\$50m on the plant retrofit, process-plant issues that led to failure to meet specifications for throughput, recovery and flake size distribution led to asset moving onto care and maintenance. The 'silver lining' of retrofitting an old plant to speed production came with pitfalls, not the least using hard-rock LDI Canadian process on a weathered deposit. With mining simply not Imerys' speciality. An example of one of the simplest fixes comes from an open-air jaw crusher, which saw substantial losses to atmosphere from 'slippier and light' graphite, with other issues as simple as the ball mill turning the 'wrong way'. In more detail, the key changes to be applied include:

- i. The removal of gravity spirals early in the process flow which were causing incomplete graphite liberation, leading to lower-than-anticipated concentrate grade
- ii. The split of the milling circuit to prevent excessive recirculation and flake degradation, and
- iii. The addition of a polishing mill in the plant to further improve concentrate purity.

Figure 6 (A) Plant layout, (B/C/D) plant internal aspects and belts and conveyors



Source: SCP 1Q22

**Opportunities:** Although the current plan shows resilient economics, Okanjande’s vast MI&I resource base of 31.4Mt @ 5.3% Cg supports a future expansion through a new larger process plant at the Okanjande mine, able to handle and produce up to 170ktpa. Northern Graphite will complete a PEA examining the economics of this expansion scenario with results to be expected this year.

Figure 7 – (A) Okorusu process plant and (B) High-grade graphite bearing ore at Okanjande mine



Source: SCP site visit, 1H22



## Valuation

**Economics:** A 600m long 200-300m wide pit aims to extract the first 4Mt @ 5% with an extremely low <0.5:1 strip (0.7:1 LOM), feeding the 600ktpa plant. Target 92% recovery drives around 31ktpa of graphite production. Even at relatively high mining costs of US\$4.70 (very small volumes) and including US\$6.25/t haul cost, this drives a US\$775/t C1 cash cost, for potential ~50% margins selling at US\$1,500/t, a price that the Lac des Iles product is achieving or exceeding currently (C\$2,068/t average of prior two reported quarters). This drove a published NPV of C\$87m, which minor timing differences sees our model closer to C\$89m. From this we apply / deduct a 5% government minority, and net off C\$27m of tax losses / sunk capex currently sitting as PP&E on the balance sheet to derive a PEA case valuation of C\$87m (Table 3).

**Upside:** the PEA US\$15.1m capex, plus US\$5.5m working capital for ~US\$20m / C\$27m is cheap given historic sunk costs. However, LOM opex includes C\$50m on transport in the PEA. Should an expansion be undertaken, this cost just gets bigger. As such, we think a trade-off to moving the plant to the mine site would be sensible. The downside of any move would be additional engineering work (relatively minor given plans for existing plant can be used as basis), but extra time would be required. This could be offset by the move allowing adjustments such as filter / dryer optimisations to lift toward 40ktpa, plus a cookie-cutter foundation for additional bolt-on modules. In addition, US\$4.8m of the US\$15.1m restart capex is for staged TMF builds at the plant site. The mine-site already has a permitted TMF granted in 2016, with no natural lining a further benefit, offsetting not just opex but capex. As such, we expect no more than net C\$10m would be required for a plant move, making the C\$50m immediate (and more in long-term) saving sensible. In this scenario, we estimate cash costs would drop from US\$776/t to US\$648/t, lifting our NPV to C\$102m, conservatively ramping up in CY24.

**Risks:** are significantly lowered by the mistakes/learnings from prior operations. However, moving a plant is more complex than refurbishing it, and improving recoveries and throughputs in this soft oxide material comes with risk. Group timing / funding is important in evaluating the trade off on a quick/cheap refurbishment against a plant move also. Politically, Namibia is a well established and a relatively easy jurisdiction to operate in, with key constraints around power/water which is suitable for early mining, but to be evaluated for any expansions in the future. *While a useful NPV, the intangible benefit is a steppingstone to qualify EV material and support future expansions which is the real game here in our view.*

**Table 3. 2022 PEA summary and economics vs. SCP valuation**

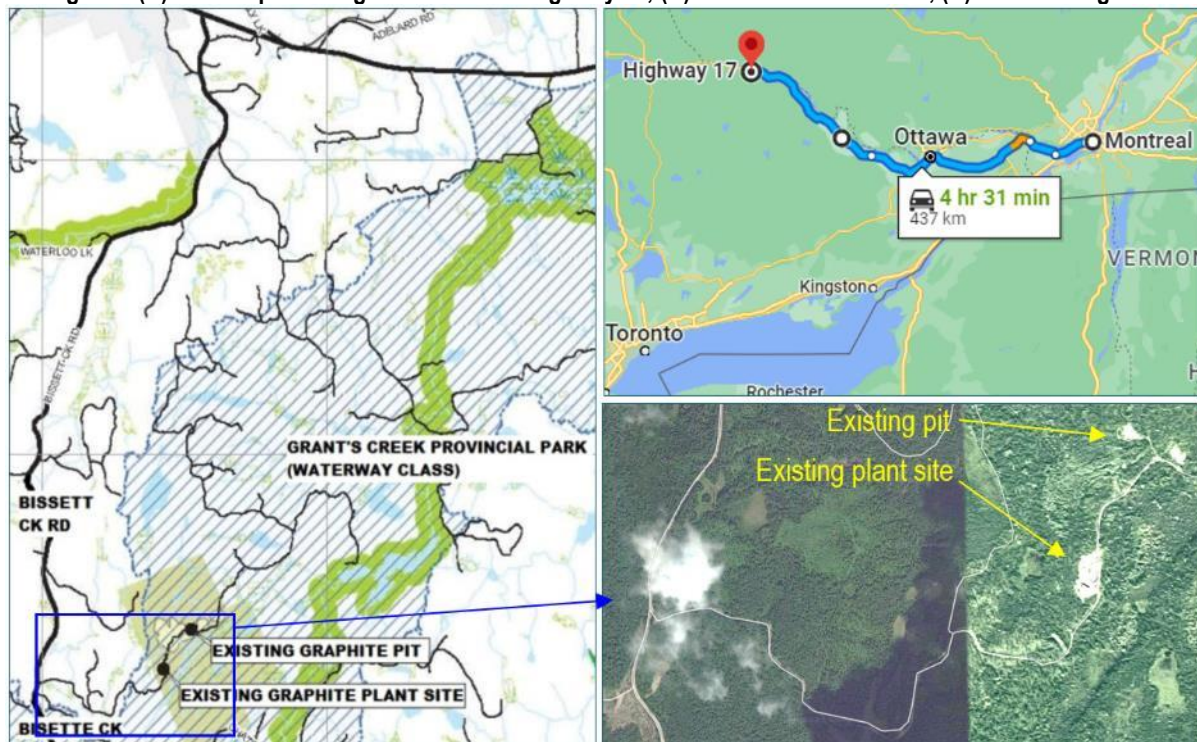
Okanjande / Okorusu	NGC	SCP-cases			
		3Q22 vs. SCP forecasts	3Q22 'PEA	PEA	SCP
Mining inventory (Mt)	6.1	6.1	6.1	6.1	6.1
Grade (% TGC)	5.27%	5.27%	5.27%	5.27%	5.27%
Strip ratio (x)	0.66	0.66	0.66	0.66	0.66
Throughput (000t pa)	610	610	610	610	610
Recovery (%)	92%	92%	92%	92%	92%
<b>Annual production (ktpa)</b>	<b>30.8</b>	<b>30.8</b>	<b>30.8</b>	<b>30.8</b>	<b>30.8</b>
Mining cost (US\$/t rock)	4.66	4.66	4.66	4.66	4.66
Pit to plant + processing cost (US\$/t)	20.98	20.98	20.98	20.98	14.77
G&A cost (US\$/t ROM)	5.34	5.34	5.34	5.34	5.34
C1 cash cost (US\$/t)	775	776	776	776	648
Pre-production capex incl. WC (US\$m)	20.6	20.6	20.6	20.6	28.1
LOM sustaining capex (US\$m)	8.2	8.3	8.3	8.3	8.3
Graphite price (US\$/t graphite conc.)	1,500	1,500	1,500	1,500	1,500
Royalty (%)	2.0%	2.0%	11.0%	11.0%	11.0%
Minority interest (%)	0%	0%	5%	5%	5%
Tax credit / sunk losses (C\$m)	0	0	27.2	27.2	27.2
<b>NPV8%-2000 (C\$m)</b>	<b>86.7</b>	<b>89.3</b>	<b>87.1</b>	<b>87.1</b>	<b>102.3</b>

