PITT STREET RESEARCH

Battery Age Minerals

A potential germanium powerhouse

Share Price: A$0.083

Battery Age Minerals (ASX:BM8) is an ASX-listed mineral exploration company. Its flagship asset is the Bleiberg project in Austria, covering a historic lead-zinc-germanium mine. The company also has the Falcon Lake Lithium project in Canada, but we see the greater potential as we move into 2025 Bleiberg's germanium potential to prove a 'company maker'.

ASX: BM8

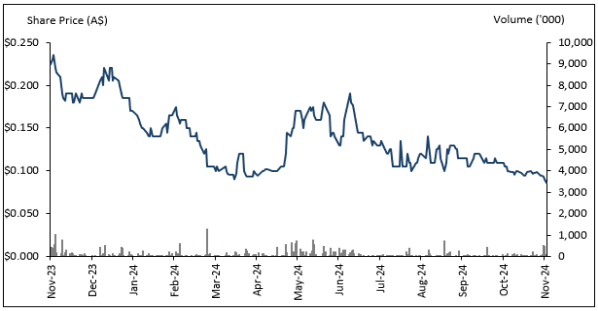
Sector: Resources

28 November 2024

Market cap. (A$ m)	7.7
# shares outstanding (m)	93.0
# shares fully diluted (m)	144.8
Market cap ful. dil. (A$ m)	12.0
Free float	100%
52-week high/low (A$)	0.24 / 0.09
Avg. 12M daily volume ('1000)	133.2
Website	https://batteryage.au

Source: Company, Pitt Street Research

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



Source: Refinitiv Eikon, Pitt Street Research

Giving Bleiberg a second life

The Bleiberg lead-zinc mine was mothballed in the 1990s due to low commodity prices after over 700 years of production. At the time of its closure, it was the world's sixth largest germanium mine by production. Battery Age Metals picked up the project in 2022 and believes it can define a large resource in the historic workings and in adjacent areas. There is precedent for exploration companies to find success in exploring closed mines for a further resource, Bellevue Gold (ASX: BGL) having been a recent example in Australia.

Germanium is a critical mineral

In 2023, China imposed export licensing controls on gallium and germanium. China supplies 60% of the world's germanium, used in applications such as fibre optic cables, solar cells, and infrared technology. Prices for the metal hit record highs earlier in 2024 due to speculation about potential state buying. Germanium is a commodity that is in high demand around the world, being crucial for semiconductors given its high conductivity. This means there is serious discussion in public policy circles, particularly in Europe, about how new, non-Chinese sources of germanium can be secured. Bleiberg could be one solution to that problem.

Upside could be realised if there's exploration success

With a market cap of under $8m and a stake in Equinox Resources worth $5.2m – the market is ascribing a mere ~$2.5m for BM8's projects. We put a tentative valuation on Bleiberg of A$32-128m. Please see p.12 for further details on our rationale and p. 18 for the key risks to our thesis.

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Introducing Battery Age Metals (ASX:BM8)

Battery Age's flagship is the Bleiberg Zinc-Lead-Germanium Project in Austria.

Battery Age Minerals (ASX:BM8) first listed in late 2020. The company in its present form was put together in late 2022 and early 2023. The current project suite of includes the Falcon Lake Lithium Project in Ontario, Canada, the Tidili Copper Gold Project in Morocco, and the flagship Bleiberg Zinc-Lead-Germanium Project in Austria. Exploration work at the Tidili project has found it has low prospectively of an economic deposit and the company is looking to part ways with it.

In the past year, the company's primary focus has been on Bleiberg project, and it has had exploration success there. It holds promise, with exposure to germanium – a commodity very useful but scarce out of China - and being a mine that operated for 7 centuries and was believed to have mined 2 Mt of the metal. Nonetheless, back in late 2022, it was Falcon Lake that was the flagship project not just because lithium prices were stronger, but also because Falcon Lake was located east of the Seymour project owned by Green Technology Metals (ASX:GT1) which held a JORC Compliant Resource of 9.9 MT @ 1.04% lithium[1]. In 2023, BM8 pegged the Jesse Lake Project for nominal staking costs after completing an assessment of the area. These Canadian projects have potential to be catalysts for the creation of shareholder value too, although the current lithium bear market will inhibit investor enthusiasm in the short-term.

This report focuses on Bleiberg. Subsequent updates will look at Battery Age's other projects and the stake in Equinox. (**Figure 1**).

Figure 1: Battery Age Metals' projects

Source: Company

The key reasons to look at Battery Age Metals

1) **Battery Age Metals boasts a diverse and promising portfolio** with exposure to multiple critical elements in mining-friendly jurisdictions, and near potential clients, particularly electric vehicle makers. BM8's projects include the Bleiberg Zinc-Lead-Germanium project as well as the Falcon Lake and Jessie Lake lithium projects in Canada.

[1] GT1 has since increased the resource of 10.3 Mt @ 1.03% lithium.

