PITT STREET RESEARCH

Blackstone Minerals

A DFS is coming before the end of CY24

Share Price: A$0.040

ASX: BSX

Sector: Resources

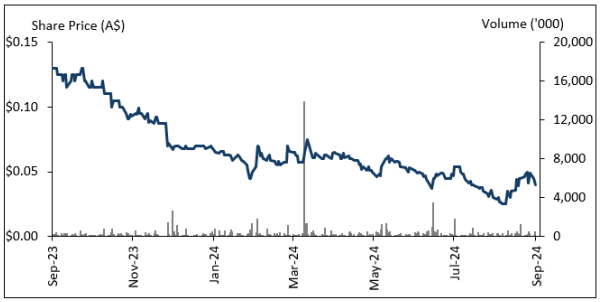
11 September 2024

Blackstone Minerals (ASX:BSX) owns 90% of the Ta Khoa project in northern Vietnam. The project consists of a nickel-copper-PGE project, along with a 400ktpa Concentrator and a site where the company plans to build an 8Mtpa Plant Site. The company will produce NCM811 (Nickel-Cobalt-Manganese with an 8:1:1 ratio in the battery cathode) that will be useful for lithium-ion batteries by enhancing their energy density and overall performance. The project has strong ESG credentials, low operating costs and is in one of the world's most under-rated destinations for resources developers.

Market cap. (A$ m)	21.0
# shares outstanding (m)	524.2
# shares fully diluted (m)	529.5
Market cap ful. dil. (A$ m)	21.2
Free float	100%
52-week high/low (A$)	0.130 / 0.025
Avg. 12M daily volume ('1000)	378.8
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

BSX is pushing ahead with Ta Khoa

The next catalyst for the company will be the release of a Definitive Feasibility Study (DFS) for the project, which is anticipated by the end of CY24. Investors could be forgiven for pessimism that it could match the US$2bn NPV and 67% IRR that was found in the 2021 Preliminary Feasibility Study (PFS) considering the state of the nickel market. But many investors forget that the PFS assumed far more conservative prices than the record highs of 2021-22 that drove momentum in many nickel stocks. Moreover, Ta Khoa is a low-cost project with a product that will attract a premium over ordinary nickel sulphide in any market conditions.

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 reiterate our valuation of Blackstone as outlined in our initiation report - at A$0.22 per share in our base case scenario and A$0.28 per share in our optimistic (or bull case) scenario. This assumes significant dilution for the purpose of funding construction for the project - 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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A recap of Ta Khoa and NCM811

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

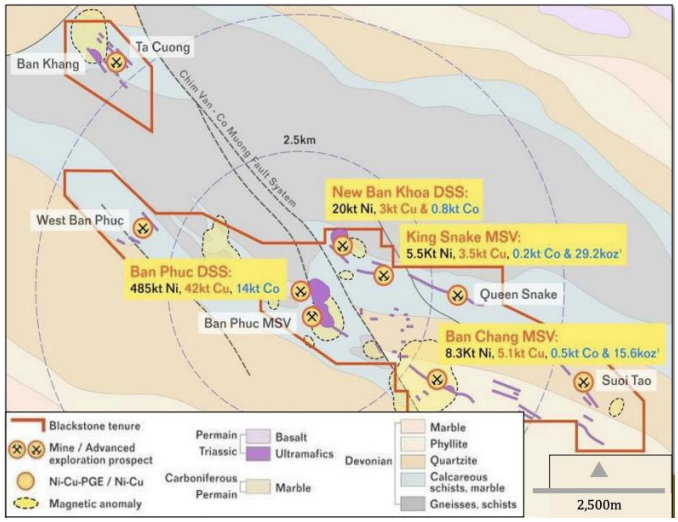
Blackstone's Ta Khoa Project is 180km west of downtown Hanoi and 55km from Son La, the provincial capital (Figure 1). Vietnam is an advantageous jurisdiction for a battery metals developer like Blackstone for several reasons including foreign investment flows, its growing reliance on renewable energy, ease of doing business and position in the EV market as a consumer in its own right, but also being located strategically close to other important EV markets such as fellow ASEAN nations, as well as China.

Ta Khoa consists of four deposits, the main one being Ban Phuc which is a DSS (Disseminated Sulphide) deposit where the sulphide minerals are dispersed or scattered throughout the host rock (Figure 2).

Figure 1: Ta Khoa's location

Source: Company

Figure 2: The Ta Khoa deposit



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 3).

