



Dr Michael Green  
Independent Mining Analyst

DOC Investments Limited,  
Kemp House,  
152 City Road,  
London EC1V 2NX

doc@docinvest.co.uk



#### Key information

Ticker: NQMI  
Share price: 3.75p  
52 week high-low: 18p – 3.02p  
Shares in issue: 325.27m  
Market Cap: £12.2m  
Market: NEX  
Sector: Mining  
www.nqminerals.com

#### Business

100% interest in polymetallic flagship Hellyer Mine in Tasmania, which has over US\$1 billion of contained gold, silver, zinc and lead plus considerable existing mine infrastructure. NQ Minerals is also developing two exploration projects (Ukalunda and Square Post) in North Queensland, located in prospective mining districts that form part of the well-known Charters Towers Gold Province.

#### Calendar

Interims: September  
Finals: May  
AGM: June

**7 August 2019**

## The Hellyer Nickel Cobalt plan

- ❖ **Gold polymetallic tailing project with substantial reserves.** NQ Minerals (NQ) acquired the Hellyer Gold Mine in Tasmania in 2017 with its impressive infrastructure and high-grade polymetallic tailings which represent substantial reserves of high-grade zinc, lead, copper, silver and gold. The presence of existing infrastructure and a mill which processed material from the previous underground mining operation meant that NQ was able to bring the tailings reprocessing project on stream in 2018 with a relatively low additional capital expenditure.
- ❖ **Potential acquisition of the Barnes Hill Nickel-Cobalt Project.** NQ knew that the ideal customer for its pyrite concentrate would be a local nickel laterite operation as sulphuric acid is the biggest cost in the treatment of nickel-cobalt in lateritic surface deposits. In June and August 2019, NQ announced investments in Tasmania Energy Metals, together with the right to take up an option to acquire a 100% interest in the Barnes Hill Nickel-Cobalt Project in Tasmania, which has substantial resources of nickel laterite lying immediately below the surface. The option values the interests at £5.5m which would be paid for in NQ shares
- ❖ **Combined entity has potential to be a low-cost nickel producer.** Extracting further value from NQ's existing concentrates is a low risk way of improving revenues and shareholder returns. The viability of developing an integrated development at Bay Bell, a heavy industry centre with a deep-water port in Tasmania, is being investigated. Hellyer pyrite could be used in the co-production of nickel/cobalt, allowing the Company to recover precious and base metals contained in the pyrite/precious metals concentrate.
- ❖ **NQ's financial model shows move into nickel provides a NPV(10) of US\$360 million and 45% IRR uplift.** This shows the magnitude of the value that may be created by such a venture, based on a series of assumptions which we consider appropriately conservative, including the use a 10% discount factor compared to 5-8% widely used in the mining industry which would increase calculated NPV.
- ❖ **Transformational deal with scope to generate significant value.** The nickel operation is projected to increase EBITDA from a projected US\$35m without the deal to US\$120m, sufficient to trigger a stock market re-rating which could result in an implied market capitalisation of US\$1,700m. Possible scenarios have been investigated giving values for NQ of between 35p to 138p per share, with a valuation for Hellyer alone of 21p. NQ's expansion plans are highly relevant in today's market as the project is clean and green using pyrite recycled from previous projects; with the produced material used in battery elements/high-tech products – all in the safe jurisdiction of Tasmania.

**Important:** See disclaimer and investment risk information on pages 7 and 8.

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## INTRODUCTION

NQ's flagship project is the 100%-owned Hellyer Gold Polymetallic Tailings Project in Tasmania, Australia where production commenced in September 2018. Hellyer currently produces three high-grade concentrates: zinc, lead and pyrite/precious metals. Pyrite is a non-standard product and optimising the value of this concentrate is all about recovering the precious metals and putting the high-grade iron ore processing residue to good use.

Pyrite or iron pyrite is an iron sulphide ( $\text{FeS}_2$ ) that is one of the most commonly occurring sulphide minerals, which is sometimes found associated with gold. Pyrite concentrate is mainly used to make sulphuric acid. Early on in the planning for the reopening of Hellyer, it became apparent that the ideal customer for the pyrite concentrate would be a local nickel laterite operation as sulphuric acid is the largest single cost in the treatment of nickel-cobalt and is a cost barrier which challenges laterite development. In addition, the facility would allow NQ to recover precious/base metals contained in its pyrite/precious metals concentrate. Unlike hydrometallurgical processes, the exothermic reaction of burning pyrite breaks chemical bonds and allows gold, silver, iron etc to be produced economically.