Source: NGC; SCP-case adds royalty, minority, sunk losses; \*adds capex, lowers opex

## Bissett Creek (100%): scale opportunity in North America

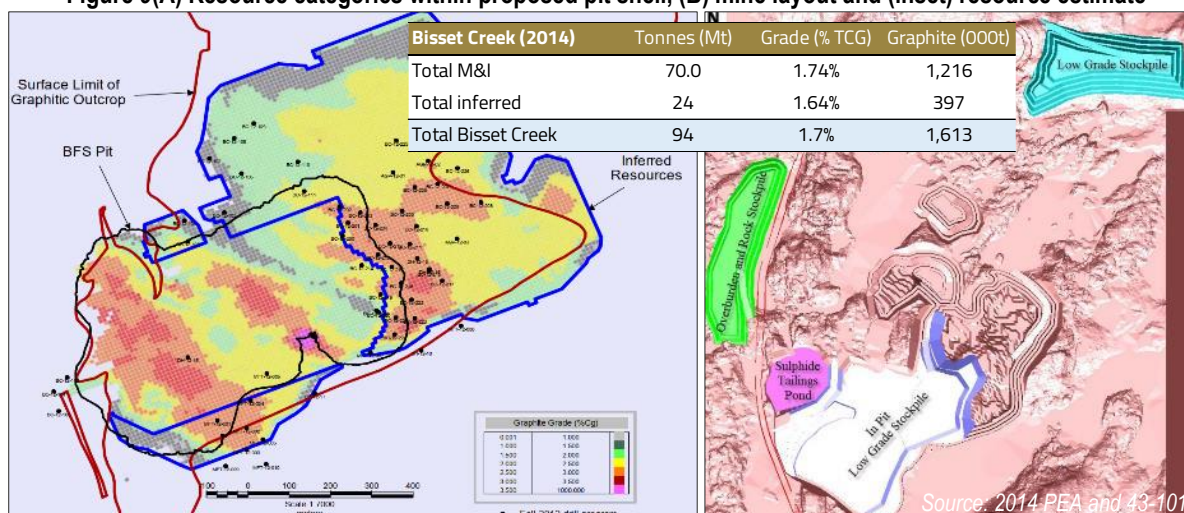
Bissett Creek lies 17km off the Trans-Canada Highway with year round access, ~415km from Montreal. The site is off grid, with 15km trucked compressed natural gas for power considered preferable to a 44km power line. After early work in the 1980s, a maiden PEA in 2010, was followed by FS and then an expansion 2014 PEA. A +20% opex and +5% capex scenario is the most recently released figure after G Mining updated cost estimates in 2018.

Figure 8 (A) Plan map showing asset south of Highway 17; (B) ~460km from Montreal, (C) with existing sites



**Geology and resource:** Precambrian meta-sediments host a graphitic gneiss ore zone, with minor dykes and sills in the area. The resource is based on 275 diamond holes (~14,000m), +99 RC and geotech holes. A low 0.24:1 strip and nine-stage pit enables 2.2% in initial years, falling to ~2% thereafter, with mining to commence after a year of pre-stripping. Over 90% of the graphite at Bissett Creek is categorized as large and XL flake size, which are the most valuable forms of graphite in the market, the highest percentage of large and XL flake graphite globally in fact. Test results in 2021 verified Bissett Creek's high-quality graphite met or even exceeded the requirements for both refractories and EV markets, with performance better than many commercial natural or synthetic grades. The expansion rate for the large flake size was 490ml/g vs 250ml/, while concentrate purity achieved 99.64% Cg using standard acid purification methods, demonstrating suitability for Li-ion battery market.

Figure 9(A) Resource categories within proposed pit shell, (B) mine layout and (inset) resource estimate



**Processing:** Ore is to be hauled 2km to a mill site for a single stage crush, and SAG/ball combination, followed by float and thickening. The circuit is relatively simple without multiple polishing mills or parallel circuits, with sizing proposed at the back end. Sulphides are separated from the ore before being pumped to tailings, and stored in a PAF storage area.

**Permitting:** The Mine Closure Plan is the main permit here; Northern has had the MCP filed and approved. Further provincial and federal permits were granted in 2011/12. Permits for air, noise, water and species at risk will be required prior to commencement of production.

