PITT STREET RESEARCH

Blackstone Minerals

Low-cost, high-ESG nickel for the EV market

Share Price: A$0.053

Blackstone Minerals (ASX:BSX) is a nickel developer with the Ta Khoa project in Vietnam. BSX is building an upstream and downstream nickel business to produce battery grade nickel/cobalt/manganese (NCM) 811 precursor (NCM811) for the lithium-ion battery industry, with resources extracted from Ta Khoa and as well as other nickel projects.

ASX: BSX

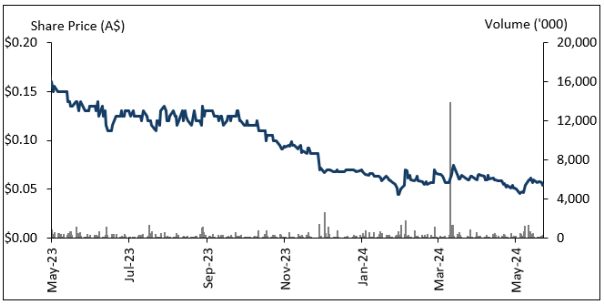
Sector: Resources

5 June 2024

Market cap. (A$ m)	25.6
# shares outstanding (m)	524.2
# shares fully diluted (m)	529.5
Market cap ful. dil. (A$ m)	27.8
Free float	100%
52-week high/low (A$)	0.160 / 0.045
Avg. 12M daily volume ('1000)	34.3
Website	www.blackstoneminerals.com.au

Source: Company, Pitt Street Research

Share price (A$) and avg. daily volume (k, r.h.s.)



Source: Refinitiv Eikon, Pitt Street Research

Ta Khoa is an appetising project

Ta Khoa is a nickel-copper-PGE project located 160km west of Hanoi in Vietnam. Blackstone owns 90% of the project. The Preliminary Feasibility Study (PFS) confirmed a JORC Resource of 130Mt at 0.37% nickel, for 485kt, along with an NPV (with an 8% discount rate) of US$2.01bn and an IRR of 67%. The project is expected to deliver US$14bn in revenue and US$4.5bn in operating cash flow over the life of the mine, which could enable the US$491m capital cost to be paid back in 1.5 years from first production. The project has strong ESG credentials, with a low level of greenhouse gases expected, relative to comparable projects in Australia and Indonesia, and before the potential for using hydropowered electricity or carbon offsets are examined. Vietnam is not only a burgeoning EV hub, but so are several neighbouring countries.

Ta Khoa remains compelling even in the current nickel bear market

There's no denying that the nickel market has had a terrible time for most of the last 18 months. This has been due to EV sales moderating and substantial supply glut in the nickel market. However, Ta Khoa remains a compelling project, being a first quartile producer with a Life-of-operations All-in Cost of US$11,997/t NCM811. Even though nickel prices have corrected from all-time highs, they aren't too far off the weighted average forecast price anticipated in the PFS.

Our target valuation suggests there's significant upside

We value Blackstone at A$0.22 per share in our base case scenario and A$0.28 per share in our optimistic (or bull case) scenario. These may not appear to be significant premiums to the company's current market capitalisation considering Ta Khoa's NPV of US$2.0bn, but we have assumed significant equity dilution to bring the project into production (we assumed 50/50 debt/equity funding of the US$850m+ necessary). Our equity value ultimately equates to ~US$2bn in our base case and ~$2.6bn in our bull case. Please see p.17-19 for more details on our valuation rationale and p.20 for the key risks.

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Disclosure: Pitt Street Research directors own shares in BSX.

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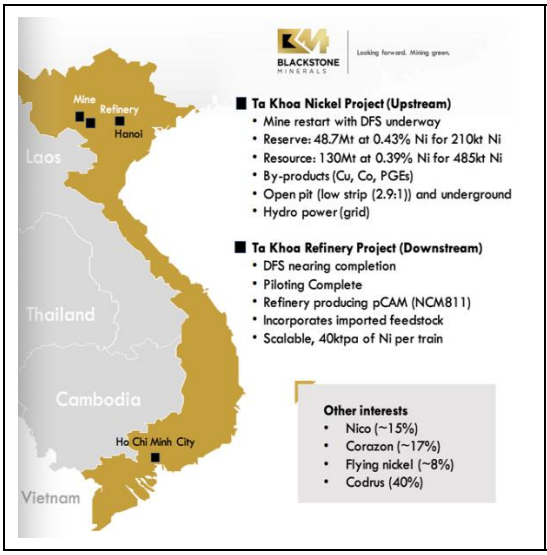
Introducing Blackstone Minerals (ASX:BSX)

Blackstone Minerals is an ASX-listed nickel developer.

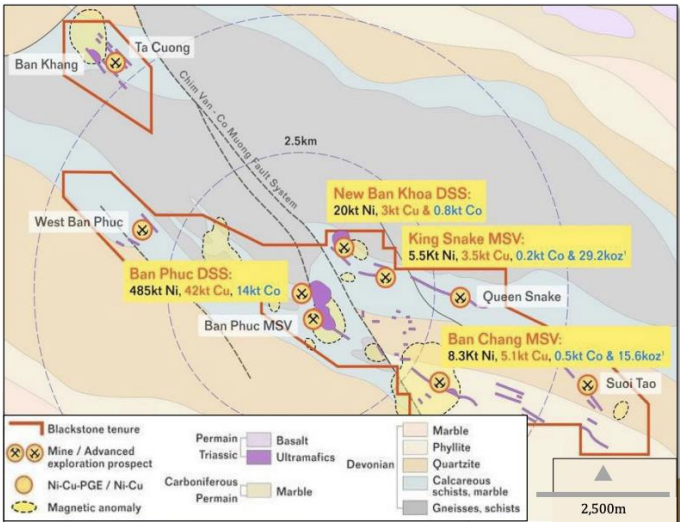
Blackstone Minerals is an ASX-listed nickel developer. It has its headquarters in Perth, and its 90%-owned flagship project in northern Vietnam, along with other projects which we outline in Appendix I. The company first listed in January 2017, focused on gold and nickel projects in WA which were eventually spun it off into Codrus Minerals in 2021. In May 2019, the company acquired the Ta Khoa Nickel project, inspired by the surge in demand of nickel and cobalt due to electric vehicles and other decarbonisation technology, as well as the unique aspects of the Ta Khoa project. One such aspect was Ta Khoa's operating history. It had been an operating mine between 2013 and 2016 but was placed into care and maintenance due to low nickel prices, as well as depletion of the only then known ore reserve. Since acquisition, Blackstone has built up the ore reserve and planned a comprehensive upstream and downstream nickel operation to serve local industrial and export partners (Figures 1 and 2).

Figure 1: Ta Khoa's location



Source: Company

Figure 2: The Ta Khoa deposit



Source: Company

NCM811

Blackstone Minerals plans to produce battery-grade NCM811.

Using the nickel concentrate and sulphate extracted from Ta Khoa (and potentially other projects) Blackstone plans to produce battery-grade NCM811. This is essentially Nickel-Cobalt-Manganese with an 8:1:1 ratio in the battery cathode. This is to say: 80% nickel, 10% cobalt and 10% manganese. NCM811 serves as a key component in the fabrication of high-performance cathode because of its role in enhancing the energy density and overall performance of lithium-ion batteries. NCM811 can store more energy than other types of batteries, andit can reduce the overall weight of the product – something crucial for certain products UAVs and drones. Both these properties will result in more operating time and lower maintenance costs. Consequently, by 2028, it is estimated that 50% of global demand for batteries will contain high nickel NCM cathodes.

Vietnam is an ideal jurisdiction for a resources developer

There are several unique advantages Blackstone has from having a project in Vietnam.

Vietnam may not spring to mind as an obvious jurisdiction for an ASX resources junior in which to have a project. Nonetheless, there are several unique advantages Blackstone gains from having a project in Vietnam. Blackstone is exposed to a burgeoning EV hub in its own right but is also close to neighbouring countries that are solid EV hubs as well. There are over 20 operating mines in the country. Vietnam is also a strong renewable energy hub, with 30% of its national grid being hydro and 24% solar.