In June 2019, NQ announced an investment in Tasmania Energy Metals Pty Ltd (TEM) which owns the Barnes Hill Ni Co project. At that stage it was reported that the two companies were evaluating the commercial and financial viability of developing an integrated facility. In this report we seek to provide an outline of possible value that may be created by the proposed combination of the two businesses which would allow the production of a portfolio of battery metals products and also allow the tremendous value in NQ's pyrite/precious metals concentrate be unlocked.

## HELLYER GOLD POLYMETALLIC TAILINGS PROJECT

The Hellyer Mine is located in NW Tasmania 80 kilometres south of the Port of Burnie. These tailings represent substantial reserves of zinc, lead, silver, gold and copper which result from the mining of the very rich polymetallic Hellyer, Que River and Fossey mines in the 1990s; which were rich lead zinc deposits within the Mount Read Volcanics.

NQ acquired the mine in June 2017 and along with the tailings, the assets included a large pre-existing mill facility and full supporting infrastructure which provides access to a direct rail line to the Port of Burnie. The acquisition cost was £22.1 million (A\$20 million plus shares equivalent to a then 29.9% stake in NQ) and vendor representation on the board.

The base metal flotation circuit at the Hellyer mill commenced commissioning in September 2018 with first sales of concentrates in November 2018. The acquisition of Hellyer was seen as allowing NQ to become a substantial producer of lead, zinc and pyrite/precious metals concentrates for ten years, by retreating the Hellyer tailings. After that, there is the opportunity to use the capacity of the mill and tailings dams to take advantage of other similar high-grade polymetallic volcanogenic massive sulphide (VMS) deposit that lies within the Mount Read Volcanics which is a Cambrian volcanic belt in Western Tasmania.

VMS deposits are a type of metal sulphide ore deposit, mainly copper-zinc, created by volcanic-associated hydrothermal events underwater. VMS deposits can also produce economic amounts of gold and silver as by-products. Global production from VMS deposits is reported to account for 22% of zinc, 9.7% of lead, 6% of copper, 8.7% of silver and 2.2% of gold of the worldwide annual production of these metals.



**Hellyer Gold Polymetallic Tailings Project. Source: Company**

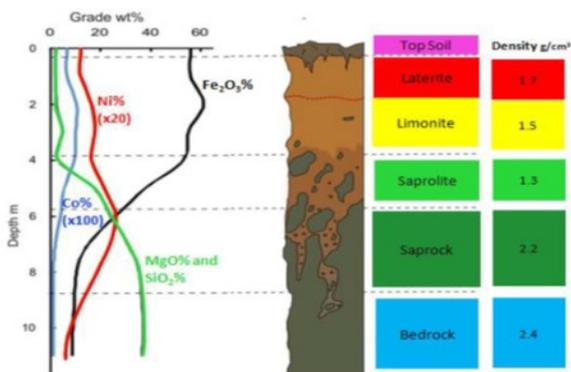


**Ball mill. Source: Author**

## BARNES HILL NICKEL-COBALT PROJECT

The Barnes Hill Nickel-Cobalt Project lies in the Tamar Development Corridor near Beaconsfield in Tasmania. This project forms part of the Anderson's Creek Ultramafic Complex which is a layered rock formation consisting of Cambrian mafic and ultramafic stratigraphy. The upper zone in the area contains secondary iron oxides like goethite, hematite and limonite, while the clay rich lower zone contains huge deposits of serpentinite, chlorite and smectite. Both the zones are rich in secondary lateritic nickel, cobalt oxides and iron ore minerals.

Barnes Hill has seen plenty of exploration activity over the years, which includes a lot of drilling across the 43.2-hectare lease area. A JORC-compliant total resource of more than 10Mt has been delineated at the two largest deposits, with two additional deposits currently under JORC-estimation after recent drilling in February 2019. Basically, at Barnes Hill, nickel and cobalt are present in surface clays. The material is free digging with surface mining to a depth of less than 30m and a stripping ratio of less than 1:1, which all points to this project being able to deliver low cost ore.