**Economic studies:** the most recent full PEA was released in 4Q13, defining a 28.3Mt @ 2.1% Cg reserve at a low 0.24:1 strip ratio. That study envisaged C\$102m capex for 1Mtpa / 25ktpa, ramping up to 2Mtpa / 45ktpa by Y5, with a 24Y life at US\$695/t cash cost driving an US\$150m NPV<sub>8%</sub> at US\$1,800/t graphite. A variation of this was contemplated in a 2014 study, simply going straight to 2Mtpa from the outset for increased capex of US\$134m at C\$1,890/t / US\$1,800/t graphite. We use this as a base-case for our own DCF, driving a C\$183m NPV<sub>8%</sub> against published C\$179m. From this, we add 30% to capex (C\$174m), being the +5% as at 4Q18 and +25% since, and add +20% to opex (as at 4Q18) for our C\$157m NPV<sub>8%</sub> at C\$2,000/t graphite price.

**Table 4. Summary of PEA, SCP 'PEA case' and SCP valuation-case valuation metrics for Bissett Creek 2Mtpa option**

Bissett Creek	NGC	SCP-cases	
2Q14 / LOM vs. SCP forecasts	PEA	PEA	SCP
Mining inventory (Mt)	40.5	40.5	40.5
Grade (% TGC)	1.82%	1.82%	1.82%
Strip ratio (x)	0.25	0.25	0.25
Throughput (000t pa)	2,000	1,978	1,978
Recovery (%)	94.7%	94.7%	94.7%
<b>Graphite roduction (000tpa)</b>	<b>35.3</b>	<b>35.3</b>	<b>35.3</b>
Mining cost (C\$/t rock)	3.74	3.74	4.49 +20%
Processing cost (C\$/t rock)	8.34	8.34	10.01 +20%
G&A cost (C\$/t rock)	1.41	1.41	1.69 +20%
Cash cost incl. royalties (C\$/t graphite conc. )	736	779	935
Pre-production capex (C\$m)	134.1	134.1	174.3 +30%
LOM sustaining capex (C\$m)	55.1	55.1	55.1
Graphite price (C\$/t graphite conc.)	1,890	1,890	2,000
<b>NPV8%-1890 (C\$m)</b>	<b>179</b>	<b>183</b>	<b>157</b>

Source: Company data, SCP estimates

**Upside:** Ultimately Bissett Creek is neither the largest, nor the highest grade, project among peers. However, we see four critical advantages; (i) Located in Canada, and more specifically in Ontario which has less investable graphite, it has potential to attract provincial government funding; (ii) the flake size and quality is extremely high, allowing the asset to ramp up in a FCF-generative manner without relying on downstream margin-addition during ramp up, and also potentially having a ready-made customer base given the similarity to Northern's Lac des Iles product; (iii) being on-road, near population centres, but with a contained 1.6Mt of contained graphite gives the twin optionality of starting-small like LDI or Namibia, and/or supporting a substantially larger operation in the future should demand improve (iv) it has very simple clean metallurgy leading to one of the simplest flow sheets in the industry which reduces processing costs. Next steps involve the update of the engineering studies, including a potential future expansion to peak 80ktpa, alongside seeking potential funding, and access to substantial state-funds earmarked for domestic EV supply, to support the build of a first phase.

**Risks:** the current economic study is based on thinking some 10Y ago, updated in 2018 and restated as sensitivities on 2014 FS, although adding metallurgical and process updates, hence a refresh to post-COVID economics would be useful. Also, any update may benefit from a company-wide strategy addressing potential BAM market-entry, ie with more subtlety compared to the 'Syrah like' one-big-line flow sheet modelled in 2014. Learnings / inputs from the LDI team here would benefit the flow sheet design substantially in our view.

## Graphex and Quebec – the keys to unlock downstream

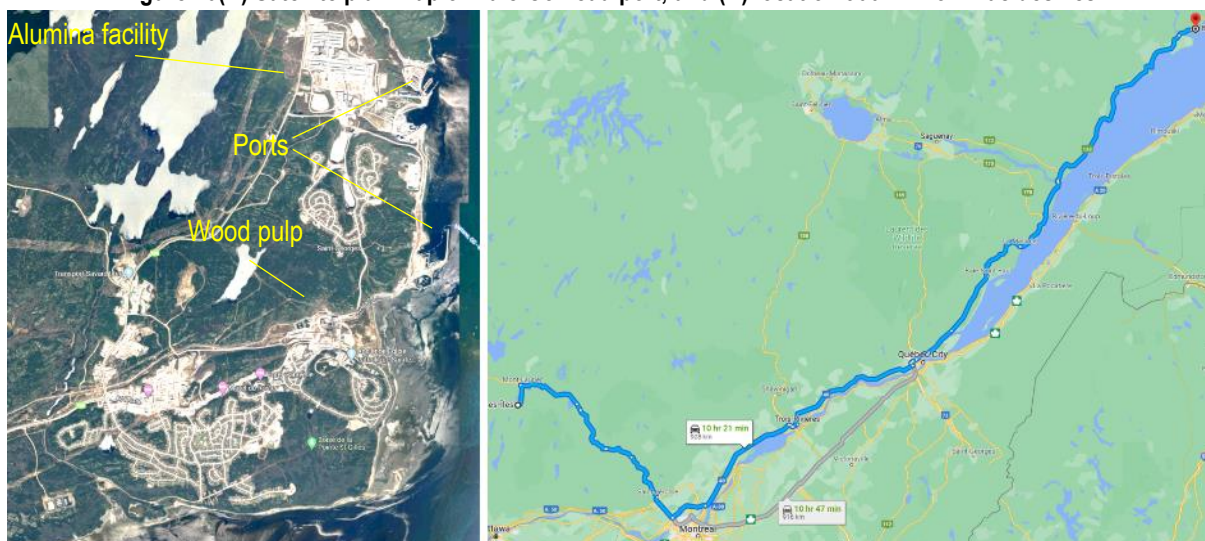
In December 2022, Northern announced a non-binding LOI with GRFX to aggregate Northern's graphite supply with Graphex's proven downstream processing expertise. Northern subsequently entered into an agreement with the Innovation et Développement Manicouagan (IDM) to evaluate sites for the construction of a downstream facility to produce up to 200ktpa of battery anode material in Baie-Comeau, Quebec – an initiative that Graphex immediately backed up by joining the JV as well.

**Graphex:** is a NYSE and HK listed downstream producer already manufacturing 10ktpa of battery anode material (BAM), and is in the process of constructing a 15ktpa facility in Michigan part of a 3Y ramp-up profile to a targeted 40ktpa of BAM. Graphex currently sources its graphite in China, but forward integrates into BAM, only partially solving the supply-chain-security issues topical to markets right now. Nonetheless, Graphex is the only experienced downstream processor of natural graphite that intends to develop BAM facilities in North America.

Even at 10ktpa of BAM, Graphex is already the third largest maker of natural-graphite anode material in China. The US extension brings this technology into North America with the Michigan facility, effectively onshoring, key to the geopolitical puzzle. Thus, the opportunity for Graphex is the domestically sourced graphite, and for Northern, the technology – a genuine match made in heaven in our view.