2) **BM8 offers near-term upside from drilling results**. The company is planning a drilling campaign at Bleiberg, which was an operating mine for over 700 years before its 1990s mothballing due to low commodity prices, as well as at Falcon Lake, where the company has already had drilling success, with results including 31.75m @ 1.45% lithium oxide, and neighbouring companies have had exploration success too.
3) **BM8 offers upside as the commodities cycle improves**. BM8 and other companies exposed to battery metals such as lithium as well as zinc have suffered from deteriorating investor sentiment due to prices for these commodities being in a bear market on account of market over supply. But both commodities are expected to enter a supply deficit in the medium term, and this should improve sentiment towards companies like BM8.
4) **BM8's projects are ideally positioned** with supporting infrastructure (including road access and nearby power stations) and are in jurisdictions (Austria and Canada) supportive of the mining and resources sector. These will be of great help to the company as it works towards an eventual mining operation.
5) **BM8 is one of the few companies offering germanium and gallium exposure through its Bleiberg project.** Germanium is an important component in the semiconductor industry because of its high conductivity. Germanium wafers are the foundation for many electronic devices. Unlike several other non-precious metals, germanium prices have performed well in the last 18 months considering export controls implemented by China which supplies the majority of the world's germanium.
6) **BM8's investment in Equinox Resources, worth $5.2m as at 27 November 2024, has potential to bear fruit for the company.** Equinox has the Mata Da Corda REE project in Brazil and it has had exploration success. Ownership in the company offers BM8 the chance to realise this stake down the track, either in the short-term as it seeks to unlock the potential of its projects while minimising dilution to shareholders, or in the longer-term when Equinox's project may be at a later stage.
7) **BM8 has a high-quality management team** which boasts extensive experience in creating shareholder value through mineral exploration and project development. We note CEO Nigel Broomham and CFO Paul Hughes who served at Pilbara Minerals, which developed the Pilgangoora Lithium project and helped create substantial shareholder value there.
8) **There's significant potential for creation of shareholder value** if the company can have continued success with its exploration. Although the company is 5-6 years from having operating mines at any of its projects, shares could re-rate sooner if the company can build towards the definition of a JORC Resource Estimate.

The Bleiberg Lead-Zinc-Germanium Project

Bleiberg covers an historic lead-zinc-germanium mine in Austria that had been worked on for over 700 years.

In this section we provide an overview of the project (Figure 2), its history, geology and potential future with BM8. We will then delve into the market opportunity of germanium and describe why Austria is an ideal jurisdiction for small-cap resources companies.

Figure 2: Location of the Bleiberg project

Source: Company

An overview of Bleiberg

Bleiberg covers 176 claims totalling 65.8 km^2, 130 km south of the Austrian city of Salzberg. The whole region is a historic lead-zinc mining area, and the Bleiberg area contains one particularly historic lead-zinc-germanium mine near a village called Villach that has a population of over 60,000 people according to the 2018 census. The Bleiberg mine had been worked for over 700 years, from the mid-14th Century until 1993. From 1946 until that closure, it was operated by a state-owned company. The 1993 closure resulted from a combination of low metal prices and the bankruptcy of the state-owned conglomerate that included the mine.

Bleiberg is believed to have produced at least 2 million tonnes of metal with an average grade of 5% zinc, 1% lead and 200 ppm Germanium.

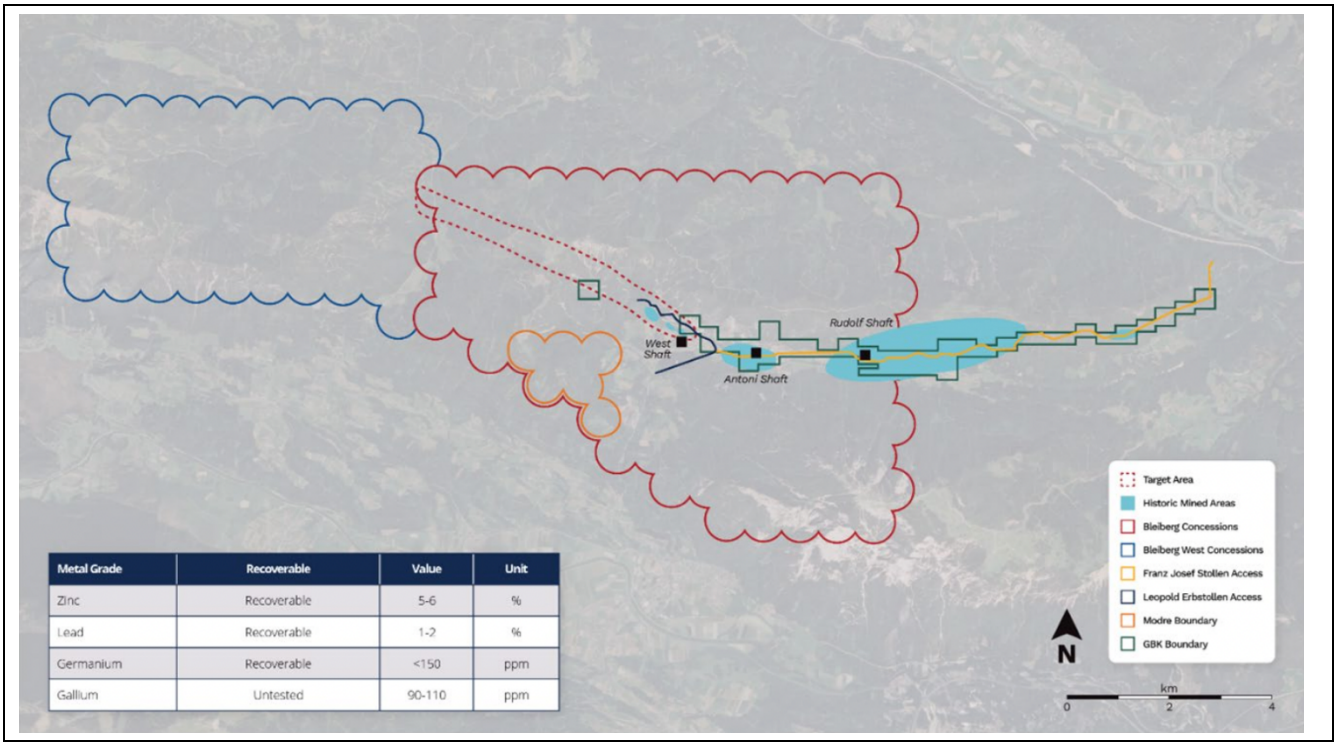
Over its history, Bleiberg is believed to have produced at least 2 million tonnes of metal with an average grade of 5% zinc, 1% lead and 200 ppm Germanium[2] but there is no formal resource estimate covering the ore which remains. Battery Age Minerals intends to establish such a resource and then work

[2] Pathfinder Resources ASX announcement 28 October 2022, p.7

towards development the project with a focus on germanium. Before its closure, Bleiberg was the world's sixth largest germanium mine.