Resource	Tonnage	Comments
Indicated and Inferred Mineral Resource (2010)	6.6Mt	Barnes Hill north and south deposits at 0.8% Ni and 0.05% Co at a 0.5% Ni cut-off grade (716 holes)
Inferred Resource Historical (2001)	3.64Mt	Scotts Hill and Mt Vulcan deposits of 3.64Mt at 0.72% Ni and 0.09% Co at a 0.6% Ni equivalent cut-off grade (43 holes)
<b>TOTAL RESOURCE</b>	<b>10.24Mt</b>	

**Barnes Hill laterite profile and Total Resource**

The existing Mine Reserve over two of four nickel-cobalt deposits at Barnes Hill is also currently being updated. Twenty new holes have been completed on the Scotts Hill and Mt Vulcan deposits which are planned to allow a new resource estimate to be prepared by consultants Snowden. At the same time there has been a substantial number of metallurgical studies performed, including extensive leach tests on Barnes Hill ore up to pilot scale.

## INTEGRATED DEVELOPMENT PROJECT

The team is evaluating the viability of developing an integrated processing facility at Bay Bell, where Hellyer pyrite would be used in the co-production of nickel and cobalt. Extracting further value from Hellyer's existing concentrates is a low risk way of improving revenues and, despite the substantial capital cost, should improve returns to shareholders.

The industrial centre of Bell Bay (approximately 30km by road from Barnes Hill) is located on the eastern shore of the Tamar River in Northern Tasmania and has been chosen as the location for the co-production facility as it is already the home of heavy industry on the island. The location has two existing smelters (Al & Mn) and high voltage power delivered from the Tasmanian hydro generation network. The area has good highway access and lies 240km by road from Hellyer, plus an existing rail link to Hellyer of approximately 320km via the Port of Burnie. Besides the availability of grid electricity, natural gas and water, there is a deep-water port allowing for long-term nickel import and product export.

At the proposed processing facility, the pyrite concentrate from Hellyer will be burnt in a 250,000tpa pyrite capacity fluidised bed roaster with the calcite (which includes base and precious metals) being sent for recovery. The SO<sub>2</sub> waste gas is captured and used to create sulphuric acid via the contact process. Blended nickel ore from Barnes Hill is planned to be sent to a new Mixed Hydroxide Precipitate (MHP) plant. MHP represents one of the intermediate products of nickel laterite ore processing through the hydrometallurgical route. MHP is then further processed by re-leaching to become NiSO<sub>4</sub>. The processing plant will produce: CoCO<sub>3</sub>, MnCO<sub>3</sub>, NiSO<sub>4</sub> and iron ore fines together with gold-silver doré and a zinc-copper precipitate. The Pre-Feasibility Study (PFS) is expected to be completed within 6 months, ahead of going onto the Definitive Feasibility Study (DFS).

The move to the mining and processing of nickel and cobalt will in addition provide the Company with a portfolio of battery metal products. On average annually, the project is planned to produce 5,100t of contained nickel as a 22.2% nickel sulphate for battery applications, as well as also producing 300t of 17.7% cobalt carbonate and 650t 35.2% manganese carbonate as salts for direct sale into the EV industry. Global demand for EVs is growing rapidly on the back of green legislation being adopted by many countries including the UK, India, Germany, France, Norway and China.

## FINANCIAL MODEL

In order to provide an outline of the potential that may result from the amalgamation of these business interests we have been granted access to the Company's financial model for the combined entity. In addition, we had discussions with management and benefited from visiting Hellyer in late-2018. The financial model summarises an assessment of the Hellyer Ni-Co plan based on the current understanding of the possible operating and commercial conditions. The model covers a 24-year period from 2019 to 2042.

Reprocessing of the tailings at Hellyer is planned to continue for a 10-year period until 2028, when the resource will have become exhausted. In years 2021 –23, forecast revenues are seen as stemming solely from lead silver concentrate and zinc concentrate sales from Hellyer, with average annual sales running at US\$62 million. During this period the pyrite concentrate is planned to be stockpiled to be used to process nickel once that operation is up and running.

