AUSTRALIAN
RESEARCH
INDEPENDENT INVESTMENT RESEARCH

Pure Minerals Limited
(ASX Code: PM1)

February 2020

INDEPENDENT
INVESTMENT RESEARCH

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Pure Minerals Limited

(ASX Code: PM1)

NICKEL & COBALT SPECIALTY CHEMICAL PROJECT

Pure Minerals is putting together the building blocks of the Townsville Energy Chemical Hub (TECH) project to make battery specialty chemicals, based on imported ore from New Caledonia. As those building blocks come together, the market's line of sight on the cost of construction and planned performance will be clearer, and the project itself will be de-risked. We expect that shareholders will benefit from that process.

The project has a similar capital intensity (~US$58,000/tpa nickel capacity) to competing HPAL nickel projects, but its entry level cost of A$513M is 15% the HPAL entry level cost.

Funding of such a capital spend will require a major offtake partner to buy into the project. Such a buy-in is likely to be the most important re-rating catalyst from the shareholders' point of view, and because this project is designed to produce specialty chemicals for sale directly to battery makers, and has a eco-friendly credentials, it is much more likely to attract a strategic partner from the battery or automobile manufacturing sector than would an HPAL.

The project management team under John Downie have extensive experience in the processing of nickel laterite ores (Queensland Nickel, Goro Nickel Project, and Gladstone Nickel Project), and are strongly incentivised to deliver a project by the end of CY2022.

BUILDING BLOCKS COMING TOGETHER QUICKLY

Completed PFS for the basic TECH project – A$513M capex including contingency for a 30 year project, with by-product credits to make the project a low cost nickel producer, but with the nickel and cobalt to be sold in the form of specialty chemicals that should attract a price premium.

High Purity Alumina bolt on– 4ktpa of HPA Scoping Study, A$849M NPV for A$87.9M capex. Altech (ASX:ATC) has a 51% owned 4.5Ktpa HPA plant and has a market capitalization of A$68M.

Key project building blocks in place – Ore supply agreement for up to 600Ktpa for 10 years + 5 year option with two New Caledonian miners; processing technology agreement with Direct Nickel; marketing agreement; plant site secured; and energy supply MOU in place.

Competent management team is strongly incentivised to deliver – 250M deferred consideration shares will be payable to the vendors (including the management team) of the TECH project. The payment of deferred shares is dependent on delivery of a DFS, all regulatory approvals, and on decision to proceed with construction.

The growing battery sector to drive demand – Demand for nickel and cobalt in the manufacture of batteries for mobile devices, particularly electric vehicles, and for stationary load balancing storage systems expected to remain in strong uptrend.

Project is scalable to at least four times the initial capacity.

VALUATION VERY SENSITIVE, BUT PRICE TREND POSITIVE

If we include the deferred consideration shares, Pure Minerals at A$0.019/sh would have a market capitalization of A$16.1M. Our NPV for the NiCo plant ranges from A$47M using the cycle price lows of the last three years to A$585M using cycle price highs over the last three years, and A$241M assuming current spot prices flat in real terms forever. The HPA bolt-on is additional value. These valuations are for the project only, and take no account of the cost of corporate overheads, nor of financing dilution. We believe the strong long term demand trend driven by the accelerating take up of batteries in electric vehicles will underpin a rising trend in nickel and cobalt prices, but with continuing high levels of price volatility.

Please note our valuations assume the project is approved for development, which is uncertain, and is based on the interim cost figures as presented in the 2019 PFS, which are likely to be revised in the course of producing a Bankable Feasibility Study. As a result, the costs, and hence the valuation, should be treated as being indicative only.

Rating

Investment Profile

Share Price ($) at 11 February 2020	0.019
Issue Capital:	
Ordinary Shares (M)	596.1
Options (M)	70.0
Deferred Consideration Shares to be issued (116.6M issued already)	250.0
Fully Diluted (M)	916.1
Market Capitalisation incl deferred consideration shares (M)	A$16.1
12 month L/H ($)	0.012-0.021

Board and Management

Directors:

Eddie King - Non-Executive Chairman

John Downie – Managing Director

Cameron McLean – Non Executive Director

Major Shareholders (20 September 2019)

Mr Andrew Matheson	7.50%
Mr John Downie	6.83%
Mrs Lily Ma	4.71%

Share Price Performance

The investment opinion in this report is current as at the date of publication. Investors and advisers should be aware that over time the circumstances of the issuer and/or product may change which may affect our investment opinion.