Vietnam is also an attractive economic hub generally with lower labour and electricity prices compared to China, and a greater ease of doing business. It is ranked 70th by the World Bank, just ahead of Indonesia, and well ahead of Brazil (124). The country's GDP per capita increased 3.6 times between 2002 and 2023 and its foreign direct investment is up over 6,000% since 2010.

Most importantly, Vietnamese nickel is not disqualified from Tax Credit eligibility under the IRA (Inflation Reduction Act), unlike most Indonesian nickel (2.2Mt). Indeed, 80% of the world's currently Cathode Active Material (CAM) supply is is either produced in China or by what the IRA deems 'Foreign Entities of Concern, or FEOCs.

A solid ESG angle

Ta Khoa also has strong ESG (Economic, Social and Governance) credentials. The project is estimated to emit only 9.8 kg of CO2-equivalent per kg of precursor Cathode Active Material (pCAM). That's a lot less than comparable projects Indonesia and Australia, and this is before you even account for the prospects of using hydropowered electricity or using carbon offsets, which may reduce emissions further.

In September 2023 Blackstone signed an MOU with Arca Climate Technologies to explore the potential for carbon capture at the project. Preliminary laboratory studies have shown that the Ta Khoa mine waste could capture 72kt of CO2 per year, nearly 20 times that of the Mt Keith nickel mine in WA.

A low-cost project

The recent bear market for nickel has spooked plenty of investors away from the sector, but Blackstone is a low-cost project compared to a typical Indonesian project. Life-of-operations All-in Cost of US$11,997/t NCM811 as compared to study weighted average forecast price on sale of NCM811 of US$16,397/t NCM811 and current Shanghai Metals Market (SMM) spot price of US$19,559/t NCM811.

Ten Key reasons to look at Blackstone

1) **Blackstone has a vertically integrated mining and refinancing business model**. It is no mere explorer, but is developing both upstream and downstream operations that will supply NCM811 Precursor to the battery industry.
2) **The company has a solid resource with potential for further upside with upcoming exploration**. The Preliminary Feasibility Study (PFS) found a JORC Resource of 130Mt at 0.37% nickel, for 485kt. Exploration work at the project has potential to expand this Resource base further, and this is why Blackstone has planned for a far longer life for its processing operations (50 years) rather than the 8-year life based off the initial Resource in the PFS.
3) **The company is exposed to the EV market in South-East Asia**. This market has been in the shadow of more developed markets (Europe and North America in particular), but it is growing at a fast pace. There are several factors that are expected to drive growth including higher vehicle ownership amongst the population, generous government subsidies and a demographic that is young and growing.
4) **Ta Khoa is a low-cost project, in the first quartile**. Life-of-operations All-in Cost of US$11,997/t NCM811 as compared to study weighted average forecast price on sale of NCM811 of US$16,397/t NCM811 and current Shanghai Metals Market (SMM) spot price of US$19,559/t NCM811.
5) **There is a fast track to production**. This is anticipated in the next calendar year (CY25) with a 10-month strip period. Thereafter production will gradually commence, ramping up to a nameplate design of 8Mtpa in 2027.
6) **Ta Khoa's strategic location in Vietnam**. Vietnam is a location that is appealing for several reasons including its exposure to the local EV market, but also the country's rapid adoption of renewable energy and favourable conditions for doing business.
7) **There's a solid ESG angle given the project's low emissions**. All battery metal project developers will try to claim a strong ESG element given the role electric vehicles will play in decarbonisation. But Blackstone can go further, given the low emissions anticipated at Ta Khoa. The project is estimated to emit only 9.8 kg of CO2 equivalent per kilogram of pCAM, well behind emissions from Indonesian and Australian mines.
8) **Prospect for even lower emissions with the use of renewable energy**. There is potential for Ta Khoa to be a Net Zero operation when other mechanisms to further reduce net emissions get implemented. These could include hydro-powered electricity, carbon capture, carbon offsets and using third-party feed.
9) **The company's management team**. Blackstone has a highly qualified management team with a proven track record of creating shareholder value in the ASX Resources Sector. In particular, Non-Executive Chairman Hamish Halliday was the founder of Adamus Resources which grew from an A$3m IPO to a multi-million ounce gold producer that was acquired by Endeavour Mining in 2011 for US$600m.
10) **Blackstone is undervalued.** We anticipate that the company can re-rate as it completes the DFS, continues with exploration at the project area and successfully negotiates with offtake partners. The recovery in nickel prices can also play a part in helping create shareholder value. Our equity value for Blackstone is ~US$2bn in our base case and ~$2.6bn in our bull

case, although these are only A$0.22 per share and A$0.28 per share assuming substantial dilution to bring the project into production.

Ta Khoa – A worthy flagship project

Ta Khoa lies in the Son La Province of Vietnam, approximately 180km west of downtown Hanoi.

The Ta Khoa Project, in which Blackstone has a 90% stake, lies in the Son La Province of Vietnam, approximately 180km west of downtown Hanoi and 55km from Son La, the provincial capital (Figure 3).

Figure 3: Ta Khoa's location

Source: Company

Exploration work was first conducted in the mid-1950s by local geologists with Russian and Chinese assistance. The first listed company to own a majority stake in the project was Asian Minerals Resources (AMR) which was listed on the Toronto Stock Exchange in 2004 and completed a Feasibility Study in 2005. Mining operations commenced twice, only to be suspended on both occasions due to depressed nickel prices, firstly in 2008 and again in 2016. Concentrate sales from the second production period, which lasted 3 years, contained 20,998t of nickel, 10,245t of copper and 676t of cobalt[1]. Ta Khoa was divested to a shell company called Ta Khoa Mining in July 2018, and Blackstone acquired the project in April 2020, following the exercise of an exclusive binding option agreement that had been executed in May of the previous year.

The Ta Khoa project will consist of:

- The Open Pit operation
- An existing 400ktpa concentrator
- An integrated waste landform, and
- An 8Mtpa processing plant site (Figure 4).

[1] Pages 11-13 of the February 2022 Preliminary Feasibility Study.

Figure 4: Ta Khoa Project

Source: Company

There is an Indicated Mineral Resource of 102Mt grading 0.38% nickel.

Ta Khoa has an Indicated Mineral Resource of 102Mt grading 0.38% nickel, and an Inferred Resource of 28Mt grading 0.36% nickel for a total of 130Mt at 0.37% nickel (Figure 5).

Figure 5: Ta Khoa Project Resources

Ta Khoa Project Resources	Mt	Ni (%)	Cu (%)	Co (%)	Ni (kt)	Cu (kt)	Co (kt)
Indicated Resources	**102**	**0.38**	0.03	0.01	**383**	27	10
Inferred Resources	**28**	**0.36**	0.05	0.01	**102**	14	3
Total	**130**	**0.37**	**0.02**	**0.01**	**485**	**41**	**13**

Source: Company

The geology and development of the project

Ta Khoa sits in a magmatic Nickel-Copper-PGE sulphide district with both Disseminated Sulphide (DSS) and Massive Sulphide Vein (MSV) deposits. DSS deposits are where sulphide minerals are dispersed or scattered throughout the host rock rather than being densely concentrated as is the case with so-called 'massive' sulphides.

There are four deposits:

- Ban Phuc DSS
- Ban Chang MSV
- King Snake MSV
- Ban Khoa DSS

Of these, the Ban Phuc resource is the main one. In fact, Ban Phuc contained the entire 102Mt in Indicated Resources and 21Mt of the Inferred Resources. 6.2Mt came from Ban Khoa, 0.7Mt from Ban Chang and 0.4Mt from King Snake. The PFS considered primary mine or feed from Ban Phuc with minor ore feed from King Snake and Ban Chang.

Ban Phuc open pit operation

The PFS anticipated that Ban Phuc would be a conventional open pit operation. The final pit will have a top elevation of 1,560m and a bottom elevation of 1,090m, with a total depth of 470m. Mining will commence with the start of pre-production with the mining of the in-pit and ex-pit borrow sources to provide materials for the construction of the initial roads, infrastructure and IWL[2]. Clearing, grubbing and topsoil stripping to expose waste material will be carried out by equipment fleet. The drilling will occur with a drill hole of 115mm in diameter in ore and 140mm in waste rocks. The ore will be blasted with a powder factor of 0.31kg/t for fresh material and 0.25kg/t for transition material. Waste transition rock will be blasted with a powder factor of 0.17kg/t and waste fresh rock with a powder factor of 0.26kg/t.