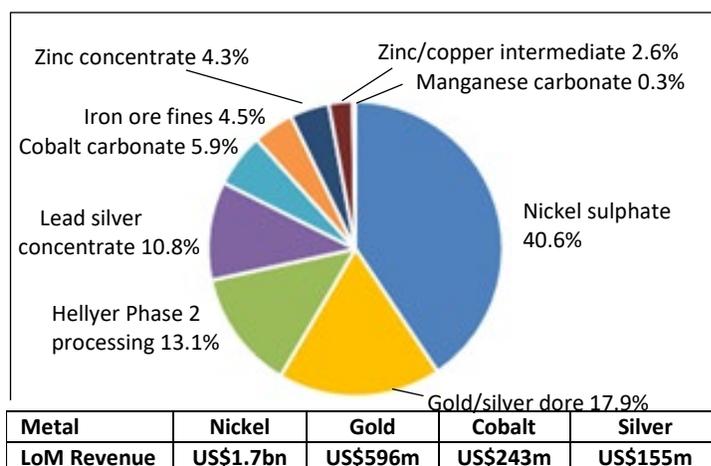
Mine development at Barnes Hill and the construction of the pyrite-nickel processing facility at Bell Bay are planned to begin within the next 18-24 months. In the intervening period, the Company intends to acquire the sites and complete environmental surveys. At the same time, the optimisation metallurgical testwork and other feasibility studies required to generate a Bankable Feasibility Study (BFS). All these steps are necessary to successfully raise the required project finance.

There is planned to be US\$215 million of capital expenditure at Barnes Hill and Bell Bay which would allow first nickel processing in 2024, with mining continuing over the projected 19-year Life of Mine (LoM). In the initial years, 10.7 Mt (dry) are proposed to be mined at an average grade of nickel (0.83%) and cobalt (0.07%); resulting 83,000t of nickel and 6,400t of cobalt produced over the initial LoM, plus the production of 455,000 ounces of gold (being an average of 22,700oz per annum) and 9.2 million ounces of silver (being an average of 462,000oz per annum). Phase 2 at Hellyer is planned to commence in 2029 which sees the mill processing 1.5Mtpa of material with a combined lead and zinc grade of 15% from another local VMS deposit in the Mt Read Volcanics.

NQ's Hellyer Ni Co plan serves to create an enlarged business where the dominant revenue generators are nickel and gold. Roasting pyrite allows precious metal credits associated with this concentrate. The move into nickel and cobalt production takes the Company into the battery metals arena. So far this year, nickel prices have climbed by 32% to US\$14,470/t, on expectations of booming demand from electric vehicles (EVs).

Although last year only 6% of nickel was used in EV batteries (vs 70% for stainless steel), according to the research house Adams Intelligence, EV manufacturers have used 57% more nickel this year. Changes in the chemistries of nickel-cobalt-manganese (NCM) battery cathodes sees the industry moving to a NCM811 battery which uses a lot more nickel. Such a battery for powering a light passenger EV requires around 50kg of nickel. Bloomberg Intelligence reckons that nickel demand for batteries could outpace that for stainless steel. However, despite the recent battery fever, nickel prices are still a long way adrift from those of the past as the metal peaked at over US\$51,000/t in March 2007. The model used the conservative World Bank commodity price estimates, which forecast nickel to remain at current levels in 2022 at US\$14,469 and to grow slowly to a long-term price of US\$18,000 by 2030. The World Bank forecast has also been used for gold prices and this goes from US\$1,348/oz in 2022 and drifting to US\$1,300 by 2030.