The project has a historic mine shaft (the Bleiberg Antoni Shaft) and is located adjacent to the Edling Hydro Power Station (Figure 3). The hydro project, operated by Andritz Hydropower, has been in commercial operation since 1962 and boasts an 87MW capacity. It is not out of the question that it could eventually supply power to the project, although investors will need to wait until the completion of a Feasibility Study for confirmation one way or the other. We also observe that Infineon Technologies AG, Germany's largest semiconductor manufacturer, has a major plant in Villach, 15km east from the Bleiberg project.

Figure 3: Bleiberg's shaft systems



Metal Grade	Recoverable	Value	Unit
Zinc	Recoverable	5-6	%
Lead	Recoverable	1-2	%
Germanium	Recoverable	<150	ppm
Gallium	Untested	90-110	ppm

Source: Company

Bleiberg's geology

Bleiberg is a Mississippi Valley Type (MVT) lead-zinc deposit.

Bleiberg is a Mississippi Valley Type (MVT) lead-zinc deposit, so called because these deposits were first found along the Mississippi River in North America. MVT deposits are sediment-hosted and tend to occur in faulted and fractured zones, and their formation is closely related to tectonic activity. Bleiberg is one of four MVT deposits along a major structure called the 'Periadriatic Lineament' which stretches from Italy through Austria and Slovenia to Romania. Historically when MVT deposits are discovered, they are large. One estimate has suggested that the median size of the typical deposit is 7.0 million tonnes (with grades of about 8% combined lead and zinc.

Bleiberg could be much bigger than was historically mined. Historically there were underground workings with around 12 km of strike length. There were around 1,100 km of workings over five shaft systems - Antoni, Max, Stefanie, WestShaft and Rudolf - to a depth of 800 metres below surface. The historical workings ended at a fault zone to the west. Battery Age's investigations have

suggested that the various stratigraphic units that yielded lead-zinc ore continue beyond the fault zone, are within targetable depths, and in total are considerably larger than area of the historic workings.

BM8 currently owns 51% of the core Bleiberg project (see the area in red in **Figure 3**) and 100% of an area staked in 2023 called the West Extension (see the area in red in **Figure 3**). For the 51% area Battery Age is in the middle of an Earn-In agreement that could ultimately see it end up with 80%. When BM8 relisted on the ASX, Bleiberg was outright owned by Poly Resources LLC, a wholly owned subsidiary of a TSX-listed company called Multi-Metal Development. As per terms of the deal, BM8 took an initial 15% in the project in return for a C$50,000 cash payment to Poly Resources, together with the allotment of 498,330 consideration shares, prior to the relisting of BM8 (then Pathfinder) on the ASX. BM8 earned the balance of its current 51% stake by by issuing C$377,500 worth of shares to Poly. The next 2 phases provide for BM8 to take its stake to 65% by spending at least C$3.5m within 36 months after completing the second Phase of farm in (which would be approximately May 2027), then going to 80% by completing a JORC-compliant Bankable Feasibility Study on the JV project area within 6.5 years from the addendum in May 2024 (which would be approximately November 2030).

BM8's work at Bleiberg

BM8 is planning the next stage of its exploration work. It anticipates a couple of seasons of drilling before it can even attempt a resource estimate.

Battery Age is now planning the next stage of its exploration work at Bleiberg. After some mapping and sampling field, and discussions with local officials, as well as former staff at the mine, and after analysing 100 years of data related to the historic mine, the company is now seeking permits to drill from some of the old workings. Drill targets have been generated across a 6 km strike length.

Progress made in the past ~12 months has included:

- Staking additional claims at the project, 60 in total which as contiguous to the west-northwest of the existing 116 earn-in claims.
- Successfully negotiating to obtain a century's worth of historic mining data to validate the work BM8 has done to date and to confirm near-term drilling targets.
- Developing a targeted exploration plan and fast-tracking exploration of extensions of the known mineralisation on its tenements as well as the highly prospective western extension.
- Completion of a field mapping and sampling campaign to further refine maiden drilling campaign

What's next at Bleiberg? Battery Age anticipates a couple of seasons of drilling before it can even attempt a resource estimate, since the core that would allow such an estimate from earlier work is not available. That said, we think that if this drilling generates intercepts comparable to the historic mine grades, then investor confidence in this project will increase.

Austria is a mining-friendly jurisdiction

Austria's Mineral Resources Act is noteworthy for the relatively administratively light-handed approach it takes towards exploration and discovery. The location in Europe benefits companies looking to mine critical minerals, being close to several companies' factories. And the country itself, under the government of Chancellor Karl Nehammer's centre-right People's

Party, has a high level of economic freedom. In the Heritage Foundation's 2024 study, Austria scored a creditable 68.4.