King Snake and Ban Chang underground operations

Ban Chang will be split into East and West deposits with the former being mined simultaneously with King Snake. The Ban Chang West will come online as the other operations are completed. These deposits are based on two-portal designs that take advantage of local topography, allow for bottom-up development, and allow inflow through ventilation with exhaust fans at the upper portal and all main haulage being completed on a down ramp. It is anticipated that underground production over the life of mine will be on average 1,100t/day from King Snake and Ban Chang together.

Processing

There will be a 10 month pre-strip period, then a 24-month ramp up with full production rate being then sustained until the end of month 110 – just over 9 years into production.

There will be a 10-month pre-strip period where mill feed material mined during that time being stockpiled, ready for mill feed which will commence in the 11th month. Mined material will come not just from Ta Khoa but from the company's projects and investee projects in Canada (outlined in Appendixes I and II) After this, production will ramp up over a 24-month period, with full production rate (8Mtpa) being then sustained until the end of month 110, just over 9 years into production.

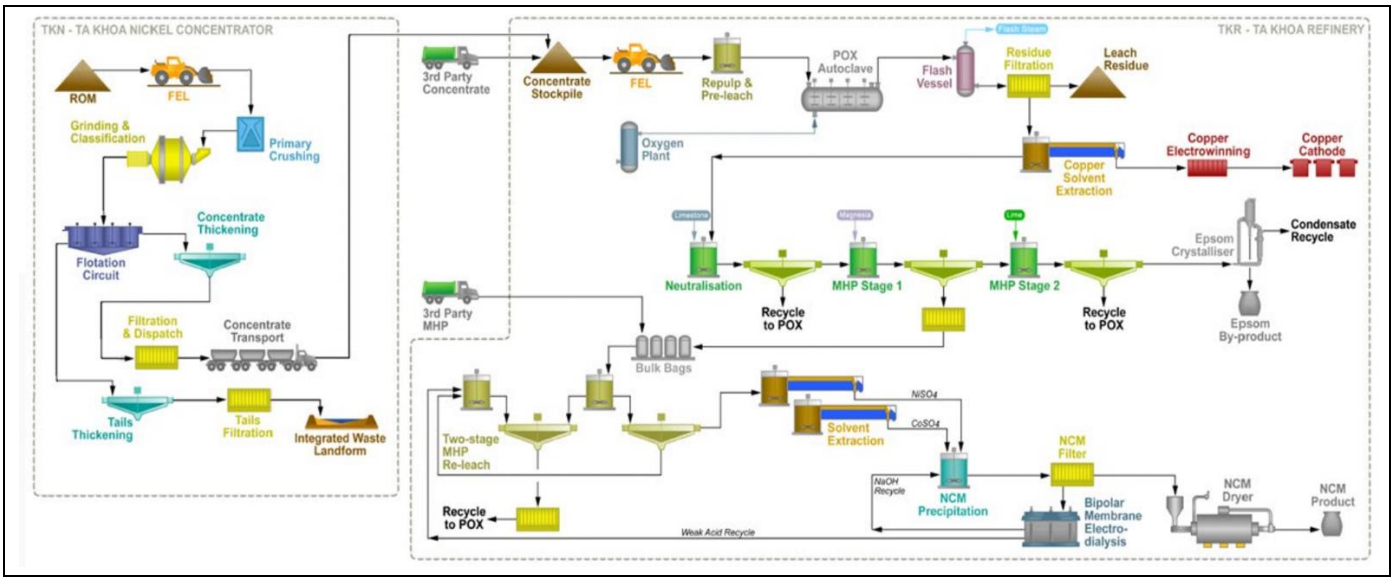
The processing plant will operate as follows (Figure 6).

- The flotation concentrate will arrive at the processing plant and be fed with sulphuric acid to an atmospheric pre-leach and Pressure Oxidation Leach (POX). This process will recover the cobalt, copper, and nickel.
- Following solid and liquid separation, the combined leach and wash liquor would be fed to a solvent extraction and electrowinning circuit (CuSX/EW) to recover copper as LME grade A copper cathode.
- The raffinate from the CuSX circuit (ie the liquid from which impurities have been removed by solvent extraction) would be neutralised with limestone forming a precipitate containing impurities that are recycled back into the process. Magnesia will be added to the neutralised liquor to precipitate the bulk of the nickel and other base metals as 'MHP1', that is, an initial mixed hydroxide precipitate. The barren liquid from MHP1 still contains some nickel, which will have then been recovered by raising the pH with hydrated lime. The precipitate, MHP2 is proposed to be recycled.

[2] Integrated Waste Landform, the places where mining waste will be stored.

- The MHP1 solids will be re-leached with sulphuric acid to give a concentrated nickel sulphate liquor with low levels of soluble impurities. T remove the remaining impurities; the leach liquor will be fed to a solvent extraction circuit (CoMgSX) that produces an aqueous raffinate containing nickel and sodium. The scrub liquor will thereafter be returned to the MHP1 unit, the cobalt strip liquor will be fed to an ion exchange column to remove impurities and the zinc strip liquor will be pumped to effluent treatment.
- The CoMgSX raffinate containing the nickel in solution will be combined with cobalt sulphate and manganese sulphate in a molar ratio of 8:1:1 (nickel:cobalt:manganese). In other words, 80% nickel, 10% copper and 10% manganese. This mixture will be fed to the NCM precipitation circuit along with aqueous ammonia and sodium hydroxide to raise the liquor pH.
- The precipitate will be separated and dried as the NCM 811 ternary precursor product – we will outline NCM 811 later in this report. The ammonia, sodium hydroxide and sulphuric acid will be removed from the barren liquor via BPED[3] for reuse and will be recycled back to the process.

Figure 6: The Ta Khoa Process Flowsheet



Source: Company

The refinery will produce three different byproducts: Copper cathode, magnesium sulphate in the form of epsomite and sodium sulphate. The first of these can be sold of the LME directly. The latter two need to be sold locally, but Blackstone has entered MOUs with local chemical companies/traders such as VineChem, PVChem and Nam Phong. These byproducts will be used to produce products such as fertiliser, detergents, construction materials and other chemical products.

Other infrastructure at the site

The project infrastructure will include multiple offices, water supply, accommodation for workers (which is planned to be expanded and refurbished to accommodate 500 people), as well as site access via road.

[3] Bipolar electrodialysis, where water can be efficiently split into H+ and OH- under a direct electrical field through a membrane. In this case the nickel goes with the OH- side.

Power supply will be provided from the Son La 220kV Hydroelectric Power Plant via the Phu Tho substation. Three major hydro power plants supply power to Phu Tho. A new 20km long 110kV line will be needed to connect the Phu Tho Substation to the Refinery. The battery limit for the power supply to the Project site would be the 110 kV terminal point of the HV switchyard. An 11kV point of supply, will be provided to the infrastructure areas.

The raw water intake will be obtained from the 1,000km-long Red River, which lies adjacent to the process plant. The water level can fluctuate between seasons and there can be floating debris in the wet season. Consequently, the water intake will be constructed using a steel rolled plate structure with duty/standby submersible pumps. The intake of water from the river will be fitted by cylindrical rolled screens prior to entry to the steel rolled plate structure to eliminate large particulates or debris. A walkway from the elevated riverbank to the top of the structure will allow maintenance and operations, even during periods of high water. Raw water extracted from the river will be settled in a duty/standby settling pond before it is gravitated to a settling pond. The ponds will allow for 15,00 sq m of storage capacity for refinery process water needs. The water will be treated using multi-media filtration. All drainage will be directed to a site water management system. Any water released back to the environment will be tested and treated and will only occur when excess water is present.

Over the 10-year refinery life, the average annual NCM Precursor production will be 85.6ktpa and the average annual refined nickel output will be 43.5ktpa.

The outcomes of the Ta Khoa operation

Over the 10-year refinery life, the average annual NCM Precursor production will be 85.6ktpa and the average annual refined nickel output will be 43.5ktpa (Figure 7).