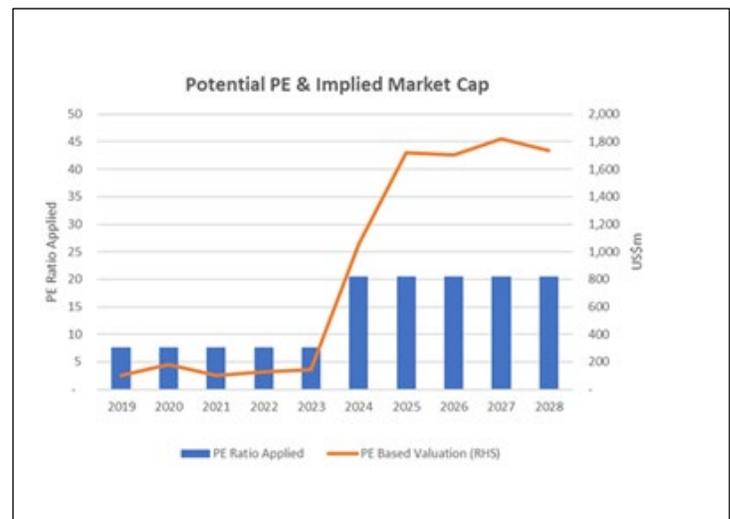
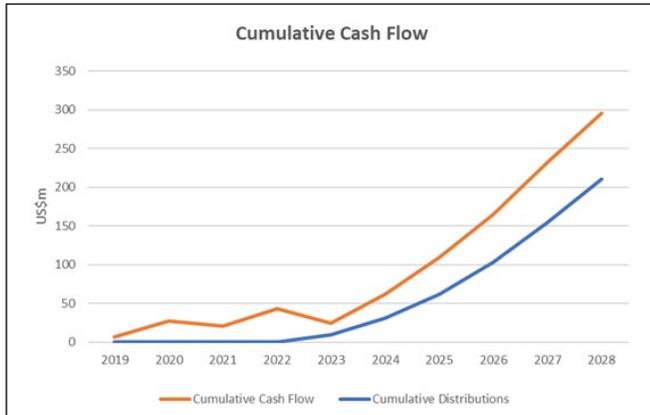
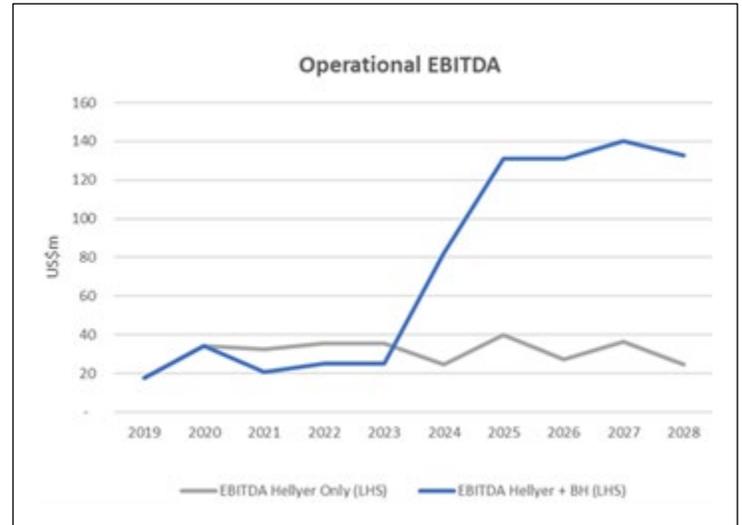
Apart from metal prices, NQ's financial model also makes assumptions for: A\$ conversion rate, JORC resource, plant contingency costs, land purchase cost, gold grade in pyrite and calcine recoveries, all of which we consider conservative. Based on the assumptions, the Hellyer Ni Co project is estimated to be a low-cost nickel operation with market leading production costs. When operating at full production, nickel costs are estimated at US\$6,000/t of contained nickel and US\$2,800/t including cobalt and manganese by-products. Sulphuric acid production becomes a profit generator through base and precious metal recovery, rather than being the largest operating cost.



## VALUE CREATION

The move into nickel has been estimated by NQ's financial model to create substantial value. The Net Present Value (post tax) of the nickel facility over a 20-year period using a 10% discount factor has been projected to add US\$360 million and has an incremental Internal Rate of Return (IRR) of 45% over the previously planned operations. In addition to conservative assumptions, the model also employs a 10% discount factor compared to 5-8% widely used in the mining industry which would increase calculated NPV.

Project revenues and returns		
Revenues (US\$m)	10 Year	20 Year
Lead silver concentrate	431	431
Zinc concentrate	171	171
Gold/silver concentrate	25	25
Nickel sulphate concentrate	439	1,260
Cobalt carbonate concentrate	52	197
Manganese carbonate concentrate	3	10
Zinc/copper concentrate	26	83
Iron ore	45	140
Gold/silver doré	176	560
Hellyer Phase 2 processing	0	523
<b>Total Revenue</b>	<b>1,367</b>	<b>3,400</b>
<b>Total Project EBITDA</b>	<b>740</b>	<b>1,943</b>
<b>Total Project EBIT</b>	<b>643</b>	<b>1,750</b>
<b>Average Annual CashFlow</b>	<b>64</b>	<b>87</b>
<b>Overall NPV post tax</b>	<b>152</b>	<b>360</b>
<b>Ni/Co Project IRR post Tax</b>	<b>45%</b>	



The project does require material levels of capital expenditure and working capital which have been factored into the model. Projected revenues and returns make for compelling reading as the combined operation of Hellyer and Barnes Hill has the scope to potentially add substantial value as it would allow NQ to gain full value for every element in the tailings dam. The projected 45% IRR on the financial model clearly shows that the move into nickel production is a robust project on its own merits.