VALUATION IN MORE DETAIL

- There are 596.1M shares on issue as at 3 February 2019, and 250m more deferred consideration shares payable to the shareholders of QMP subject to a time line that would see commitment to construction of the TECH Project by November 2022. At that point, the total shares on issue would be 846.1M shares, plus any additional shares from raisings to fund ongoing activity, or conversion of options.
- At the current share price of A$0.019/sh, the market capitalization of the company including deferred consideration shares would be A$16.1M.
- Prior to the acquisition of QPM and the TECH Project, the company on its then asset base was valued at A$3.8M by the market, so the current implied valuation of QPM is just over A$12M.

Table 1 TECH project (excluding the HPA Project) NPV based on commodity highs and lows over last three years

	Nickel US$/lb	Cobalt US$/lb	AUDUSD	Project NPV A$M
3 Year Price High	6.85	41.09	0.74	585.50
Current Spot	6.35	14.63	0.68	241.50
3 Year Price Low	3.49	12.37	0.68	47.40

Source: IIR estimates

- On the basis of the PFS economics, on an after tax basis, a nominal WACC of 7.2%, and no allowance for any R&D Incentive recoveries from the Australian Tax Office, we can generate valuations between A$47M and A$585M. The high end assumes the nickel cobalt and AUDUSD as at the highest monthly prices in the last three years, and the low end is the lowest monthly prices over the same period. At current (30 January 2020) prices, the NPV is A$241M.
- This is a very wide range, but we are comforted by the forecast strength of the nickel and cobalt demand likely to be driven by the battery manufacturing sector, and the general invasion of battery technology into all areas of life, from mobile phones, to power tools, to electric vehicles, and to stationary power supply installations. We expect that over the period that this project will need to get to financial close, we will see higher highs and higher lows in what will remain a volatile nickel and cobalt pricing environment.
- What is relatively comfortable to forecast is that the project is worth substantially more that the A$16.1M market capitalization referred to above.
- We estimate the value of the R&D Inventive tax refund included in Pure Minerals TECH project PFS is A$135M. If received, that would amount to an uplift in our valuation of A$0.16/sh.

SENSITIVITY

- Increasing nickel prices by US$1/lb increases NPV by A$108M
- Increasing cobalt prices by US$5/lb increases NPV by A$85M
- Increasing AUDUSD rate by 0.05 decreases NPV by A$100M
- Increasing the discount rate by 1% decreases NPV by A$70M

POTENTIAL UPSIDE TO VALUATION

- The Scoping Study for the High Purity Alumina Plant was released on 11 February 2020. As a simple measure of comparative valuation, Altech (ASX:ATC) has a market capitalization of A$68M and owns 51% of the just completed 4500tpa HPA plant in Malaysia and kaolin mine in Australia. The comparative valuation upside to Pure Minerals is A$118M. However, the Pure Minerals HPA plant costs are much lower than Altech because the feedstock is high purity Aluminium Hydroxide vs natural kaolin, the EBIT margin is significantly higher, and therefore the valuation should be higher than Altech once the Pure Minerals plant is built. We have yet to model the Pure Minerals HPA plant in detail.
- Successful exploration at the Eden Garry Project (EPM 27035) in the prospective Malborough region of Queensland. At this stage, the company is not reporting any activity on this asset.
- Sale or spinout of assets owned pre the acquisition of QPM and the TECH Project.