Figure 7: Life-of-Operation Physicals

Metric	Unit	Base Case
Refinery Capacity	ktpa	400
Life of Refinery	Years	10
Concentrate Feed	Kt	3,894
Nickel in Concentrate Grade	%	11.5%
Cobalt in Concentrate Grade	%	0.3%
Copper in Concentrate Grade	%	1.1%
Metallurgical Recovery – Nickel into NCM Precursor Product	%	96.8%
Metallurgical Recovery – Cobalt into NCM Precursor Product	%	96.7%
Metallurgical Recovery – Copper into Copper Carthode	%	93.1%
NCM Precursor Production Breakdown:		
Nickel recovered in NCM Precursor Product	Kt	435
Cobalt recovered in NCM Precursor Product	Kt	11
Cobalt make-up Quantities	Kt	44
Manganese	Kt	51
Hydroxide	Kt	315
Total NCM Precursor Production	Ktpa	**856**
Average Annual NCM Precursor Production	Ktpa	**85.6**
Average Annual Refined Nickel Output	Ktpa	**43.5**

Source: Company, Pitt Street Research

Why Ta Khoa stacks up - its economics and ESG credentials

Even though nickel prices have fallen from the highs of 2 years ago, they are still some way above the PFS' AISC, let alone 2016 levels.

In this section we will explore Ta Khoa's economic and ESG credentials. We will address the end markets (nickel more broadly and NCM811) in the next section, although we will address a major elephant in the room very shortly – namely depressed nickel prices and if indeed the project still stacks up. As we will outline, even though prices have fallen from the highs of 2 years ago, those prices are still way above the PFS's anticipated All-in-Sustaining Cost (AISC), let alone 2016 levels that forced its previous owners to put the mine on care and maintenance for the last time before offloading it.

Ta Khoa's economics

The 2021 PFS generated compelling economics (Figures 8 & 9). These were headlined by a 67% IRR in the Base Case and 98% in the so-called Spot Case, that utilised commodity prices applicable at the time of the study.

Figure 8: Life-of-Operation Economics

Metric	Base Case (US$m)	"Spot" Case (US$m)
Revenue – Sale of NCM811 Precursor	14,032	16,739
NCM811 Precursor Price (avg realised, per t of NCM811)	16,397	19,559
C1 Cash costs[4] (per t NCM811) – see Figure 9	**11,125**	**11,209**
All-in Sustaining Costs (per t NCM811)	11,423	11,507
All-in Cost (per t NCM811)	11,997	12,081
Average Annual Operating Cash Flow	**451**	**715**
Operating Cash Flow (Total for Life of Mine)	4,512	7,146
Net Cash Flow (Pre-tax)	3,766	6,400
Net Cash Flow (Post-Tax)	3,646	6,199
Post-tax NPV (at an 8% discount rate)	**2,007**	**3,509**

Source: Company, Pitt Street Research

Figure 9: Project Operating Costs

Metric	US$m Life of Operations	US$/t NCM811 Precursor
Purchase of Nickel and Cobalt Concentrate (Net of Penalties)	6,043	7,062
Refining	3,590	4,195
Logistics	118	138
G&A	27	32
Residue Storage	18	22
By-Product Credit (Copper)	(276)	(323)
By-Product Credit (PGEs)	-	-
Operating Costs (C1 Cash Costs)	**9,521**	**11,125**

Source: Company, Pitt Street Research

[4] C1 costs comprise the cost of purchasing nickel and cobalt in concentrate, refining, product logistics, site G&A, including OHSE and residue storage less by-product credits.

Ta Khoa's capital costs

The project will need US$491m in capital to enter operation.

The project will need US$491m in capital to enter operation. This does not include sustaining capital and capex required for the site's closure, nor does it include pre-commitment costs prior to a Final Investment Decision. The PFS estimate was completed to an AACE (Association for the Advancement of Cost Engineering) Class 4 (plus or minus 25%) level of accuracy. As Figure 10 depicts, the biggest cost is for the 'Process Plant' and this includes the purchase of nickel and cobalt in concentrate. The estimation was drawn from assumptions of metal prices and that nickel concentrates typically trade at a discount to the underlying metal price of 65-80%.

Figure 10: Project Capital costs

Capital Cost Area (US$m)	Base Case	% of total
Process Plant	245	50%
Site Infrastructure	16	3%
Residue Storage	8	2%
Owners Direct	43	9%
Precommitment Costs	-	0%
EPCM	51	10%
Owners Costs	47	9%
Contingency	82	17%
Total Project Capital	**491**	**100%**
Sustaining Capital	143	
Closure	113	
Total Capital	**746**	

Source: Company, Pitt Street Research

Ta Khoa's ESG credentials

The project is expected to have low greenhouse gas emissions

The project is estimated to emit 9.8 kg for of CO2 equivalent per kilogram of pCAM, well behind Indonesia and Australia (Figure 11).

Figure 11: Forecasted Emissions

Unit	Kg CO2 eq. per kg NCM811
Open pit and underground mining	0.2
Concentrating of the ore	0.7
Transport of the concentrate	0.0
Importing third party concentrates	4.4
Extraction of nickel and cobalt to produce MHP	1.8
Refining of MHP into NCM81	2.8
Total	**9.8**

Source: Company, Pitt Street Research

Note: There are other contributing factors worth less than 0.05kg CO2 per kg, included in the overall result but not visualised in the graph.

The figures above are before accounting for the prospects of using hydro-powered electricity or using carbon offsets.

In September 2023, Blackstone signed an MOU with carbon capture company Arca Climate Technologies to explore the potential for carbon capture at Ta Khoa. Preliminary laboratory studies have shown that the Ta Khoa mine waste could capture 72kt of CO2 per year, nearly 20 times that of the Mt Keith nickel mine in WA.

It is important to note that some flows and processes were not accounted for including transport of consumables to the site and final product to the consumer, the impact of tailings, on-site water treatment, product packaging, emissions that are not CO2 and materials required for construction of the mine, concentrator expansion and refinery.

The nickel and NCM811 markets

Nickel is an important commodity

Nickel is extensively utilised due to its unique properties including the ability to withstand extreme temperatures and be recycled repeatedly.

Nickel is a metal that is distinguished by its ductility, malleability and resistance to corrosion. This metal is extensively utilised across various industries due to its unique properties, including the ability to withstand extreme temperatures, its magnetic characteristics at room temperature, and its ability to be reused again and again without a loss of quality. In fact, according to the nickel institute, over two thirds of nickel used in all consumer products today is recycled.

Nickel's primary use has been in the production of stainless steel, which has typically accounted for global nickel consumption. But in recent years, it has begun to be used in lithium-ion batteries. Since nickel batteries have nearly twice the energy density of other materials, batteries can increase the driving range of any car while having a smaller battery than would otherwise be the case. According to Adamas Intelligence, the amount of nickel in EV batteries was 25.3kg in 2023, a figure that had grown 8% in the preceding 12 months.

Why have nickel prices been depressed in 2023 and 2024?

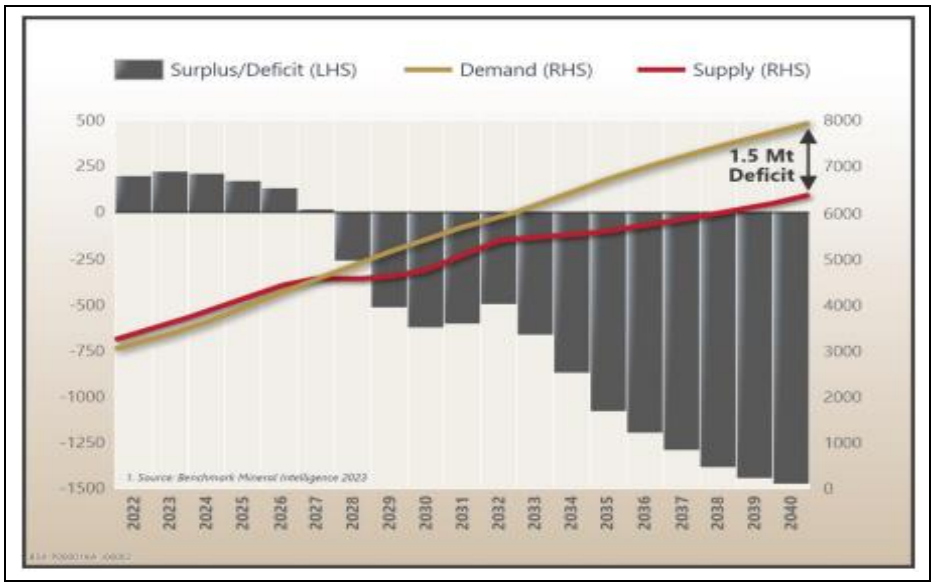
There's no hiding the fact that nickel prices have been depressed in the last couple of years, especially CY23. In early March 2022, nickel prices briefly reached over US$100,000 per tonne in one trading session. Prices retreated from these all-time highs but saw a rally in the December quarter of CY22, closing the year at US$30,000 per tonne. Nickel prices closed the following year (CY23) barely over half of that.