Austria is home to several hundred mining and quarrying operations. The biggest mine in the country is the Erzberg open-pit iron mine in Eisenerz, Styria. This mine produces 2.153mt of ore per year and is operated by Vienna-listed company Voestalpine. ASX-listed companies with operations are scarcer, but one was European Metals before it got merged into Critical Metals Corp which is now listed on the NASDAQ and still holds the Wolfsberg Lithium Project which is located 270 km south-west of Vienna in the Carinthia region. Another is ADX Energy (ASX: ADX) which is testing its Welchau discovery well in the north of the country.

The metals at Bleiberg

Bleiberg is prospective for zinc, lead, germanium and gallium.

Germanium: What is it?

Germanium is an important component in the semiconductor industry because of its high conductivity. It is also used in fibre-optic cables to prevent the loss of signal over long distances.

Germanium, atomic number 32, is a mineral that does not exist as a native metal. It is normally recovered as a byproduct from concentrates from other commodities – particularly zinc ore and coal fly-ashes, mostly the former. Nonetheless, there are 6.7 ppm germanium in the entirety of the world's crust[3]. Many of the world's largest zinc mines are also important sources of germanium, one example being the Red Dog Mine in Alaska that is the second largest zinc producing mine on earth.

When in its pure metallic form, germanium is a semiconductor and is able to perform at high frequencies and low operating voltages. Additionally, in crystal and glass form it is transparent to most of the infrared light spectrum. And it has exceptional glass properties such as high refractive index and low chromatic dispersion.

In the 1950s, germanium was used in transistors to replace vacuum tubes in the enormous mainframes of a day, a discovery that would eventually lead to the modern smartphones that are hundreds of thousands of times more powerful than the Apollo-era computers.

An important use today is in semiconductors, where 'SiGe', that is, an alloy of silicon and germanium, is used to create chips with superior properties. SiGe semiconductors have a smaller 'bandgap' than 'regular' silicon chips, which means better conductivity, in turn implying lower energy consumption, especially at higher temperatures. Germanium also allows increased 'electron mobility', meaning faster switching speeds and higher frequency operation. SiGe chips also have a higher thermal conductivity than silicon chips, which helps to dissipate heat more efficiently. And germanium makes the chip better 'tunable', meaning that the material's properties can be tuned to suit specific applications. All these characteristics make SiGe chips especially useful in photovoltaic and optoelectronics applications, although the application range is much broader than just those two areas. Other minor uses of germanium include in metallurgy, phosphors and chemotherapy.

[3] Curtolo, D., Friedrich, S. , amd Friedrich, B. (2017) *High Purity Germanium, a Review on Principle Theories and Technical Production Methodologies*, DOI: 10.4236/jcpt.2017.74005

Why is germanium 'critical'?

Germanium is likely to be an important industrial mineral in the years ahead given all the above uses, and because China is responsible for the bulk of the world's supply chain.

Germanium has been designated a critical mineral by the US, EU, Japan, India and Australia. It likely to be an important industrial mineral in the years ahead given all the above uses, and also because China is responsible for the bulk of the world's supply chain, supplying around 60% of germanium[4].

As is the case with other metals where China controls the supply chain, such as Rare Earth Elements (REEs), there is a move by the West to diversify its supply chain away from China and establish one of its own. But these deposits will be hard to come by – the US only has reserves of 2,500t and there are no producing mines right now and the last one with relatively substantial production (the Apex mine in Utah, which was the first mine in the world to be operated primarily for germanium and gallium) closed in the mid-1980s[5].

The importance of this metal came to the fore when China announced export controls on germanium in July 2023. Exporters would have to apply for an export license for every single shipment of germanium, providing the government with details on the overseas buyer and end use. This was in retaliation to the US Chips and Science Act of 2022 which curtailed exports of high-end microchips and technology to China, as well as similar restrictions from other countries including Japan and the Netherlands.

Exports came to a virtual standstill for a couple of months although ironically the degree of exports in the 12 months to September 2023 was higher than the period 12 months previous. Accordingly, the price began to rise, and China has been quicker to approve exports to more favourable jurisdictions, with nearly 40% of exports being shipped to Russia and Hong Kong. There is now widespread discussion in Western world industry and public policy circles about how new sources of germanium can be secured outside of China. Prices in China have risen markedly in the second half of 2024 (see **Figure 10**). This suggests that Bleiberg can potentially be very valuable if it has a substantial germanium resource that can be extracted economically.

Gallium

There are very few gallium deposits, and so the bulk of the world's supply comes from recycling semiconductor wafers. And so, a gallium resource could very valuable, even if it was not high in volume.

Before we proceed with gallium, it is important to note that the company has *not* tested whether a gallium resource is recoverable, notwithstanding the estimate that there is 90-110 ppm. Gallium is a material like germanium in its formation and its end uses – in semiconductor applications including LEDs, microwave devices and Blu-Ray players. Gallium is considered a critical mineral by the US and EU. The UK does too and sees germanium as less important than gallium[6].

Like germanium, China controls the world's supply chain with 80% of the world's supply. Although there is not a shortage of gallium right now, the challenge is that there are very few deposits for it. As a result, the bulk of the world's supply comes from recycling semiconductor wafers, but as they get smaller and smaller, so does the quantities of gallium in each one. A Nature Communications paper in 2022 declared that gallium is 'almost never functionally recycled' once it reaches final products[7]. If BM8 can find a gallium resource, it could be very valuable. What's more is that BM8 may not necessarily need to find a large volume for it to be economically viable, given

[4] Source: Critical Raw Materials Alliance, crmalliance.eu/germanium. See also https://pubs.usgs.gov/periodicals/mcs2024/mcs2024-germanium.pdf
[5] https://www.usgs.gov/data/germanium-deposits-united-states
[6] The launch document of the UK's Critical Minerals Strategy named gallium amongst 'a cohort of minerals with high criticality for the UK' and did not mention germanium.
[7] https://www.nature.com/articles/s41467-021-27829-w

the lack of existing mineral deposits and the need for 'organic' sources of gallium.