**Quebec:** Innovation et Développement Manicouagan (IDM) is a support organization working with government departments to facilitate development, finance and acceleration of Quebec-based business, specifically in Manicouagan. Baie-Comeau, the selected port-area, is a heavy industry port, with large-scale industrial parks and a substantial rail-port complex. With 500MW of green, cheap power available from hydro-Quebec (and +350MW private power), *this* is why people go to Quebec, and that before any potential state-funding assistance. Tax advantages, service providers and an industrial development strategy, all assist here. The port is 916km from Lac des Iles, and is the site of a substantial Alcoa aluminum refinery and paper mills.

Figure 10(A) Satellite plan map of Baie-Comeau port, and (B) location 900km from Lac des Iles



Source: Google Maps

## Financing structure, balance sheet and encumbrances

To acquire Imerys' natural graphite division, Northern Graphite had to implement a complex finance package deal consisting of a combination of debt, equity and sale of royalty and stream on the acquired assets, and the issuance of NGC's shares to Imerys as partial payment of the acquisition.

**Debt (LDI):** NGC secured a US\$12m senior loan maturing 2Q26, with SOFR +9% coupon and granted the lender 4.8m \$1.01 2Y warrants. **Royalty (LDI/Bissett):** Northern sold a 9% royalty on LDI graphite sales to Sprott Resource Streaming and Royalty for US\$4m, issuing 1.2m \$1.01 2Y warrants at the time, and granting the investor a ROFR on any future Bissett Creek stream. **Stream (Okanjande):** Northern raised US\$20m by streaming 11.25% of Okanjande production up to 350kt, after which the purchaser may convert this into a 1% royalty for life of deposit, issuing the purchaser 4.5m \$1.01 2Y warrants at the time.

**Balance sheet:** refurbishment of the Okorusu plant in Namibia is budgeted at US\$15m. Cash currently sits at ~C\$4.7m and C\$14m debt outstanding as of September 30, 2022. LDI is currently seeing a build up of inventory, so we expect to see this fall into year end before lifting again as inventory sell-down progresses.

## Initiate coverage with BUY rating and C\$1.00/sh PT

We build up a SOPT valuation based on each of the assets below;

1. LDI – excluding life extensions: 1x C\$13m NAV multiple based on existing operating mine
2. LDI – Mousseau West satellites: 0.75x ~C\$40m NAV multiple based on simple satellite / existing plant
3. Okanjande: 0.6x C\$102m NPV, a lower multiple as our NPV is on plant-move scenario
4. Bissett Creek: 0.5x C\$157m NPV until funding is in place, but factoring 20-30% capex-opex escalation

Deducting net cash, and addition dilution / cash from options, drives our C\$273m NAV, or risked C\$1.00/sh valuation. To a degree, while valuing the start-up small mines for Northern Graphite is the most quantifiable aspect of the valuation, the upside really comes from both the expansion (in Namibia) and potential downstream synergies. For now, we exclude any valuation for this, but very much see these as the engine room of future growth. Our thesis is simply that demonstration of firstly full economics, then execution, on the small mines is step one to crystallise our existing PT. Next or even ahead of this execution, we would look for Namibia expansion and refreshed Bissett Creek economics, which result-dependent could add to our SOPT, ultimately executing on those builds too, with a drape of forward integration over the whole group.

**Table 5 (A) SOTP and (B) sensitivity analysis to our Northern Graphite valuation**

Group-level SOTP valuation	C\$m	O/ship	NAVx	C\$/sh	1xNAV today (C\$m, ungeared)* sensitised to graphite price & discount					
					Group NAV (C\$m)	\$1200/t	\$1350/t	\$1500/t	\$1650/t	\$1800/t
NPV Lac des Iles 4Q22	12.9	100%	1.00x	0.09	10% discount	186	224	261	296	332
NPV Mousseau West satellite	39.4	100%	0.75x	0.20	8% discount	195	235	<b>273</b>	311	348
NPV Okanjande (build start)	102.3	100%	0.60x	0.42	5% discount	210	254	296	337	378
NPV Bisset Ck (build start)	156.7	100%	0.50x	0.54	<b>Price target (C\$/sh)</b>	\$1200/t	\$1350/t	\$1500/t	\$1650/t	\$1800/t
Central, fin. & aq'n cost	(36.6)	100%	1.00x	(0.25)	10% discount	0.60	0.78	0.94	1.11	1.27
Net cash (3Q22)	(9.3)	100%	1.00x	(0.06)	8% discount	0.64	0.82	<b>1.00</b>	1.17	1.34
Cash from Options	7.7	100%	1.00x	0.05	5% discount	0.70	0.90	1.09	1.28	1.46
<b>1xNAV8% US\$1500/t</b>	<b>273</b>		<b>PT:</b>	<b>1.00</b>	<i>*Project level NPV, ex fin. costs and cent. SGA, d'counted to build start</i>					

Source: SCP estimates

## APPENDIX I: Evolving market dynamics

There is no doubt that EVs are the future of natural graphite demand. However, the subtleties on production specifications are near endless. We pick up three key thematics here that are pertinent to the future success and economics of moving downstream. In short, we see Northern Graphite as able to address these concerns;

- Qualification lag mitigated by large-flake sales to the refractory market during qualification, working-cap (and equity dilution blow-outs) are mitigated by qualifying on 'Stage 1' small mines pre expansion;
- Downstream technology risk mitigated by partnering with existing SPG producer vs. attempting to roll out proprietary technology, which essentially never proceeds as fast in real life as in Microsoft Excel;
- Like downstream technology, cleaning with HF is proven, as is permitting HF in Canada – peers seeking to pioneer thermal or caustic cleaning may see short-term gain on permitting time frame, but long-term (potentially fatal) pain on technology risk

Ultimately this is an emerging space, where dynamics may change. As a 'second mover' in a high-tech space, Northern is well placed to pivot if, likely via trial, error and equity dilution, peers pioneer more efficient cleaning methods.