FINANCIAL POSITION

- Pure Minerals had cash on hand at 31 December 2019 of A$1.12M and forecast outgoings per the 5B cash flow statement of A$0.629M during the March 2020 quarter.
- Pure Minerals has been successful in obtaining an Australian Federal Government grant of A$2.55M as part of the CRC-P round 8 program. This funding will be used to fund ongoing development of the TECH project, most notably works relating to pilot plant trials and product acceptance testing.
- As part of the grant, Pure Minerals' partners CSIRO and Direct Nickel will also contribute A$1.6M to these activities (PM1 release 31 January 2020). The combined funding will total A$4.15M.
- The Federal Government funding will be provided in 6 quarterly tranches over FY20 and FY21. The funds are to be spent on conducting the processing tests on the ore bulk sample through the CSIRO/DNi plant in Perth to produce Mixed Hydroxide Product (MHP), and also run pilot tests processing the MHP through a Sulphate Pilot Plant to produce saleable sulphate products.

FINANCING

- The starting point for funding the construction of a project like this would be a traditional 60-70% project debt, 40-30% equity package, that would require and equity raise of A$160-220M which in turn would require Pure Minerals to nave a market capitalization of around A$200m.
- In the absence of the share market providing that kind of recognition, there are alternatives.

Project sell down to offtake partner

- A project sell down to an offtake partner is a strategy Orocobre used very effectively to get its Olaroz Lithium Project funded, with a sell down to major offtake partner, Toyota, and retaining a 66.5% share. The market capitalization of Orocobre rose from A$110M to A$182M in the 4 days following the announcement of Toyota's involvement (there was no mention of acquisition price at that time). Toyota involvement also bought in JOGMEC low cost debt funding.
- Because the TECH project is planned to produce products saleable directly to battery makers, and because the banks will want significant comfort regarding sales contracts, the presence of an offtake partner as a shareholder has multiple benefits, and should be seen as the most preferred form of equity raising.
- The selldown reduces the share of the project that Pure Minerals will be responsible for funding, it would raise cash to contribute to Pure Minerals equity requirement, it provides offtake clarity, and investors take comfort from the completion of due diligence by a technically competent corporate.

R&D Incentive Scheme based lending

- The Australian Tax Office Research & Development Incentive Scheme could potentially provide a cash payment of 38.5% of qualifying expenditure. The construction of the first nickel processing plant to use the Direct Nickel technology developed in partnership with the CSIRO and the sulphate refining technology developed directly by the CSIRO has a strong chance of qualifying.
- Pure Minerals has not published the amount of that payment but from the published PFS NPVs we estimate the company expects to receive A$135M which would amount to a refund of around 26% of the overall PFS pre-production capex.
- While Pure Minerals should be able to borrow against the project itself, there are specialist lenders that will lend against the R&D Tax Incentive scheme payment, as a separate asset. Depending on the detail of the loan, the Main Street banks may see funds advanced against the R&D Incentive as equity.
- We would not expect that a lender would lend 100% of the expected payment, but this has the potential to be a material contribution to Pure Minerals' non-bank funding contribution.

Export Import Funding

- The components of the processing plant would be sourced from suppliers experienced in their construction and operation. Depending of the country of origin, there may be funding available to assist in the purchase.

Prepayment against future sales

- For high margin projects, there is the ability to receive payment in advance from off-takers. That cash can be used to assist with funding the construction of the project.
- This is generally for a specific, relatively short duration period of sales (ie 10% of sales for the first two years).

Sale of royalties and commodity streams

- There are a number of investment funds that will pay cash for mineral royalties or streams. The fund provides cash up front, often as early as in the exploration stage, and is repaid by receiving a percentage of the metal output, either in actual physical form, or notionally with a cash payment of the financial equivalent. This funding is very common in precious metals. A couple of groups are starting to supply this option to battery commodities.
- This form of finance can be expensive if the project is long life, and the royalty is uncapped. However, the advantage is that, as a provider of funds, the royalty or stream holder cannot bankrupt the producer.
- This form of funding may not be suitable if the project includes an offtake partner in the production joint venture. That party typically doesn't need the funding assistance, and is trying to maximise the access to the materials, and minimise the long term cost of purchasing the materials.