Zinc and Lead

Although Germanium is the most 'critical' mineral of those at Bleiberg, the presence of zinc and lead cannot be overlooked. In fact, germanium occurs as a by-product of zinc, and all natural deposits of zinc contain at least a small amount of lead. Zinc is a bluish-white, shiny mineral that is important because it protects iron and steel from corrosion. Hence it is used significantly in the construction, transport and appliance manufacturing industries for galvanising purposes and played a key part in Australia's late 19th and early 20th century industrialisation as it was discovered in Broken Hill in 1883 followed by Mt Isa in 1923. Zinc has a low melting point and is a good electrical conductor. It is not found in its pure form, however, and is alloyed (mixed) with several other metals.

After a bull-run post-COVID, zinc prices on the LME (London Metals Exchange) gave up all those gains, halving between April 2022 and May 2023, due to concerns over China's property market slowdown – with China being a major zinc customer and hosting the world's largest smelter network. Galvanised steel is zinc's most important end-use sector, accounting for 60% of all demand, and China has been the most active builder over the last 10 years.

In its most recent forecasts, issued in October 2024, The International Lead and Zinc Study Group (ILLZSG) estimated a 164,000-ton supply deficit having anticipated a 56,000-ton surplus only 6 months earlier[8]. This is because demand is not keeping up with supply – 2024 zinc production is 5.7% lower than 2021 levels. The bear market of 2022 led to the Tara mine in Ireland and Aljustrel in Portugal being taken offline. Although the former of these will be reactivated, Ivanhoe Mines (the owner of the new Kipushi zinc mine in DR Congo) halved its production guidance due to a lack of power and operational problems.

The supply-demand dynamics of zinc will continue be important for BM8's germanium production ambitions. Notwithstanding the supply deficit, it is not the case that there are very few deposits as is the case with germanium. They will play a big part in determining the profitability of existing producers and investor sentiment towards zinc companies – producers and explorers alike. Investors in BM8 may be excited about Bleiberg as a germanium prospect but need to remember that the deposit is geologically a zinc-lead deposit first.

[8] https://www.reuters.com/markets/commodities/zinc-facing-supply-deficit-mine-output-falls-again-2024-10-09/

BM8's strategy with Bleiberg

Bleiberg intends to continue with exploration on the project and formally define a resource.

Bleiberg intends to continue with exploration on the project and formally define a resource. Thereafter it could undertake feasibility studies with the eventual goal of re-starting Bleiberg as an operating mine. Realistically, it will be at least 5 years before we see a recommencement of production at Bleiberg. In this section, we will look at what resource could be at Bleiberg, and BM8's tactic of 'brownfields' exploration.

What Resource could be at Bleiberg?

Work conducted by independent geologists suggests a resource target of 0.8 Mt in a base case and 2 Mt of contained metal in a bull case.

There are several published estimates of the metal remaining at Bleiberg from knowledgeable sources. Work by Immo Cerny and Erich Schroll, both geologists associated with the mine, has suggested:

1) At least 2.2 million tonnes of metal was produced over time[9].
2) At least 3 million tonnes of metal was identified prior to the mine's closure[10].
3) There could be another 2 million tonnes in the already developed areas of the mine, plus another 8 million tonnes from areas that were never developed[11].
4) Average grades of 1% Pb, 6% Zn and 200 ppm Ge are all reasonable based on historic head grades[12].

200 ppm germanium is a rich grade. Probably the best way to understand 200 ppm germanium this is to consider that parts per million is equivalent to grammes per tonne. At a gold price of US$2,600 per ounce and a germanium price of US$2,600 per kg, 200 ppm germanium is equivalent to 6.2 g/t gold[13], a high grade for any commercial gold resource today.

The available data can be used to infer a resource target range. Subtract 1) from 2) above for a base case and assume the lower number from 3) in an optimistic case. The result is a resource target range as in **Figure 4** of 0.8Mt in a base case and 2Mt in a base case. We stress that this is historic work from independent geologists, not an estimate based on work the company has done, although it suggests the deposit could have further mineralisation.

There is plenty of exploration work to do. The Bleiberg deposit itself extends 12km in strike and 800m have been explored in depth by underground workings. However, the extent of the whole deposit and its definite limits and borders to the host rock have not yet been explored in detail.

[9] Schroll, E. (2006*). Neues zur Genese der Blei-Zink Lagerstätte Bleiberg.* Carinthia II 196./116. Jahrgang Seiten 483-500 Klagenfurt 2006.
[10] Ibid
[11] Cerny,I (1989). Die karbonatgebundenen Blei-Zink-Lagerstätten des alpinen und außeralpinenMesozoikums. Die Bedeutung ihrer Geologie, Stratigraphie und Faziesgebundenheit für Prospektion und Bewertung. Arch Lagerstätten forsch Geol Bundesanst Wien 11:5-125.
[12] Cerny,I. (1991*). Lagerstättenforschung in Kärnten Neuergebnisse und Aspekte für die Zukunft*. Carinthiall 181./101. Jahrgang S. 119-129 Klagenfurt 1991.
[13] Note, one troy ounce is equivalent to 31.103 grams.