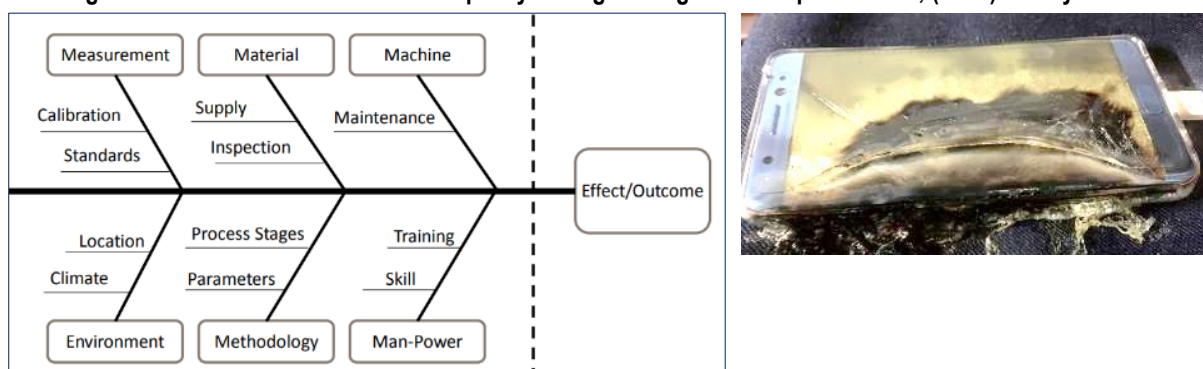
### 1. Competition from synthetic abating as fast-charge and battery size trade off against battery life

While graphite demand for batteries is rocketing, this is partially supplied by synthetic graphite. Synthetic is typically made by converting coke, heating it to 2500°C and leaving it to cool, replicating the natural metamorphic process that created natural graphite. Natural flake is very crystalline, which makes it good for constant-consumption batteries, but for high charge-discharge, synthetic has better performance for a longer life. Other tradeoffs include natural flake's improved fast-charge ability, and much smaller physical size enabling longer-range on same-size batteries using natural flake. Historically the ease of building 200-300ktpa synthetic graphite facilities led China down this route, but the environmental issues with their small-mines centres, concentrated around Heilongjiang on the Korean border. Ultimately the best batteries will use a mix of both, with cycle-life from synthetic trading off against performance and cost compromise of natural graphite.

### 2. Qualification is key hurdle, and is not improving, yet; small-mines the solution to equity dilution

Despite being 5Y late on their downstream strategy, Syrah's early and current work is some of the most comprehensive in the market, ironically providing learnings for 'second mover advantage'. Core to qualification is the '5M's (plus environment), shown in Figure 11, with each 'M' being a qualification requirement for downstream processing. In essence, this process is designed to avoid a repeat of Samsung's Galaxy Note 7 issues (Figure 11, inset), albeit that wasn't graphite-related, but due to aspects of battery cell construction. Although material testing can take a 'notoriously long time', including up to a year for some tests, much of that work can proceed prior to production, or even prior to funding, primarily around material and method. But aspects such as the 'machine', and 'man power' go as far as requiring the naming of the individual plant GM, something that can only occur post production. This chicken-and-egg scenario has effectively scuppered new natural-flake mines (and more specifically funding of them) for a decade. The immovable object is increasing demand, so 'something has to give', but with such high risks (of battery explosion / market cap impact), so far the only thing 'giving up' is the share count of the miners. Thus, any mine that can qualify a small project (reduced working-cap build up / opex post production but pre qualification), or better still able to sell coarse flake while fines qualify, is structurally advantaged.

Figure 11. Ishikawa or fishbone '5Ms' quality management guides EV-qualification; (inset) Galaxy Note 7



Source: Syrah resources, 2016

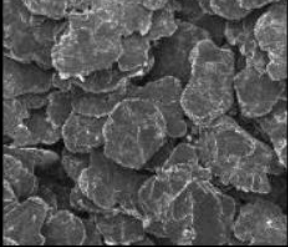
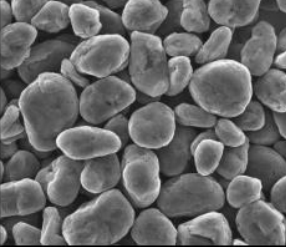
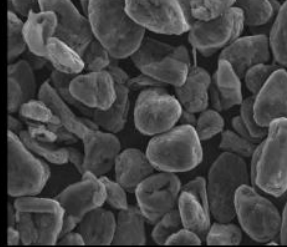
### 3. Forecast downstream economics moot as yield and costs glossed over, technology risk more so

Downstream is broadly divided into spheronization of graphite first, a relatively simple process using fast-spinning blades in either continuous process, or batch-process jet mills, to 'round' graphite with ultra-fine waste sold into recarburiser market to increase carbon content of steel. This is followed, or sometimes preceded, by purification to remove impurities, and finally by coating the product. From here, anode material can be used in batteries, which are used in cars.

Despite being some six years old, Syrah's summary shown in Figure 12 remains close to present day situation. Most juniors plug in a cost, and price of refined product, and suggest strong economics on that basis. This is counter to the recent US inflation reduction act, where domestically-supplied metals could give credits to enable battery makers to lift margins from ~5% to ~30%. A 5% margin is somewhat at odds with margins forecast by pre-revenue junior miners for going downstream. The missing link here is yield, representing losses during the process, and subtleties such as credits for the 'waste' (ultra-fine used to increase carbon content of steel, known as recarburiser), which some feasibility studies optimistically hoped would see similar prices to raw flake graphite, themselves forecast at US\$1,000/t to US\$1,900/t by 2020 against perhaps US\$500/t FOB spot pricing.

Yield is inherently links spheronization size, where yield to 5-10um could reasonably be half that of 20-30um, perhaps 30-40% vs. 60-70%. When we visited China in 2015, EV's were reportedly seeking 7-12um, with 10-20um more commonly used in consumer electronics. The issue is that battery makers typically keep precise blends and sizes confidential. We understand that anode manufacturers are now asking for 6-8um grind-size on d50, which would equate to a d90 of around 10um. An example is a junior selling at US\$500/t with a 50% gross margin, seeking US\$2000/t by spheronizing graphite, at US\$500/t cleaning cost and 70% yield, this could add US\$750/t to mine-gate product, potentially tripling margins. At 30% yield the exercise could be loss making. In the competitive world of Chinese spheronisation, even before technology IP is taken into account, we suspect triple-digit margins on SPG plants may be optimistic, to put it politely.

Figure 12(A) A 2016 slide from Syrah summarising SPG remains largely unchanged

	Flake Graphite	Uncoated Spherical	Coated Spherical
Products			
Cost	US\$300/t	US\$2,300/t <sup>(1)</sup>	US\$3,200/t <sup>(2)</sup>
Price	US\$600/t - US\$1,200/t <sup>(3)</sup>	US\$3,000/t - US\$4,500/t <sup>(3)</sup>	US\$7,000/t - US\$10,000/t <sup>(1)</sup>

Source: Syrah Resources, 2016

### 4. Technology: Proprietary vs. joint-venture

Anode material typically sells for US\$8-10k/t on a fully purified, coated 'ready to use' basis, with niche sales as high as US\$20k/t. Japanese and Chinese groups pioneered the production of SPG (spherical coated graphite), with spheronization the simplest step, purification similarly simple if using toxic HF, but more complex if using thermal or caustic processes. Coating is generally considered black-box / has the highest barriers to entry. Technically none of this process is patented, with western SPG groups several years behind eastern groups. However, like car production itself, it may take a group 10Y to make up at 2Y lag in technology, which itself is always evolving.