Why? Because there was an oversupply of nickel in the market as EV sales growth was weaker than had been anticipated. Also hurting matters was rapid growth from nickel producers in Indonesia, which has more than half the world's production. This has rocked the entire industry and everyone in it, with companies going into administration (most notably Panoramic Resources) or having to downsize and/or write down assets. IGO had to write off the entire A$1.3bn it paid for Western Areas, only 18 months prior.

The current downturn in the nickel market will not last forever, and indeed prices have begun to recover.

However, the current downturn in the nickel market will not last forever, and indeed prices have begun to recover, with prices just under US$19,000/t as of April 26, 2024. According to analysis from Benchmark Mineral Intelligence, 2023 was the peak surplus in the nickel market. From 2028, a deficit is expected to emerge and grow to 1.5Mt by 2040. At that point, the equivalent of 3 Ta Khoa Refineries will be required to meet the deficit (Figure 12). As we've noted before in this report, conservative pricing assumptions were used for the PFS, which still lie below the prices right now. As the supply surplus shifts a deficit, we think the bear market of CY23 will become a distant memory.

Figure 12: The nickel market deficit



Source: Company

It is also important to note that the broader nickel price includes *both* so-called Class 1 and Class 2 nickel. Class 1 has nickel content of at least 99.8% and Class 2 has content less than that. It is predominantly the latter that has been coming onto the market from Indonesia. But Class 1 nickel sulphide deposits like Ta Khoa are lower cost and higher margin versus Class 2 deposits.

NCM811

This is essentially Nickel-Cobalt-Manganese with an 8:1:1 ratio in the battery cathode. This is to say 80% nickel, 10% cobalt and 10% manganese. It serves as a key component in the fabrication of high-performance cathode because of its role in enhancing the energy density and overall performance of lithium-ion batteries. NCM batteries in general are just one type of batteries that can be used. Nickel-Cobalt-Aluminium (NCA) are one other example. But NCM811 are becoming increasingly popular given they can store more energy and reduce the overall weight of the end product.

NCM811 are becoming increasingly popular given they can store more energy and reduce the overall weight of the end product.

Both of these will result in more operating time and lower maintenance costs. As a consequence, by 2028, it is estimated that 50% of global demand for batteries will contain high nickel NCM cathodes.

Although NCM pricing is difficult to track individually, analysis from SMM (Shanghai Metals Market) that BSX conducted internally depicts that NCM typically trades at a 20-40% premium to metal prices. In studies conducted to date, it has applied a 20% premium. And so, the company used US$17,670/t of NCM811.

Vietnam – a burgeoning economy and a great place for Blackstone to do business

Vietnam is not one of the first countries many investors would imagine as a destination for an aspiring battery metals developer. The ASEAN country of 100 million would nonetheless be recognised as a country that has undergone significant economic growth and taken significant foreign investment inflows. The amount of Foreign Direct Investment increased from US$1.3bn in 2000 to US$15.8bn in 2020. As we will outline, this is because the country is an increasingly attractive place to do business, including for resources companies. There are over 20 active mines in the country, both among public companies and private companies.

There are three key reasons why Vietnam is an appealing place to be for Blackstone.

There are three key reasons why Vietnam is an appealing place to be for Blackstone. Namely, the country's place in the global EV market, the country's rapid adoption of renewable energy, and the ease of doing business.

Vietnam's place in the EV market

Vietnam has a major role to play in the growth of electric vehicles globally, and is a major hub in its own right. The Vietnamese Automobile Manufacturers Association (VAMA) forecasted last year that EV ownership would reach 1 million by 2028 and 3.5 million by 2040. The country is home to Vinfast, a company that began making EVs in 2021 and sells both at home and abroad. Indeed, it is building a manufacturing plant in North Carolina and is planning one in India.

The broader ASEAN region is seeing the fastest EV sales growth with 894% during the June quarter of CY23 alone according to Counterpoint Research. Much of this is being filled by Chinese companies, which find it easier to export to these countries given they are closer geographically and have less trade tensions with China.

Renewable energy hub

For a developing country, Vietnam has substantial exposure to renewable energy. According to the US Trade Office, Vietnam's national grid is 30% hydro and 24% solar. This is important not just for Blackstone, so the project can have such low greenhouse gas emissions, but also for the broader market, so that the power used in electric vehicles can be renewable. Many electric vehicles may appear to be environmentally friendly just because they do not use petroleum, but they may use electricity derived from other non-renewable sources, such as burning coal. Indeed, a non-renewable power source can account for over 25% of greenhouse gases in a typical EV.

Ease of doing business

The country is also an attractive economic hub generally with lower labour and electricity prices compared to China, and a greater ease of doing business. It is ranked 70th by the World Bank, just ahead of Indonesia, and well ahead of Brazil (124). The country's GDP per capita increased 3.6 times between 2002 and 2023 and its foreign direct investment is up over 6,000% since 2010.

Valuation and catalysts

We value Blackstone at A$0.22 per share in a base case scenario and A$0.28 per share in an optimistic (or bull) case scenario.

We value Blackstone at $0.22 per share in a base case scenario and $0.28 per share in an optimistic (or bull) case scenario, using a Discounted Cash Flow method assuming Ta Khoa enters production and has the 10-year mine life that the PFS promised. Our assumptions on Ta Khoa's operating metrics and costs are outlined in Figures 13 and 14, and we will elaborate on the most important ones on the next page.

The figures of $0.22-$0.28 per share may appear to undervalue the company given it has a project with an NPV of US$2bn, but it is important to note from the outset that we have assumed significant equity dilution to bring the project into production. There are many factors influencing our valuation, but the company's shares on issue are undoubtedly the most influential on the final price per share, so we will address this first.

Capex funding and capital structure

We assume that by FY27, the company has nearly 14bn shares on issue. This is derived from assuming:

- US$854m in pre-production capital, consisting of US$363m at TKNP (the upstream mining component) and US$491m at TKR (The downstream processing component), which derives a figure of A$1.293bn for pre-production capex in Australian dollars at an exchange rate of A$1=US$0.66.
- The company opts to fund 50% of this amount with debt and 50% with equity with equity is raised at 4.8c per share.
- We have assumed sustaining capex as well, but once Ta Khoa is in production, it will only be a matter of months before the company can self-fund this through free cash flows.
-

Operating assumptions and costs

Following our assumption for the number of shares on issue, the next most important variables (Figures 13 and 14) are:

– **NCM811 Precursor pricing.** It is difficult to track this price because it does not trade openly on any commodities exchange in the way the spot price of nickel does. However, we have assumed a price of US$17,696.51 per tonne for the first operating year, which is derived from A$26,812.90 per tonne using A$1=US$0.66. Assuming 53kt of production in the first year, this derives the approximate amount of revenue that Blackstone assumed in its PFS. In our optimistic case scenario, we have assumed an extraction rate of 100% consistently and a gold recovery rate of 95%, resulting in 960kt ores mined and processed.

– **Production of NCM811 Precursor.** We assume 53kt in NCM Precursor production in the first operating year (CY26), which would represent just a ramp up of 62% from 85.6kt. We assume production of over 90ktfor 4 years before slowly declining back to 53kt in the final year.

– **Costs of production.** We have assumed costs (excluding depreciation) in line with the PFS as in Figure 10, moving in line with production and increasing slightly for inflation over the life of our model. The company's operating margin is consistently between 35% and 40% over the Life of Mine. Depreciation of the project is spread equally across the life of the project.