Figure 4: Resource Target Range for Bleiberg

Case	Ore (mt	Lead	Zinc	Germanium (ppm)	Contained metal (mt)
Base	13.3	1%	5%	200	0.8
Optimistic	33.2	1%	5%	200	2.0

Source: Stuart Roberts, Pitt Street Research

The strategy of brownfields exploration

In exploring at Bleiberg, Battery Age Minerals is undertaking a so-called brownfield exploration strategy as opposed to a greenfield strategy. Brownfield assets are where there has previously been exploration or mining activity, whilst greenfield assets are where there has been no such activity.

The advantages of brownfield exploration include:

- More confidence in exploration success.
- Existing infrastructure and therefore lower capital costs.
- Existing regulatory or environmental approvals, in some instances.

The most pertinent key to realising new mineralisation is either using new technology that can find mineralisation that was previously undiscovered. It is so often the case that mines are closed because operators believe their resource has been exhausted. But in other instances, mines may be closed for other reasons including lower commodity prices, as was the case with Bleiberg.

One ASX-listed example of a successful brownfield strategy is Bellevue Gold (ASX: BGL), which is Australia's newest gold producer.

One ASX-listed example of a successful brownfield strategy is Bellevue Gold (ASX: BGL), which is Australia's newest gold producer. Bellevue Gold picked up its namesake mine in Western Australia during 2016. The Bellevue Mine had been an operating mine for roughly a century, producing a total of 800,000oz during that time before appearing to have run out of life. Bellevue picked it up in 2016 and commenced a drilling campaign in the last quarter of 2017, never looking back from there. It has Total Mineral Resources of 9.8 Mt at 9.9 g/t for 3.1Moz of gold. 1.7Moz of this is Indicated with the balance inferred. This makes it one of Australia's highest-grade gold mines. Production has just begun. The company forecasts a 10-year mine life and for $2.1bn of free cash flow, assuming a gold price of A$2,500/oz. Production began in late October 2023 with the first gold pour.

The fact that it took 7 years to get to production should indicate to shareholders that BM8 will take several years to get to production. Nonetheless, it could have an MRE within 2 years from now.

Valuing the Bleiberg Lead-Zinc Germanium Project.

The resource target range above range can be used to provide a rough valuation guide. We used the resource target range from **Figure 4** above and plugged in assumption on lead and zinc prices close to the lows on LME of the last ten years for a base case and the middle of the range for an optimistic case. For germanium we used the prices prevailing in late 2022 as a base case and the median point of the 2024 re-rating as our optimistic case (Figures 5-10).

Figure 5: Assumed Bleiberg metal *in situ*

Case	Lead (t)	Zinc (t)	Germanium (kg)
Base	132,890	664,452	2,657,807
Optimistic	332,226	1,661,130	6,644,518

Source: Stuart Roberts, Pitt Street Research

Figure 6: Assumed metal prices

Case	Lead (USD/t)	Zinc (USD/t)	Germanium (USD/kg)
Base	1,680	1,610	1,124
Optimistic	2,060	2,630	1,826

Source: Stuart Roberts, Pitt Street Research

Figure 7: US$ assumed metal value *in situ*

Case	Lead (US$bn)	Zinc (US$bn)	Germanium (US$bn)	Total (US$m)
Base	0.22	1.07	2.99	4.28
Optimistic	0.68	4.37	12.13	17.19

Source: Stuart Roberts, Pitt Street Research

We suggest 0.5% of resource target valuation is applicable today, which implies a value of A$32m to $128m, which points to a potentially significant upside from the current share price of Batter Age Minerals. Please note***, this is not a JORC resource and there is no current JORC Resource***. Instead, it is a reasonable estimate from skilled professionals highly familiar with the project.

Figure 8: A$ assumed metal value *in situ*

Case	Lead (A$bn)	Zinc (A$bn)	Germanium (A$bn)	Total (A$bn)
Base	0.33	1.60	4.46	6.39
Optimistic	1.02	6.52	18.11	25.65

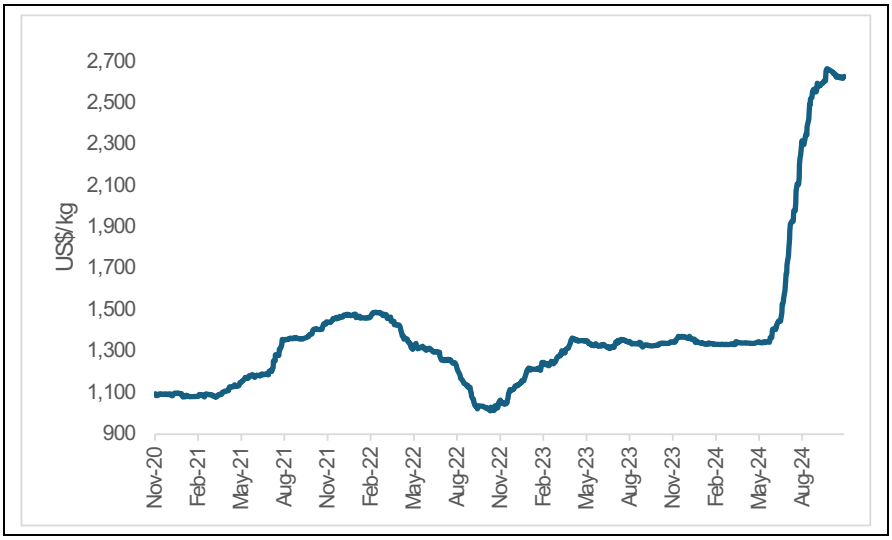
Source: Stuart Roberts, Pitt Street Research