Figure 3: 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

Results of the 2021 PFS

A Preliminary Feasibility Study (PFS) was completed in 2021, assuming a future model of an operating mine as well as a plant for processing and refining the commodities into NCM811. The study generated a post-tax NPV of $2bn and IRR of 67% in a so-called 'base case'. The study also examined a scenario where prices remained at their then highs and a post-tax NPV of $3.5bn and IRR of 98% were generated (Figure 4). The average annual NCM Precursor production is anticipated to be 85.6ktpa and the average annual refined nickel output will be 43.5ktpa.

Figure 4: Results of the 2021 PFS for Ta Khoa

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[1] (per t NCM811)	**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

The project is estimated to emit 9.8 kg of CO2 equivalent per kilogram of pCAM, well behind Indonesia and Australia, before accounting for the prospects of using hydro-powered electricity or using carbon offsets. 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.

All about NCM811

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

[1] 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.

But does Ta Khoa still stand up?

Investor sentiment towards nickel developers like Blackstone has been negative in the last 18 months. Like many other battery metals, prices have substantially retreated due to concerns of an oversupply in battery metals, given slowing EV sales. The nickel market has been particularly impacted, due to rapid growth from nickel producers in Indonesia, specifically of cheap low-grade nickel pig iron. After briefly surpassing US$100,000/t in the March quarter of CY22, the nickel price was US$16,375 at the end of CY23.

The first few months of CY24 saw a resurgence which led to optimism among investors, prices nearly reached US$22,000 in early-May. But this revival was not maintained and prices retreated to levels witnessed at the start of the year. A huge blow to the entire sector came in July when BHP suspended operations at its Nickel West operation and West Musgrave project. This was a clear sign of non-confidence in the nickel market, and BHP did not shy away from that fact. Despite BHP saying this was temporary, the decision will only be reviewed in early 2027, and the company cited consensus that nickel prices would be lower over the next half-decade. Certain steps taken by governments, like the Biden administration's Clean Energy Financing Program and royalty relief in Western Australia, have done little to inspire confidence and may even be contributing to the program by enabling more supply to come onto the market.

Here's why it does

In our view, investors aren't considering the crucial traits that distinguish this company from its peers. While accepting the 'Spot Case' in the PFS is unrealistic, we think the 'Base Case' isn't. Prices are not too far off what the Base Case considered, and the project still attracted an IRR of over 60%. Arguably, investors fear the upcoming DFS (due by the end of this year) will be less inspiring. But we would remind investors of the following facts:

1. **NCM811 is a premium product**. We are not talking about pig iron from Indonesia that has caused the over-supply in the market and needs to be further processed to be suitable for use in batteries. NCM811 Precursor is a refined product
2. **The Low-cost of the project ensure high margins**. Putting the company's capital requirements to the side, the All-In Sustaining Cost (AISC) is US$11,997/t over the Life-of-Operations. At the forecast price used in the Base Study US$16,397, this represents a 37% margin.
3. **BSX has always been realistic with its pricing assumptions.** When nickel prices hit over US$100,000 per tonne, the company did not update its assumptions, although it may have led some investors to believe prices would remain at those levels for several years. But BSX and the consultants that built the PFS used realistic assumptions, predicting modest growth over the rest of the 2020s (Figure 5). By 2030, the study assumes nickel metal prices are US$18,800. This is 18% higher than the estimated CY24 price, which is actually slightly lower than the current (August 2024) spot price), but it represents a measly CAGR of just 2.7%. The NCM811 Precursor price is an even lower 2.1% CAGR. Yet we have seen even in the first half of CY24 that prices can be far more volatile in a shorter space of time.

Figure 5: Results of the 2021 PFS for Ta Khoa

Item	Nickel Metal Forecast	Cobalt Metal Forecast	Manganese Metal Forecast	NCM 811 Price Based on NCM inputs	NCM Price Premium	NCM Price Forecast	NCM81 Precursor Spot Price
Source:	BMI[2]	BMI	SMM[3]		BSX[4]	A*(1+b)[5]	SMM
CY2024	16,000	58,387	2,696	12,020	20%	14,425	**19,559**
CY2025	16,400	67,145	2,696	12,783	20%	15,339	**19,559**
CY2026	17,300	72,011	2,696	13,551	20%	16,261	**19,559**
CY2027	17,800	75,904	2,696	14,053	20%	16,864	**19,559**
CY2028	18,300	77,850	2,696	14,432	20%	17,318	**19,559**
CY2029	18,500	75,033	2,696	14,354	20%	17,224	**19,559**
CY2030	18,800	61,227	2,696	13,625	20%	16,350	**19,559**
Long-term	**18,800**	**58,577**	**2,696**	**13,456**	**20%**	**16,147**	**19,559**

Source: PreFeasibility Study, p.37.
Note: All figures are numerical US dollars except the specifically noted percentages. The Long-term data is BSX's own assumptions as BMI did not have estimates for nickel prices beyond CY30.