Partnering vs proprietary: is the simple choice for juniors seeking to forward integrate.

The subtleties don't stop there. For example, early work into graphite for batteries focused on active material, more recently shifting to conductive. There are two types of carbon – the anode has active carbon, the main focus of current production. However, the cathode also requires conductive material to provide conductivity between metals, a very different end use. This is somewhat moot now as the conductive market, known as 'carbon black', is embryonic at this stage, albeit commands a far higher price on a smaller market size.

## 5. The purification conundrum: permit HF, or try commercializing caustic / thermal

The only commercially rolled-out technology to purify 93-98% carbon mine-gate flake is hydrofluoric acid. Miners can lift their grades at site to >99% as juniors promoted last cycle, but said promoters commonly omit that to do this recovery would drop to sub-economic levels, so that can be ruled out. The competing processes are caustic bake and thermal heating ('boiling off' impurities). Most juniors lean away from HF because of its toxicity. In fact, HF is readily permitted in Canada / USA, with the key hurdle not actually the acids' toxicity, but recycling / equipment to deal with the waste stream that has picked up not just silica, but heavy metals in the cleaning process. Imerys, and by extension Northern Graphite's management team, has experience operating HF, including recycling, at their Norwegian quartz-purification facility, so are ideally placed to proceed with this proven technology.

Thermal is often touted as a better solution, as quite rightly heat is far less toxic than HF. However, given the above logic that the difficulty is not in the cleaning media, but in the residue, the output heavy metals in thermal purification typically end up in gaseous form in a chimney, rather than in a liquid acid waste stream. With this in mind, thermal purification could ostensibly be seen as worse than HF. Ironically HF diluted heavily with water ends up in simple non-toxic fluoride state once impurities are removed, far from the perceived 'permitting enemy'. Examples of this include peer Nouveau Monde, who in 3Q21 filed a patent for thermal purification citing it as 'greener' than hydrofluoric acid, preferring to rely on its own patented (by definition, commercially unproven) methods, using potentially using a hybrid system where chloring lowers the required temperatures.



## APPENDIX II: PEER COMPARISON

At the core of our investment thesis is the feasibility of an adjustable production plan with qualified products in a Tier 1 jurisdiction in short time to benefit for the EV material market boom, so we stack Northern Graphite against peers in Table 1 below. We see four key takeaways:

1. In the natural graphite market, big NPVs come with large production profiles, and that comes with big CAPEX and thus a great payback risk. Northern Graphite is well positioned with only US\$20m capex to refurb the existing mill (and/or minimal additional to move if trade-off warrants) required for the restart of its Namibian operations for well-sized mine with production easily absorbed by the market, when (i) Canadian peers require > US\$350m capex and (ii) African competitors suffer from lack of regional infrastructure and/or facing political instability and potential social unrest leading to halt of operations often, as has happened to Syrah recently. We think that NGC offers a substantially lower political and equity dilution risk.
2. Ultimately, for a graphite producing company to have free cash flow it needs positive operating profit margins and not extensive debt overhang. Northern Graphite has both – with proven operating experience under its belt and existing cash flow, building up over CY24, something not replicated in peers.
3. Ironically, we see almost Northern Graphite's peers, looking to gain downstream exposure by using proprietary technology which of course comes slower and is riskier as the results are not guaranteed. More interestingly though, is that only two of them have released capex estimates, with Nouveau Monde's battery anode plant requiring ~US\$700m. In the contrast, Northern Graphite recently announced a JV with Graphex – an already anode producing company, with Northern providing the necessary raw material, and Graphex the know-how to produce anodes, which is the logical approach in our view.
4. Perhaps the most critical of all, is the product qualification. Northern Graphite is the **ONLY** graphite producing company in North America with qualified products, while Syrah and Nouveau Monde still haven't completed the qualification process, leading to extremely low-value sales price for this lengthy period (usually 2-3 years) for Syrah as Nouveau Monde is not even producing yet.

**As such, we think Northern Graphite stands out as the leading producing company and soon the 3<sup>rd</sup> largest graphite producer outside of China, with qualified products and a growing production profile, providing a strong upside value potential, while its peers do not have this to offer nor the exploration 'cookie' that usually precious metals companies offer.**