Figure 9: Risked valued of A$ metal value *in situ*

Case	Value A($m)
Base	32
Optimistic	128

Source: Stuart Roberts, Pitt Street Research

Figure 10: Traded value of germanium in China, in USD terms



Source: investing.com

BM8's management

BM8's current board and leadership composition is as follows (**Figure 11**):

Figure 11: BM8's leadership composition

Board of Directors and Management	
Name and Designation	**Profile**
Robert Martin Non-Executive Chairman and Non-Executive Director	Mr Martin is a commercial businessman with over 25 years' commercial experience across a broad range of sectors including mining and mining services, manufacturing, and capital markets. Recently, Mr Martin owned and operated a large and highly successful mining services business, with offices in multiple jurisdictions globally, which was acquired by a prominent Perth business after year-on-year growth and profitability. He runs a family office in Western Australia and serves on the boards of Critical Resources (ASX: CRR), Equinox Resources (ASX: EQN), Parkd (ASX: PKD), Infini Resources (ASX: I88) and Pioneer Lithium (ASX: PLN).
Gerry Fahey Non-Executive Director	Mr Fahey is a specialist geologist in mining geology, mine development and training. He has over 40 years' experience in the industry, including 10 years as Chief Geologist at Delta Gold where he developed several gold projects including the Eureka, Chaka, Globe and Phoenix mines. He has also served as Director of Prospect Resources which in April 2022 sold its 87% stake in its Arcadia Lithium project in Zimbabwe for US$378m. He is also a member of the Joint Ore Reserve Committee (JORC)
David Pevcic Non-Executive Director	Dr David Pevcic is an experienced corporate professional and investor, with a principal focus on the resources and technology sectors. Dr Pevcic is the founding Director of Infini Resources Limited (ASX:I88), Executive Chairman of Nanoveu Limited (ASX:NVU), and director of several privately owned mineral exploration ventures in Canada, Brazil and Australia. Dr Pevcic holds a Bachelor of Science, Bachelor of Medicine and Bachelor of Surgery from the University of Western Australia
Nigel Broomham Chief Executive Officer	Mr Broomham is a geologist with over 12 years industry experience, including over 10 years in the battery metals sector, specifically in lithium and manganese. Prior to joining Battery Age Minerals, Mr Broomham held leadership roles with ASX-50 lithium producer Pilbara Minerals (ASX: PLS) in exploration, resource development and mining production. As Head of Geology at Pilgangoora, he was extensively involved in the exploration and development of the world-class Pilgangoora Lithium-Tantalum Project in the Pilbara region of Western Australia and was tasked with leading the geology team from exploration through to production. Earlier in his career, he has also worked at Mineral Resources Limited, Consolidated Minerals Manganese, Hancock Prospecting (Roy Hill) and Golder Associates.
Paul Hughes Chief Financial Officer	Mr Hughes is an experienced finance & accounting professional with a demonstrated track record of success in financial leadership and strategic decision making in the ASX mining and resources space. Prior to joining Battery Age, Mr Hughes held multiple finance positions within Pilbara Minerals, most recently overseeing the Corporate, Planning & Investment function. In this role, he was responsible for delivering integrated mine, financial, and business planning encompassing vital aspects such as life-of-mine modelling, expansion plans, capital, funding, and financing strategies, which recently delivered final investment decisions for the expansion projects at the Pilgangoora mine site. Mr Hughes has also held senior finance positions at Orica (Mining Explosives), Downer Mining (Mining Contractor) and early career experience in the finance and banking sectors.

Nick Mitchell Exploration Manager	Mr Mitchell is an exploration geologist with over twenty years industry experience. Prior to working with Battery Age, Mr Mitchell worked with several highly successful junior miners and contracting companies, including Fronteer Gold, and Cantex Mine Development Corp, and as a senior consultant to both junior exploration and mid-tier mining companies. Since joining Battery Age, he has played a key role at the company, particularly in the supervision and executive of the Phase II drilling at Falcon East extension with a view to provide integral guidance and technical support to both the Falcon Lake Lithium project and to the Bleiberg Germanium project.
Harry Spindler Company Secretary	Mr Spindler is an experienced corporate professional with a broad range of corporate governance and capital markets experience. Over the past 20 years', Mr Spindler has held various company secretary positions across a diverse range of ASX-listed companies and been involved with several public company listings, merger and acquisition transactions and capital raisings. Mr Spindler is a member of the institute of Chartered Accountants Australia and New Zealand and a member of the Financial Services Institute of Australia. Since 2010, Mr Spindler has worked for corporate advisory firms and has advised a number of clients across a range of industries. Prior to this, Mr Spindler had a career in corporate recovery and restructuring at KPMG.

Source: Company

A potential re-rating of BM8

What could BM8 re-rate to?

As an exploration-stage company without its own MRE for either Falcon Lake or Bleiberg, it is too early to value BM8 using an EV/Resource or DCF methodology. However, it is not irrelevant to observe that it has a $5.2m stake in Equinox Resources. With a market capitalisation of ~$8m, the market is ascribing no more than $2.5m to Bleiberg and that scenario would ascribe no value at all to Falcon Lake.

We think once BM8 has a JORC Resource for one of its projects (even if it is only Indicated and/or Inferred), it could trade similarly to other explorers, with the market possibly comparing it to other ASX lithium developers with Canadian projects.