- **Corporate tax.** We use a 20% corporate tax rate according to the legislated rate in Vietnam. Royalties are counted as part of operating costs.
- **Discount rate.** We arrive at a WACC of 10.9%, reflecting a 17.8% cost of equity, a 5.0% cost of debt and an equal proportion of debt and equity for funding pre-production capex. The 17.8% cost of equity reflects a risk-free rate of return of 4.3% (the level of the Australian 10 year government bond), a 9% equity premium and a 1.5x beta.

Figure 13: Ta Khoa operation assumptions

KEY METRICES - Ta Khoa Integrated Project PFS		
Metrics	**Units**	**Value**
Physicals		
Life of Mine	Years	10.3
Ore Mined	'000 t	64,527.0
Strip Ratio	Waste:Ore (t:t)	2.9
Processed Tonnes	'000 t	64,527.0
Nickel Grade	%	0.41%
Nickel Recovery	%	57.0%
Total Mined	'000 t	150.5
Avg Annual Nickel Recovered in Concentrat	'000 t	14.6
Concentrate Produced	'000 t	1,884.0
Nickel in Concentrate Grad	%	8.0%
Processing Plant Capacity	'000 t per annum	400.0
Concentrate Feed	'000 t	4,026.0
Nickel in Concentrate	%	11.9%
Cobalt in Concentrate	%	0.34%
Cu in Concentrate	%	0.81%
Metallurgical Recovery - Ni into NCM	%	96.8%
Metallurgical Recovery - Co into NCM	%	96.7%
Metallurgical Recovery - Cu into NCM	%	93.1%
Nickel recovered in NCM Precursor Product	'000 t	462.0
Cobalt recovered in NCM Precursor Product	'000 t	13.0
Cobalt make-up Quantities	'000 t	45.0
Manganese	'000 t	54.0
Hydroxide	'000 t	335.0
Total NCM811 Precursor Production	'000 t	909.0
Average Annual NCM811 Precursor Production	'000 t	88.0
Average Annual Refined Nickel Output	'000 t	44.7

Source: Company

Figure 14: Ta Khoa operating costs

KEY METRICES - Ta Khoa Integrated Project PFS		
Metrics	**Units**	**Value**
Operating Cost Summary (per tonne of NCM811)		
Mining	US$/t	566.0
Processing	US$/t	698.0
Land Waste Reform	US$/t	113.0
G&A - Integrated	US$/t	91.0
Royalties	US$/t	213.0
Purchase of Concentrate	US$/t	5,734.0
Refining	US$/t	4,321.0
Logistics	US$/t	125.0
Residue Storage	US$/t	21.0
By Product Credit	US$/t	(267.0)
Sustaining Capital	US$/t	503.0
Closure	US$m	122.0
TKNP Pre-production Capital	US$m	363.0
TKR Pre-production Capital	US$m	491.0
Total Ta Khoa Pre-production Capital	US$m	**854.0**
Total Ta Khoa Pre-production Capital	A$m	**1,293.9**
Proportion of pre-production capex raised by debt	%	50%
Proportion of pre-production capex raised by equity	%	50%
Price capital raised at	A$	0.048
Tax rate - Vietnam		20%

Source: Company

The only substantial difference between our base and bull cases is that our base case assumes 2% growth in the NCM811 precursor price while our bull case assumes 3.5%. Given our opex assumptions remain the same on a per tonne basis, this means a higher operating margin – ranging from 40-45% over the life of our model.

Figure 15 shows our valuation summary for Blackstone Minerals. Our valuation in USD is $2.0bn and our bull case is US$2.6bn. We have not assumed any terminal growth beyond the life of the project.

Figure 15: Our DCF calculation for Blackstone Minerals

Valuation (A$m)	Base Case	Bull case
Present Value of FCF	3,084.2	3,962.3
Present Value of Terminal Value	0	0
Enterprise Value (A$ m)	**3,084.2**	**3,962.3**
Net (debt) cash	(23.1)	(23.1)
Provisions	1.2	1.2
Equity value (A$ m)	**3,062.2**	**3,940.5**
Share outstanding (Diluted)	13,993.2	12,993.2
Implied price (A$ cents)	**0.219**	**0.282**
Current price (A$ cents)	0.053	0.053
Upside (%)	312.9%	431.3%

Estimates: Pitt Street Research

We foresee the stock being re-rated to our valuation range driven by the following factors:

- The completion of a Definitive Feasibility Study (DFS), which will further highlight the promise of Ta Khoa,
- Strategic Partnerships with parties for concentrate feed, offtake and by-product opportunities,
- The pursuit and securing of financing for the project, and
- A recovery in nickel prices.

Risks

We see the following key risks to our investment thesis:

- **Funding risk**: A critical factor for the success of the project is the completion of project financing in a timely manner. The project is in the financing stage and requires debt and equity capital for commencement of construction. Without funding, the project is not getting off the ground.
- **Project delays**: We have assumed that the company will commence its production in 2027. If there are further delays due to funding, operational challenges or regulatory hurdles, the project timelines will be pushed back, which will affect the cash flows and economics of the project, as well as investor confidence in the company.
- **Underlying commodity risk**: BSX is exposed to commodity price risk, which depends on macroeconomic factors and demand and supply dynamics of the underlying commodity. Although nickel prices appear to have bottomed, a prolonged downturn for the worse could potentially impact the project's economics, and thereby the ability to secure finance.
- **NCM811 pricing risk**: A key assumption is that NCM811 will attract a premium to metal prices, reflecting additional costs, logistics and technology required to upgrade. If it cannot attack a premium, the NPV of the project plunges, even when leaving the nickel price unchanged. The ~$2bn NPV was based on a 20% premium. A 10% premium slashes this to $1.34bn and no premium slashes it to $680m.
- **Geological risk**: The reserves and resources figures for the project are estimates. There could be a downside risk if a portion of reserves is re-categorised as resources at a later stage. There could also be a downside risk if the company cannot increase its Resource through future exploration work.
- **Key personnel risk**: One of the reasons to invest in the company is its leadership team. There is the risk that key personnel could depart and the company may be unable to replace them and/or their contribution to the business.
- **Sovereign risk**: Although Vietnam has less sovereign risk than other countries, it isn't as proven as other nations for resources developers to the extent jurisdictions like Canada and Australia are. Sudden changes to local laws could impact the company and its investors' confidence.

Blackstone's leadership team

The company's current board and leadership composition is as follows (Figure 16):

Figure 16: BSX's leadership composition

Board of Directors	
Name and Designation	**Profile**
Hamish Halliday Non-Executive Chairman	Mr Halliday is a geologist with over 20 years corporate and technical experience, founder of Adamus Resources Limited, a A$3M float which became a multi-million ounce emerging gold producer. He holds a Bachelor of Science in Geology and is a Member of the Australasian Institute of Mining and Metallurgy Source.
Scott Williamson Managing Director	Mr Williamson is Mining Engineer who brings over 20 years experience in technical and corporate roles in the mining sector and equity capital markets. He holds a double degree in Engineering and Commerce and is a Member of the Australasian Institute of Mining and Metallurgy Source.
Frank Bierlein Non-Executive Director	Dr Bierlein is Geologist with 30 years of technical and corporate experience, focusing on grass roots to mine-stage mineral exploration, target generation, project management and oversight, due diligence studies, mineral prospectivity analysis, metallogenic framework studies, and mineral resources market & investment analysis. Dr Bierlein holds a PhD in Geology from the University of Melbourne and is a Fellow of the Australian Institute of Geoscientists (AIG), a Member of the Society of Economic Geologists (SEG) and the Society of Geology Applied to Mineral Deposits.
Alison Gaines Non-Executive Director	Ms Gaines has over 20 years of experience as a director in Australia and internationally. She has experience in the roles of Board Chair and board committee chair, particularly remuneration and nomination and governance committees. Ms Gaines is the Managing Director of Gaines Advisory P/L and was recently global CEO of international search and board consulting firm Gerard Daniels, with a significant mining and energy practice. She has a Bachelor of Laws and a Bachelor of Arts (hons) from the University of Western Australia, a Graduate Diploma Legal Practice from Australian National University and is an Honorary Doctorate of the University and Master of Arts (Public Policy) from Murdoch University. She is a Fellow of the Australian Institute of Company Directors and holds the INSEAD Certificate in Corporate Governance.