Company	Production Stage				Development Stage									Pre-Development Stage			
	Syrah	Northern Graphite	Northern Graphite	Northern Graphite	Renascor	Talga	Magnis	Nouveau Monde	NextSource	Sovereign Graphite	Sovereign Rutile	Blackrock	EcoGraf	SRG	Evolution	Mason	Volt Resources
Project	Balama	LDI	Bisset Creek	Okanjande	Siviour	Vittangi	Nachu	Matawinie	Molo	Maligunde	Kasiya	Mahenge	Epanko	Lola	Chilalo	Lac Gueret	Bunyu
Location	Mozamb.	Canada	Canada	Namibia	Australia	Sweden	Tanzania	Canada	Madagascar	Malawi	Malawi	Tanzania	Tanzania	Guinea	Tanzania	Canada	Tanzania
Stage	Prod'n	Prod'n	PEA ('18)	PEA ('22)	BSF ('19)	DFS ('21)	BFS ('22)	BFS ('18)	BFS ('19)	BFS ('18)	Scoping ('22)	DFS ('22)	BFS ('17)	BFS ('19)	DFS ('20)	BFS ('18)	BFS ('18)
Market cap (\$m)	A\$1,536	C\$65	C\$65	C\$65	A\$686	A\$583	A\$408	C\$366	C\$287	A\$191	A\$191	A\$152	A\$97	C\$68	A\$46	A\$57	A\$54
Net cash (US\$m)	34	(9)	(9)	(9)	50	26	55	11	5	11	11	10	30	9	10	7	7
Resource (Mt)	1,421	1	94	37	93	30	174	153	141	46	1,775	213	31	50	67	83	77
Grade (% TGC)	10.0%	7.2%	1.7%	5.3%	7.3%	24.1%	5.4%	4.3%	6.2%	7.2%	1.3%	7.8%	9.9%	4.1%	5.4%	17.2%	5.4%
Inventory (Mt)	107	1	28	39	51	2	76	62	22	10	541	70	12	42	9	5	3
Grade (% TGC)	16.0%	7.2%	2.1%	5.1%	7.4%	24.1%	5.2%	4.2%	7.0%	9.5%	1.5%	8.5%	8.3%	4.2%	9.9%	27.8%	6.3%
Recovery (%)	80%	89%	95%	92%	91%	90%	90%	93%	88%	90%	62%	93%	95%	84%	96%	85%	93%
ROM (ktpa)	2,000	168	1,840	631	1,650	100	5,000	2,550	240	600	12,000	1,061	695	1,400	500	3,400	400
Strip (x)	1	4.7	0.3	0.7	1.9	4.0	1.5	1.2	0.5	1.0	0.0	0.8	0.4	0.7	5.0	1.3	0.7
Conc grade (%)	95%	97%	95%	96%	94%	-	99%	97%	97%	97%	-	97%	96%	95%	94%	94%	95%
Mine conc prod'n (ktpa)	350	15	38	31	105	21	236	103	45	52	155	87	60	55	50	500	24
Opex (minesite, US\$/t)	615	934	774	651	355	608	639	444	566	323	by product	466	500	508	778	200	664
Capex (mine, US\$m)	138	6	81	15	82	192	364	359	67	49	372	182	89	123	87	1168	32
Basket (J/L/M/F %)	9/12/12/68	17/20/18/45	60/35/5/0	11/48/24/17	4/17/7/72	0/0/0/100	32/32/9/18	15/33/28/24	24/23/7/46	24/26/9/41	31/31/11/27	5/18/36/41	20/31/28/21	17/28/9/47	32/27/6/36	19/14/13/54	12/27/15/46
Spot basket (US\$/t)	688 CIF	1,572	1,693	1,360	1,122	-	1,521	1,336	1,267	1,317	1,418	1,141	1,354	1,287	1,424	1,255	1,107
FS basket (US\$/t)	1,000	1,600	1,800	1,500	925	12,312*	1,847	1,675	1,208	1,216	1,085	1,731	1,181	1,321	1,534	1,190	1,195**
FS / spot (%)	(31%)	(2%)	(6%)	(9%)	21%	-	(18%)	(20%)	5%	8%	31%	(34%)	15%	(3%)	(7%)	5%	(7%)
RISKS / EVALUATION																	
Grid power (Y/N)	Yes	Yes	Yes	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Downstream	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes
Own tech	Yes	No	No	No	Yes	No	Yes	Yes	No	No	No	No	Yes	No	No	Yes	No
3rd party tech	No	Yes	Yes	Yes	No	Yes	No	No	Yes				No	Yes	Yes	No	Yes
Spheronisation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes				Yes	Yes	Yes	Yes	Yes
Cleaning	Thermal	HF	HF	HF	Thermal	Proprietary	Thermal	C-chlorination	Proprietary				Thermal	Yes	Thermal	C-chlorination	Thermal
Coating	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes				Yes	Yes	Yes	Yes	Yes
Anode	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes				Yes	Yes	Yes	Yes	Yes
Opex (d/stream, US\$/t)	3109				1989				1680								
Capex (d/stream, US\$m)	176				63				689								

Source: Company data, SCP estimate using as spot px disclosed prices as of January 2023, from BlackRock Mining, \*refers to Battery Anode price, \*\*CIF price

<b>Ticker:</b> NGC CN	<b>Price / mkt cap:</b> C\$0.58/sh, C\$70m	<b>Group P/NAV today:</b> 0.44x	<b>Asset:</b> LDI / Okanjande
<b>Author:</b> B Salier / E M Rec / xNAV PT:	<b>BUY, C\$1/sh</b>	<b>1xNAV:</b> C\$1.33/sh	<b>Country:</b> Canada / Namibia

### Share data

Basic shares (m):	121.3	FD with options (m)^:	144.5
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Commodity price	CY23E	CY24E	CY25E	CY26E	CY27E
Graphite px (C\$/t)	2,053	2,027	2,018	2,019	2,018

### Group-level SOTP valuation

	C\$m	O/ship	NAVx	C\$/sh
NPV Lac des Iles 4Q22	12.9	100%	1.00x	0.09
NPV Mousseau West satellite	39.4	100%	0.75x	0.20
NPV Okanjande (build start)	102.3	100%	0.60x	0.42
NPV Bisset Ck (build start)	156.7	100%	0.50x	0.54
Central, fin. & aq'n cost	(36.6)	100%	1.00x	(0.25)
Net cash (3Q22)	(9.3)	100%	1.00x	(0.06)
Cash from Options	7.7	100%	1.00x	0.05

<b>1xNAV8% US\$1500/t</b>	<b>273</b>	<b>PT:</b>	<b>1.00</b>
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### 1xNAV today (C\$m, ungeared)\* sensitised to graphite price & discount

Group NAV (C\$m)	\$1200/t	\$1350/t	\$1500/t	\$1650/t	\$1800/t
10% discount	186	224	261	296	332
8% discount	195	235	<b>273</b>	311	348
5% discount	210	254	296	337	378

Price target (C\$/sh)	\$1200/t	\$1350/t	\$1500/t	\$1650/t	\$1800/t
10% discount	0.60	0.78	0.94	1.11	1.27
8% discount	0.64	0.82	<b>1.00</b>	1.17	1.34
5% discount	0.70	0.90	1.09	1.28	1.46

\*Project level NPV, ex fin. costs and cent. SGA, d'counted to build start

### Group NAV over time

	Mar 23	Mar 24	Mar 25	Mar 26	Mar 27
Lac des Iles (C\$m)	52.7	52.7	52.3	48.8	41.4
Okanjande (C\$m)	-	102.3	137.8	129.6	123.8
Bisset Ck (C\$m)	156.7	201.0	331.2	347.8	318.5
Central G&A (C\$m)	(35.4)	(32.7)	(29.1)	(25.1)	(22.4)
Cash + fr. ops (C\$m)	14.4	8.0	(12.2)	11.1	17.0
1xNAV (C\$m)	<b>188.4</b>	331.4	480.1	512.2	478.3
1xNAV8%/sh FF FD (C\$/	1.30	2.3	3.3	3.5	3.3

### 1.0xNAV/sh (C\$m, geared)^

1Q23 NAV (C\$m)	\$1200/t	\$1350/t	\$1500/t	\$1650/t	\$1800/t
10% discount	242	340	435	529	623
8% discount	272	377	<b>480</b>	582	683
5% discount	327	448	564	680	796