In the meantime, we think the first drilling in Bleiberg in mid-2025 can potentially help re-rate BM8, particularly if the intersections are broadly in line with the historic ore grade estimates.

Catalysts for BM8's re-rating

We think BM8 can re-rated if any of the following occur:

- Continued exploration success at Bleiberg and Falcon Lake,
- The eventual definition of a Mineral Resource at either or both projects,
- Either a re-rating of Equinox Resources, leading to an uptick in BM8's stake, or alternatively a sale of these shares leading to a cash influx for the company,
- The recovery of prices for BM8's other commodities – lithium, lead and zinc.

Risks facing BM8

We see the following key risks to our thesis on BM8:

- **Exploration risk:** There is no certainty that exploration work will find any further mineralisation, let alone any sufficient that could support a larger mining development. Moreover, even if mineralisation is found, there is no certainty that it will be able to be extracted economically. The ability of the company to continue with its exploration activities could be affected by a range of factors including geological conditions, weather conditions, unanticipated operational and technical difficulties, unanticipated metallurgical problems, industrial disputes, supply chain issues and Indigenous heritage factors.
- **Funding risk**: As an early-stage explorer that is not generating revenue BM8 will inevitably need future financing to realise its ambitions with the project. It is not a certainty that such financing could be raised, and any financing deals could be dilutive to investors and/or inhibitive on the company's operations
- **Regulatory risk.** The company's ability to explore is contingent on possessing all necessary permits necessary and abiding by all regulation including taxation, native title, industrial relations, health and safety, environment protection and license consent. Any withdrawal of consent by regulators, or inability to obtain any permits necessary for further exploration could put shareholder value in jeopardy.
- **Underlying commodity risk**: BM8 is exposed to commodity price risk, which depends on various macroeconomic factors as well as demand and supply dynamics of the underlying commodity. A continued lull in commodity prices could mean that investors fail to be interested in the company, even if it is otherwise on track.
- **Key personnel risk**: There is the risk the company may lose key personnel and be unable to replace them and/or their contribution to the business.

Glossary

Bankable Feasibility Study (BFS) – A study that determines the viability of a project from a financial standpoint.

Brownfields – Areas where resource exploration and/or mining has occurred before, as opposed to greenfields areas where it has not.

Conductivity – in the context of metals, the metal material's ability to transmit heat or electricity.

Diamond drilling – A rotary drilling technique, named after the diamond-impregnated drill bits that are used to cut through rock and produce a solid core sample.

Electric Avenue – A term for the area around Windsor, On., Canada where gigafactories are being built.

Fault zone – An area where rocks deform due to faulting, leading to changes in lithology, pore pressure and seismic velocity. A fault is just one specific fracture as opposed to a cluster of parallel faults.

Germanium – A chemical element and semiconductor material.

Joint Ore Reserve Committee (JORC) – The organisation responsible for the code of practice that promotes robust standards for the public reporting of exploration results and mineral resources.

Mississippi valley type (lead-zinc) deposit – Mineral deposits characterised by the occurrence of lead and zinc ores. They are sediment-hosted and tend to occur in faulted and fractured zones, and their formation is closely related to tectonic activity.

Mineral Resource Estimates (MRE) - An estimate of the ore tonnage and grade of a geological deposit.

some of the world's most beneficial elements including lithium and REEs.

Rare Earth Elements (REEs) – A set of seventeen metallic elements, including the fifteen lanthanides on the periodic table plus scandium and yttrium.

Sampling – A type of early-stage exploration that takes samples of soil and subsoil, usually with tools no more comprehensive than hand-held tools like shovels, picks and hand augers.

Scout drilling – The drilling where only the uppermost part of an orebody is drilled with the intention of delineating its surface configuration.

Stratigraphic – Concerned with the study of rock layers (strata) and layering (stratification).

Appendix I – Capital Structure

Class	In Millions	% of dully diluted
Ordinary shares	101,899,140	70%
Options	42,904,923	30%
Fully diluted shares	144,804,063	

Source: Company

Note: Anti-dilutive options and rights are excluded because the company is in a loss position

Appendix II – BM8's Interests in Mining Tenements

Location	Tenement Reference	Interest
Western Australia[14]	M47/1450	27.97%
Canada, Bloom Lake	221266, 221267, 229223, 243759, 251792, 251793, 251794, 287807, 308044, 325202, 336173, 582713, 582714, 716167, 716168, 716165, 716166, 716170, 716171, 716169	100%
Canada, Falcon Lake (Central)	727287-727384, 668831, 670166, 670168, 721084, 721085, 746214, 754668, 106057-106058, 121357-121360, 122094, 132858-132859, 134102, 136948-136962, 142489, 148810, 165547-164548, 166603, 178073, 179345, 185376-185377, 186114-186115, 208573, 209065, 215331, 224637-224639, 237714-237716, 244810, 246081, 252181, 256393-256395, 274457, 281913, 289275, 291550, 301417-301418, 302155, 311782-311784	90-100%
Canada, Falcon Lake (West)	727385-727406	100%
Canada, Falcon Lake (East)	727409-727452	100%
Canada, Jessie Lake	834651-834704, 835652-835724	100%
Morocco, Tidili	EP3842355, EP3842356, ML383699	85%
Austria, Bleiberg	EL 476/22 (BB1) – 591/22 (BB116); 1524/23 (1/23) – 1583/23 (60/23)	51%; 100%
Argentina	168-L-1939, 66-C-2005, 28-L-2011	100%

Source: Company Annual Report 2024, p.14

[14] Held indirectly through its stake in Equinox

Appendix III – 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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