Daniel Lougher Non-Executive Director	Mr Lougher's career spans more than 40 years involving a range of exploration, feasibility, development, operations, and corporate roles with Australian and international mining companies including a period of eighteen years spent in Africa with BHP Billiton, Impala Plats, Anglo American and Genmin. He was the Managing Director and Chief Executive Officer of the successful Australian nickel miner, Western Areas until its takeover by IGO. Mr Lougher holds a Bachelor of Science (Honours) of Mining Geology, a Graduate Diploma in Engineering (Mining) and a Master of Science (Engineering). Dan also holds a First Class Mine Manager's Certificate of Competency (WA) and is a Fellow of the Australasian Institute of Mining and Metallurgy (AusIMM). He is the Chair of the Company's Technical Committee and Nomination Committee.

Source: Company

Comparable companies

Australian Mines (ASX:AUZ) has three green metal projects, with the most advanced being the Sconi project in northern Queensland, prospective for cobalt, nickel and scandium. It has an NPV of $817m post-tax and an IRR of 15%. The project has a 30-year project life and over that time will deliver a total of $13.3bn in revenue and $4.98bn in net cash flow, from 46,800 tpa of nickel sulphate and 7,000tpa of cobalt sulphate. The project will include include a 2mtpa ore processing plant and is expected to be commissioned in 2028.

Ardea Resources (ASX:ARL) has the Kalgoorlie nickel project, named after the town it lies 70km northwest of. With a 6.1Mt Nickel and 386kt cobalt resource, it is in the top 10 global nickel resources. In late April 2024, Adrea entered into a binding Cooperation Agreement with Sumitomo Metal Mining and Mitsubishi to form a 50-50 Joint Venture to develop the project.

Chalice Mining (ASX:CHN) discovered the Gonneville project in 2020 which has a resource of 560Mt @ 0.54% nickel or ~1.7g/t palladium equivalent. 55% of this is Measured and Indicated wit the balance inferred. This equates to 16Moz of 3E (Palladium, Platinum and Gold combined), 860kt nickel, 520kt of copper and 83kt of cobalt. This is equivalent to 3Mt of nickel equivalent. An FID will be made in 2026 and first production may not occur until 2029. A 2023 scoping study estimated an A$2.8bn NPV under a 15Mtpa scenario with A$4.2bn NPV under a 30Mptpa scenario, both using a 6.5% discount rate and delivering a 26% IRR. The company has claimed that Gonneville metals could enable the annual manufacturing of ~330,000 battery electric vehicles, ~1.8m Plug-in Hybrid Vehicles or ~900,000 Fuel Cell Electric Vehicles (FCEVs)[5][6].

Alliance Nickel (ASX:AXN) has the NiWest Nickel Cobalt Project, which is near Leonora in WA and close to Glencore's Murrin Murrin operation, which is the largest nickel-cobalt operation in Australia. NiWest has a resource of 93Mt @ 1.04% nickel and 0.07% cobalt for 971,000t nickel and 65,000t of cobalt, 83% of which is in the Measured and Indicated Category. The company is targeting annual production of ~90,000t nickel sulphate (20kt of nickel metal) and ~7,000t cobalt sulphate over the first 15 years. Big 3 US automaker Stellantis is a strategic offtake partner with and cornerstone investor in the company.

Widgie Nickel (ASX:WIN) has the Mt Edwards Nickel Project in Western Australia. It has consists of 12 separate nickel sulphide deposits with a combined Mineral Resource Estimate of 13.16Mt @ 1.45% for 190,300t nickel. It lies close to several battery metals projets including the Mt Marion Operation owned by a Joint-Venture of Mineral Resources (ASX:MIN) and Jiangxi Gangfeng. A Scoping Study has predicted $402m in Free Cash Flow, $1.65bn in Net Revenue, an NPV of $197.4m and an IRR of 22.9%.

[5] Slide 6 of Chalice's Scoping Study Presentation from August 2023.
[6] This presumes 30Mtpa production and the entirety goes to that specific vehicle type as well as the assumption that the average nickel content is 45kg.

Glossary

All in Sustaining Costs (AISC) – These costs include adjusted operating costs and sustaining capital expenditure, corporate general and administrative expenses, and exploration expenses reflecting the full cost of production from current operations.

C1 costs – Includes direct costs, which involve costs incurred in mining and processing (labour, power, reagents, materials) plus local general and administrative expenses, freight, and realisation, and selling costs. Any by-product revenue is credited against costs at this stage.

Cathode – The oxidising electrode in a battery that acquires electrons from the external circuit and reduces them during the electrochemical reaction.

Cathode active material (CAM) - the key raw material that drives performance and cost of a battery.

Cyanidation – A process through which metals are extracted from their ores by dissolution in a solution of sodium or potassium cyanide.

Disseminated Sulphide (DSS) – Where sulphide minerals are dispersed or scattered throughout the host rock rather than being densely concentrated as is the case with so-called 'massive' sulphides.

Electrowinning – An electrolytic process (that is to say, a process based on the principles of electrolysis) through which metals are recovered.

Grade – The amount of metal in each tonne of ore, usually expressed as a percentage.

Internal Rate of Return (IRR) – IRR is the expected compound annual rate of return that is likely to be earned on a project or investment. It is the discount rate that makes the NPV of a project = 0.

Malleability – The ability of something, in this case a metal, that can be shaped into something else without breaking under pressure.

Neutralised – In general terms, it is the reaction between an acid and a base (i.e. a metal oxide or metal hydroxide).

Open Pit – A mine where the minerals are mined entirely from the surface.

Precursor Cathode Active Material (pCAM) –the foundation for cathode active material (CAM), which is used in the production of cathodes for lithium-ion batteries.

Pressure Oxidation (POX) - a process used to extract gold, copper, zinc, molybdenum, and uranium from refractory ore bodies.

Raffinate – A liquid product that remains after soluble components have been extracted – in this instance metals extracted.

Sulphate – A term used to describe a chemical compound related to sulphuric acid.

Massive Sulphide Vein (MSV) – Deposits where a high proportion of the material (typically over 90%) consists of sulphide minerals. They are not sparsely scattered throughout the host rock.

Mineral Resources (JORC Code) – A concentration or occurrence of solid material of economic interest in or on the earth's crust in such a form, grade/quality, and quantity that are reasonable for eventual economic extraction. Mineral Resources are subdivided, in order of increasing geological confidence, into Inferred, Indicated and Measured categories.

NCM811 - This is essentially Nickel-Cobalt-Manganese with an 8:1:1 ratio in the battery cathode. This is to say 80% nickel, 10% cobalt and 10% manganese.

Net Present Value (NPV) – It is a technique used in capital budgeting and investment planning to analyse the feasibility of a projected investment or project. It is the difference between the present value of cash inflows and the present value of cash outflows over a period of time.

Offtake agreement – An arrangement between a producer and buyer to buy and sell portions of the producer's future goods. It is normally negotiated before the construction of a factory or facility to secure a market and revenue stream for its future output.

Open at depth – A term applied to a deposit where drilling is progressing, mineralisation has been found, but it is not known where the mineralisation 'ends'.

Open Pit – A mine where the minerals are mined entirely from the surface.

Stripping Ratio – A strip ratio, or stripping ratio, is an important measurement related to the open-pit mining process. It represents the amount of waste material (also known as overburden) that must be moved in order to extract a given quantity of ore.

Appendix I – Blackstone's other projects

Blackstone has the Gold Bridge project in Canada. It has also secured an option agreement to acquire 100% of the Wabowden nickel project in Manitoba, Canada. The company also has exposure to Canada through its investments in Corazon (ASX:CZN) and Flying Nickel (TSX:FLYN) which will be covered in the next appendix.

Gold Bridge

Blackstone acquired the project in late 2017. Formerly called the 'Little Gem' Project, the project lies 180km north of Vancouver in British Columbia, Canada. Prior to the acquisition of Ta Khoa, this was Blackstone's focus and it undertook extensive exploration during the 2018 and 2019 field seasons. Results in the former year included grades up to 2.3% cobalt, 32 g/t gold, 1.6% copper and 1.1% nickel. Blackstone is seeking joint venture partners for the project.