One legitimate concern is that even if the operations will be profitable, it will be more difficult to attract finance. The study estimated US$491m in capital and the DFS could easily derive a more significant figure, given rapid global inflation since CY21, as well as global supply chain issues. However, it may not be a doom and gloom scenario given inflation has been steadier in Vietnam – peaking at 4.9% in early 2023. Moreover, the premium product NCM811 is compared to nickel pig iron (the oversupply of which has caused the depression in the global nickel market) should make the project lucrative for debt and equity investors with the capital that could fund the project.

A DFS is coming later this year

The next catalyst for the company is the completion and release of a Definitive Feasibility Study for Ta Khoa, which is due by the end of this year. During the June quarter of CY24, it undertook the final pilot program of the pCAM (Precursor Cathode Active Material) NCM811 necessary to finalise DFS activities.

The program will utilise feedstock generated during a previous pilot program to produce on-specification pCAM material in the chemistry of NCM811 to 'typical' lithium-ion battery standards for the EV market. Successful generation of pCAM NCM811 during the pilot program (Figure 6) will confirm the company's flowsheet is 'fit for purpose' and allow the Company to progress through to DFS completion.

[2] Bloomberg Minerals Intelligence.
[3] Shanghai Metals Exchange.
[4] Blackstone Metals' Analysis of Shanghai Metals Exchange data.
[5] Where A is the NCM Precursor Price Based on Metal Inputs and b is the % premium.

Figure 6: pCAM testwork facility and Blackstone pCAM NCM811 sample

Source: Company

Beyond the program, the company has done further work behind the scenes to advance the project. This includes:

- Working with residue repurposing technical partners in Vietnam to define future test work and research scope.
- Achieving 'non-hazardous' waste classification to Vietnamese standards,
- Progressing design of the Construction Aggregate Storage Facility, and
- Integrated residue repurposing within the DFS flowsheet.
- Collaborating with Real Material to produce batches of brick and construction materials using residue from Ta Khoa, in order to optimise design and test the structural integrity against Australian Standards (Figure 7).

Figure 7: Bricks manufactured from Ta Khoa Refinery Residue

Source: Company

Our Valuation of Blackstone

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 reiterate our valuation of Blackstone as outlined in our initiation note from May 2024 - 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. When accounting for future dilution (giving the company nearly 14bn shares on issue), this equates to US$2.08bn in our base case and US$2.67bn in our bull case (translating to A$3.08bn and A$3.96bn respectively).

To recap our basic assumptions:

- We assume production begins in the next financial year, with only 50% of average production over the remaining 10-year life of the project.
- We use a discount rate of 10.9%, derived from a 4.3% risk-free rate of return, a 9% equity premium and a 1.5x beta.
- We use an exchange rate of A$1=US$0.66 and a corporate tax rate of 20% as is the statutory rate in Vietnam.
- US$854m in pre-production capital is assumed, 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. Our model has the company opting to fund 50% of this amount with debt and 50% with equity with equity is raised at 4.8c per share, although
- An NCM811 price of US$17,696.51 per tonne is assumed 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. 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.
- We have assumed costs (excluding depreciation) in line with the PFS, 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.

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 8 shows our valuation summary for Blackstone Minerals. Our valuation in USD is $2.0bn and our bull case is US$2.6bn, which is A$3.08bn and A$3.96bn (Figure 8). We have not assumed any terminal growth beyond the life of the project.

Figure 8: 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)	0.040	0.040
Upside (%)	648.5%	705.0%

Estimates: Pitt Street Research

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

- A recovery in nickel prices,
- 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, and
- The pursuit and securing of financing for the project.

Risks

The key risk to our investment thesis is that nickel prices will remain at their current depressed levels for the medium term (3-5 years) or potentially even decline further. Investors are all too aware that current nickel prices have affected investor sentiment in nickel companies and their operations. They will also make it difficult to secure financing.

Beyond this, other risks include (but are not limited to):

- **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.
- **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.

Appendix I – 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.
- While at university, he worked for a handful of corporate advisory firms

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