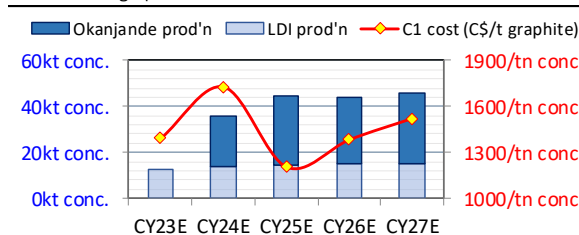
  

1Q23 NAV (C\$/sh)	\$1200/t	\$1350/t	\$1500/t	\$1650/t	\$1800/t
10% discount	1.67	2.35	3.01	3.66	4.31
8% discount	1.88	2.61	<b>3.32</b>	4.02	4.73
5% discount	2.26	3.10	3.90	4.71	5.51

^Project NPV less central SG&A & finance cost, plus net cash at the time

### Production

	CY23E	CY24E	CY25E	CY26E	CY27E
LDI prod'n (kt of graphit	13	14	14	15	15
Namibia (kt of graphite	-	22	30	29	31
<b>Total prod'n (000t)</b>	<b>13</b>	<b>36</b>	<b>44</b>	<b>44</b>	<b>46</b>
C1 cost (C\$/t graphite)	1,393	1,726	1,207	1,385	1,523



Source: SCP estimates; \*Financial statements incl. LDI / Namibia, excl. Bisset Ck (held in SOTP); net C\$5m equity at spot share price

### Resources: Ore %Cg Graphite (kt)

Lac des Iles and M. West	4.7Mt	6.3%	298
Okanjande	39.1Mt	5.0%	1,972
Bissett Creek	94.1Mt	1.7%	1,613

<b>Global</b>	<b>138Mt</b>	<b>2.8%</b>	<b>3,884</b>
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### Ratio analysis

	CY23E	CY24E	CY25E	CY26E	CY27E
Average shares on issue (m)	121.3	121.3	121.3	121.3	121.3
Forward EV (C\$m)	85.4	105.6	67.8	61.8	48.9
EBITDA (C\$m)	2.8	19.0	34.0	25.7	32.4
CFPS before w/c (C\$/sh)	(6.9)	(11.8)	18.5	16.1	9.7
EPS (C\$/sh)	-	5.1	12.3	9.6	12.8
Forward EV/EBITDA (x)	30.1x	5.6x	2.0x	2.4x	1.5x
Forward FCF yield (%)	-12%	(0)	32%	28%	17%
PER (x)	-	11.3x	4.7x	6.1x	4.5x

### Income Statement

	CY23E	CY24E	CY25E	CY26E	CY27E
Revenue (C\$m)	26.4	74.1	91.9	91.5	94.4
COGS + royalty (C\$m)	17.9	50.6	53.4	61.0	57.1
D&A (C\$m)	3.2	7.5	9.2	8.7	9.3
<b>Gross profit (C\$m)</b>	<b>5</b>	<b>16</b>	<b>29</b>	<b>22</b>	<b>28</b>
Exploration (C\$m)	1.0	-	-	-	-
Direct/indirect tax (C\$m)	1.3	3.4	7.9	5.3	7.6
G&A ex site (C\$m)	4.2	4.0	4.0	4.0	4.0
Finance cost (C\$m)	1.9	1.9	1.9	-	-
Other (C\$m)	0.5	0.5	0.5	0.8	0.9
<b>Net income (C\$m)</b>	<b>(3.6)</b>	<b>6.2</b>	<b>14.9</b>	<b>11.6</b>	<b>15.5</b>

### Cash flow Statement

	CY23E	CY24E	CY25E	CY26E	CY27E
Receipts from sales (C\$m)	(3.6)	6.2	14.9	11.6	15.5
Add back depreciation (C\$m)	3.2	7.5	9.2	8.7	9.3
Non-cash tax (C\$m)	-	-	-	-	-
Other (C\$m)	0.5	0.5	0.5	0.5	0.5
Changes in WC (C\$m)	0.5	(5.9)	0.9	1.0	1.2
<b>Cash flow ops (C\$m)</b>	<b>0.5</b>	<b>8.3</b>	<b>25.5</b>	<b>21.8</b>	<b>26.4</b>

### Cash flow ops (C\$m)

Cash for acquisitions (C\$m)	-	-	-	-	-
PP&E (C\$m)	(7.4)	(28.5)	(2.2)	(1.3)	(13.5)
Other (C\$m)	(1.0)	-	-	-	-
<b>Cash flow inv. (C\$m)</b>	<b>(8.4)</b>	<b>(28.5)</b>	<b>(2.2)</b>	<b>(1.3)</b>	<b>(13.5)</b>

### Cash flow inv. (C\$m)

Equity issued (C\$m)	5.0	-	-	-	-
Net debt movement (C\$m)	-	-	-	(14.6)	-
Minority / lease (C\$m)	-	-	-	-	-
<b>Cash flow fin. (C\$m)</b>	<b>5.0</b>	<b>-</b>	<b>-</b>	<b>(14.6)</b>	<b>-</b>

### Cash flow fin. (C\$m)

Net change in cash (C\$m)	(12.9)	(20.2)	23.3	35.0	13.0
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### Balance sheet

	CY23E	CY24E	CY25E	CY26E	CY27E
Cash (C\$m)	0.3	(19.9)	3.3	9.3	22.2
AR + inventory (C\$m)	36.2	45.8	44.9	44.6	43.0
Exploration (C\$m)	14.2	14.2	14.2	14.2	14.2
PP&E assets + others (C\$m)	55.3	76.4	69.3	61.9	66.1
Other (C\$m)	0.5	0.5	0.5	0.5	0.5
<b>Total assets (C\$m)</b>	<b>106.5</b>	<b>116.9</b>	<b>132.3</b>	<b>130.4</b>	<b>146.0</b>
Debt (C\$m)	14.6	14.6	-	-	-
AP + leases	13.8	17.5	32.1	18.1	17.8
Deferred tax/rev (C\$m)	30.0	30.0	30.0	30.0	30.0
Total liabilities (C\$m)	<b>58.3</b>	<b>62.0</b>	<b>62.0</b>	<b>48.1</b>	<b>47.8</b>
S/holders, rsrvs, minor. (C\$m)	70.7	71.1	71.6	72.1	72.5
Retained earnings (C\$m)	(31.4)	(25.2)	(10.2)	1.4	16.8
<b>Liabilities+equity (C\$m)</b>	<b>106.5</b>	<b>116.9</b>	<b>132.3</b>	<b>130.4</b>	<b>146.0</b>

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HOLD:	1
SELL:	0
UNDER REVIEW:	1
TENDER:	0
NOT RATED:	0
TOTAL	55

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