The estimated cumulative cash flow is shown to climb rapidly post the nickel facility going into production in 2023. At the same time, the estimated EBITDA is estimated to rise from US\$35 million for Hellyer on its own to US\$131 million for the combined entity in 2025. This highlights the potential that the nickel facility, once working at full production, could be materially value enhancing. The level of earnings is estimated based on a specific project and specific operating parameters and does not rely on increasing metal prices or productivity.

## EARNINGS MULTIPLE ENHANCEMENT

Size has a dramatic implication on the value that is awarded to quoted mining companies. Looking at mining stocks quoted in London, there is an obvious trend of increasingly higher Price Earnings (PE) multiples being awarded to larger companies. Analysis of the share prices of London-listed mining companies with earnings in 2018 shows the following:

Market capitalisation	PE (median)	London-listed mining companies (code, share price, market capitalisation, PE ratio)
Up to £50m	4.7	Red Rock Resources (RRR, 0.48p, £3m, 2.38x), Shefa Gems (SEFA, 5.25p, £9m, 5.97x), Bisichi Mining (BISI), 110p, £12m, 3.54x) & Ariana Resources (AAU, 2.08p, £12m, 9.88x)
£50m - £200m	7.6	Caledonia Mining Corporation (CMCL, 477.50p, £51m, 3.63x), Shanta Gold (SHG, 8.40p, £66m, 8.16x), Trans-Siberian Gold (TSG, 86p, £75m, 7.61x), Petra Diamonds (PDL, 10.33p, £89m, 20.66x), Gem Diamonds (GEMD, 69p, £96m, 3.67x), Sylvania Platinum (SLP, 35p, £100m, 9.11x), Ferro-Alloy Resources (FAR, 35.20p, £110m, 39.11x), Griffin Mining (GFM, 80.50p, £139m, 5.43x), Anglo Asian Mining (AAZ, 128.66p, £149m, 9.04x) & Base Resources (BSE, 13.75p, £160m, 3.76x).
£200m - £500m	8.8	Pan African Resources (PAF, 11.46p, £221m, 18.19x), Kenmare Resources (KMR, 218p, £239m, 4.74x), Bushveld Minerals (BMN, 26p, £291m, 8.97x), Atalaya Mining (ATYM, 217p, £298m, 8.54x), Tharisa (THS, 114p, £301m, 5.18x), Petropavlovsk (POG, 9.90p, £328m, 9.90x), Central Asian Metals (CAML, 201p, £357m, 6.42x) & Anglo Pacific Group (APF, 205p, £372m, 11.38x).
£500m - £2bn	20.5	Highland Gold Mining (HGM, 216.60p, £788m, 43.32x), Acacia Mining (ACA, 226.60p, £929m, 20.98x), Ferrexpo (FXPO, 250.10p, £1,472m, 4.40x) & Centamin (CEY, 130.60p, £1,510m, 20.09x).

Based on this understanding of the PE multiples awarded to medium-sized mining companies listed on the London Stock Exchange, when EBITDA potentially hits the US\$131 million level, the implied market capitalisation is likely to be in excess of US\$1.7 billion (£1.4 billion). Of this figure, our analysis suggests that approximately £174 million of this total can be assigned to Hellyer on its own, which is equivalent to 21p per share on a fully diluted basis. In the table below we have laid out a range of possible per share valuations (fully diluted) based on the combined value of Hellyer and Barnes Hill (BH). The value scenarios reflect varying proportions of the BH project value incorporated into the overall NQ valuation and the equity raise scenarios (medium/high dilution) reflect the potential equity component of BH's capital expenditure.