Wabowden

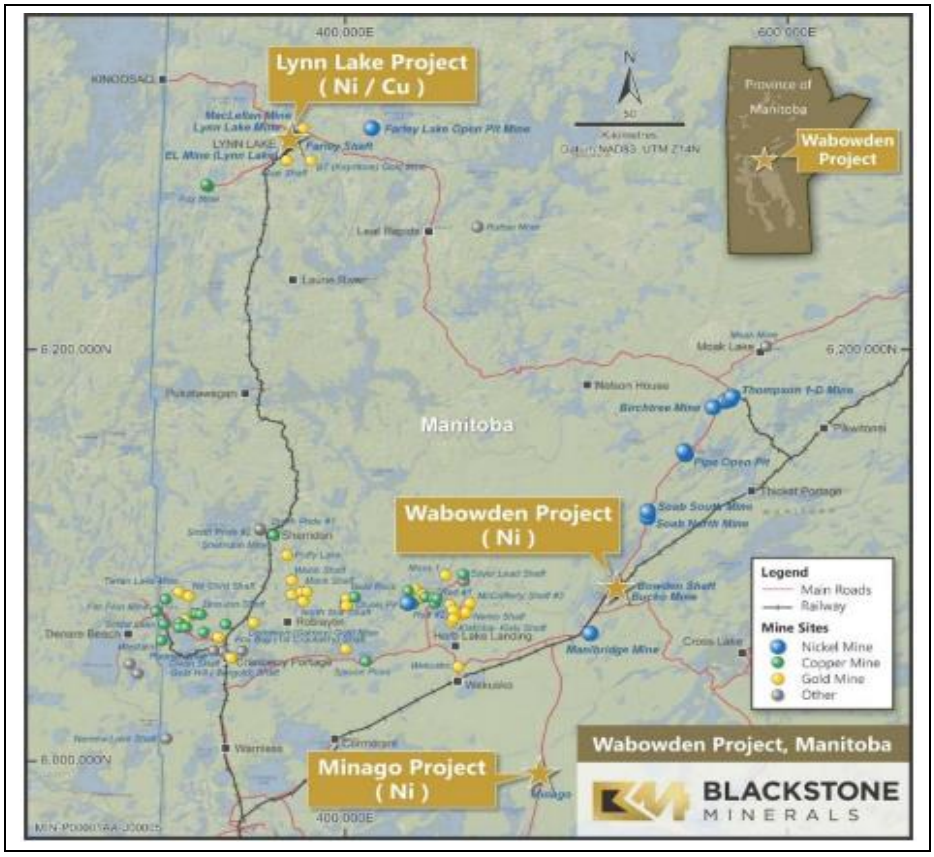
In December last year, Blackstone entered into an option agreement with CaNickel Mining (TSX.V:CML) where Blackstone was provided with a 12-month period and exclusive right to acquire this project, which lies in Canada's Manitoba province (Figure 17). The period provides Blackstone time to further consider the project, options for development and funding to achieve development. Blackstone paid C$1.1m upon entering of the agreement and is liable to pay:

- C$20m (less the C$1.1m payment) in cash and C$10m in shares upon closing of the eventual acquisition,
- Another C$10m in cash 18 months thereafter,
- C$15m payable upon Wabowden achieving fully permitted status, and
- C$25m upon Wabowden entering commercial production.

Wabowden is located in the Thompson Nickel Belt, which is the fifth largest nickel sulphide camp in the world. It is named after the town it is situated

around and lies 650km north of provincial capital Winnipeg. Across all five deposits, the project has a resource base of 230Mt at 0.56% nickel for 1.3Mt of contained nickel. Production occurred between 2009 and 2012, but was put in care and maintenance at that time, and minimal exploration has occurred since then.

Figure 17: Wabowden's location in Manitoba



Source: Company

Blackstone believes Wabowden could be re-developed as a large-scale, low cost, bulk mining operation underpinned by two of the deposits (Bowden and Buck) given their extensive strike and width. There are a number of ways Blackstone could proceed with Wabowden:

1. It could potentially help to fill the Ta Khoa Refinery, removing dependence on third-party feed sources.

2. It could also be a standalone operation, generating high-quality nickel concentrate for the conventional LME market or potentially to serve US gigafactory and vehicle manufacturing hubs directly,

3. Become a central hub and key platform to consolidate its investments in the Manitoba province, building its existing investments, with potential to deliver 30+ years of nickel supply.

In any case, the company is well positioned with supportive government policies (i.e. the Canadian Critical Minerals Infrastructure Fund and the Manitoba Critical Minerals Strategy), the project connected to the Manitoba hydropower network which provides low-cost green energy, and a straightforward re-permitting underway.

Appendix II – Blackstone's investments

Corazon's Lynn Lake Project

In early March 2022, Blackstone made a strategic investment in Corazon Mining, a $2m investment to earn a 14% stake in the company, which has the Lynn Lake Project (see Figure 14).

Lynn Lake is 100% owned by Corazon and is an underground mine that is development ready. It has a Resource of 27.7Mt @ 0.62% nickel for 168kt. Since this deal, exploration has continued, and the current phase of studies will be completed in the September quarter of CY24. Afterwards, a fully optimised and scheduled mine plan will be generated for assessment.

Flying Nickel's Minago project.

4 months prior to the Corazon deal, Blackstone invested C$2.98m in Flying Nickel, then a subsidiary of Vancouver-based Silver Elephant Mining Corp (TSX:ELEF) but now listed in its own right on the TSX Ventures Exchange. Blackstone invested C$2.98m upfront, which earnt it a 6.85% stake in the company. Minago has a NI 43-101 compliant Measured and Indicated Resource of 44.23Mt at 0.75$ nickel for 721.6m pounds of nickel (or 327,312t), and an inferred resource of 19.55Mt at 0.74% nickel for 318.9m pounds of nickel (144,651t)[7]. Flying Nickel believes Minago is one of Canada's largest undeveloped sulphide nickel deposits. It too could supply feed for the Ta Khoa refinery.

[7] https://www.flynickel.com/projects/minago-nickel/

Appendix III – Capital Structure

Class	In millions	% of diluted
Ordinary Shares	524.17	99.0%
Options	5.31	1.0%
Fully diluted shares	**529.48**	

Source: Company

Appendix IV – Blackstone's Shareholder Register

Shareholders	Ownership
Nanija Civetta	15%
Deutsche Balaton	14%
Fidelity	5%
Board and Management	5%
EcoPro	5%
Probus	5%
Minority Shareholders	51%
Total shareholders	**100%**

Source: Company

Appendix V – Analysts' Qualifications

Stuart Roberts, lead analyst on this report, has been an equities analyst since 2002.

- Stuart obtained a Master of Applied Finance and Investment from the Securities Institute of Australia in 2002. Previously, from the Securities Institute of Australia, he obtained a Certificate of Financial Markets (1994) and a Graduate Diploma in Finance and Investment (1999).
- Stuart joined Southern Cross Equities as an equities analyst in April 2001. From February 2002 to July 2013, his research speciality at Southern Cross Equities and its acquirer, Bell Potter Securities, was Healthcare and Biotechnology. During this time, he covered a variety of established healthcare companies, such as CSL, Cochlear and Resmed, as well as numerous emerging companies. Stuart was a Healthcare and Biotechnology analyst at Baillieu Holst from October 2013 to January 2015.
- After 15 months over 2015–2016 doing Investor Relations for two ASX-listed cancer drug developers, Stuart founded NDF Research in May 2016 to provide issuer-sponsored equity research on ASX-listed Life Sciences companies.
- In July 2016, with Marc Kennis, Stuart co-founded Pitt Street Research Pty Ltd, which provides issuer-sponsored research on ASX-listed companies across the entire market, including Life Sciences companies.
- Since 2018, Stuart has led Pitt Street Research's Resources Sector franchise, spearheading research on both mining and energy companies.

Nick Sundich is an equities research analyst at Pitt Street Research.

- Nick obtained a Bachelor of Commerce/Bachelor of Arts from the University of Sydney in 2018. He has also completed the CFA Investment Foundations program.
- He joined Pitt Street Research in January 2022. Previously he worked for over three years as a financial journalist at Stockhead.
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