### Valuation of Hellyer + Barnes Hill Projects based on Equity Raise and BH Project Risk Scenarios

Percentage of Barnes Hill's Valuation Applied to the NQ Share Price	Equity Raise Scenario	
	Medium dilution <sup>1</sup>	High dilution <sup>1</sup>
100%	138p	102p
75%	108p	80p
50%	78p	58p
25%	47p	35p

<sup>1</sup> Estimated total equities in issue on completion of Barnes Hill funding of 1,010 million shares (medium dilution) and 1,361 million shares (high dilution).

## CONCLUSION

NQ's expansion plans make compelling reading as the project is clean and green using pyrite that is being recycled from previous projects, with produced material used in battery elements and high-tech products, based in the safe jurisdiction of Tasmania.

We consider that the current share price does not reflect the underlying potential earnings stream that can be generated from the Company's existing Hellyer assets and mineral reserves. In addition, the option to acquire the Barnes Hill site and unlock the potential synergies via a new plant at Bell Bay, if successfully achieved, will be transformational and result in a material enhancement in revenue, profitability and shareholder value. It would also transform NQ into a low-cost producer of nickel, gold and other metals for the rapidly expanding battery production market which would result in enhanced investor perception. This together with the projected potential earnings would result in a re-rating of the shares and a material uplift in value.

Some of the risk factors that could adversely affect this transformation are set out overleaf, and include the ability of the directors to tidy up the balance sheet by extending the maturity of short term debt, and then to raise adequate new funding for the ambitious capital expenditure which will be necessary to fulfil the plan.

Dr Michael Green is an independent analyst who specialises in growth companies and resources companies. He gained a BSc Honours degree in Mining Engineering from Nottingham University, UK and PhD for a thesis on the economic analysis of mining projects. He began working in the City in the 1980s as a Mining Analyst with stockbrokers Buckmaster & Moore and then HSBC-owned Greenwell Montagu Securities. Subsequently, he was involved in analysing growth companies and became Head of Research at specialist small-cap stockbroker Everett Financial. Since, 2006 Michael has been an independent analyst providing research for mining companies, stockbrokers, corporate finance houses and advisers.

## RISK FACTORS

The following risk factors are considered to be the most significant for potential investors in the company. However, the risks listed do not necessary comprise all those associated with an investment in the Company:

### General

- The Company will require additional financial resources to continue funding its future expansion. No assurance can be given that any such additional financing will be available or that, if available, it will be available on terms favourable to the company or its shareholders.
- The Company's total return and net assets can be significantly affected by currency movements.
- The Company is likely to face competition from other entities operating in its business sector, many of which have significantly greater resources than the company.
- Market perception of the Company may change.
- Development projects are uncertain and it is possible that actual capital and operating costs and economic returns will differ significantly from those estimated for a project prior to production.
- Each prospective investor should view his purchase of equity shares in the Company as a long-term investment and should not consider such purchase unless they are certain they will not have to liquidate their investment for an indefinite period. The market price of the shares may not reflect the underlying value of the assets of the Company.
- The market in the shares may be illiquid or subject to sudden or large fluctuations and it may be difficult for an investor to sell his shares and may receive less than the amount originally invested.

### Exchange

- The Company's shares are currently traded on NEX Exchange. Investments in shares traded on NEX carry a higher degree of risk and may be more difficult to realise than investments in shares quoted on the official list of the UK Listing Authority or on the Alternative Investment Market.

### Company Specific

- Your attention is drawn to Note 2 (Going Concern) to the accounts to 31 December 2018 published on 31 May 2019. As at the accounts date the Company had negative shareholder' funds of £18.9m, financial liabilities of £31m and net current liabilities of £14m. These conditions indicate a material uncertainty that may cast significant doubt about the Company's ability to continue as a going concern. The directors stated at the time that they were confident in the ability of the Company to be successful in securing additional funds through debt or equity issues, but there is no certainty that this will happen.
- The new resource estimate at Barnes Hill may fall short of expectations.
- The Company will require funding to complete the expansion. There is no assurance that the Company will be able to obtain such financing, when required, on favourable terms or at all. Any failure by the Company to raise sufficient funding to complete the construction of the expansion and place the Project into commercial production could have a materially adverse impact on the Company and the value of its securities.
- The Company's business is the extraction of minerals which is subject to environmental, safety and community risk.
- The Company's current and potential end products, base and precious metals, are subject to fluctuating prices on international markets.

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