RISKS

- The TECH project will produce nickel and cobalt in the form of specialty chemicals, rather than LME deliverable metal. While this is an advantage in that the project should earn a selling premium, it will not be able to deliver nickel or cobalt metal into the terminal market of the London Metal Exchange. Instead it will have to reliably deliver to the specific specifications of its various customers.
- The core of the business is the ore supply. If that supply was interrupted, the business would be in trouble. This risk is moderated by New Caledonia's almost total dependence on exporting nickel in various forms as its major source of export income. In addition, there are other potential sources of nickel laterite ore, and Pure Minerals has a local property that may prove to be a commercial deposit.
- Financing poses a large hurdle with a PFS capital spend of A$513M and a current market capitalization of A$11M. We believe that the market capitalization will increase as the project is de-risked. However, if the share market doesn't re-rate the company to the point where it can fund the project, the company is likely be in a position to sell all or part of the project.
- Technological risk is high given this will be the first commercial plant built globally using this processing route. The offsets to that risk is that there is a substantial pilot plant in Perth capable of continuous testing (as opposed to batch processing). Also, the stages of the process are well known, used in a number of other industries, and well understood. The major source of risk for these kinds of projects if the uncertainty at the front end caused by using a natural material as a major input. The pilot work is critical to understand and manage this element.
- Cost revision can occur between the PFS and DFS. The PFS is typically to an accuracy of +/-25%, and costs typically go up rather than down.
- Commodity price risk is a fact of life in the materials sector. The defence is having a cost of production that is lower than a significant part of the cost curve. On the PFS numbers, this is certainly the case, due to the co-product credits. For projects that have a relatively low cost of production, there is a capacity to weather the downturns, and in the upturns, the commodity volatility works in favour of the materials producer. We also believe that nickel is in a structural demand uptrend, and while there is an oscillating business cycle on top of that trend, over time we expect to see higher demand highs and higher demand lows.
- Currency risk is also a fact of life, but in this case, Australia is a wonderful place to base a globally exposed exporting materials business, because of the historical synchronization of the Australian exchange rate to the global business cycle. In periods of global demand weakness, the Australian dollar typically falls, assisting to protect the margins of exporters.

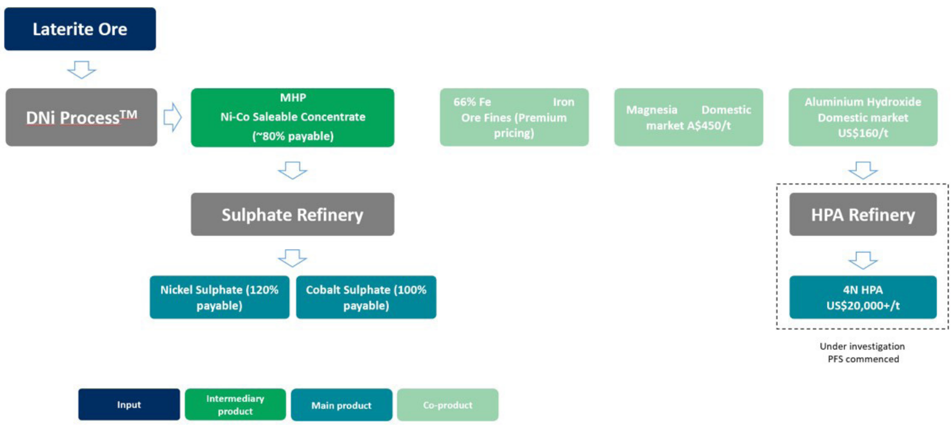
TOWNSVILLE ENERGY CHEMICAL HUB (TECH) PROJECT

HISTORY

- Pure Minerals has an unspectacular history as Eagle Mining (ASX:ENL) before changing its name and working up a manganese project.
- On 15 October 2018, the company announced the purchase of an option to acquire Queensland Pacific Metals Pty Ltd (QPM). QPM had secured at that time a binding ore supply agreement from two established New Caledonian mining companies, a plan for processing that ore, and the in house expertise to deliver on that plan.
- The option exercise was approved at a General Meeting on 1 May 2019, and the formal acquisition was announced on 15 May 2019. QPM is the operating company, and the Townsville Energy and Chemicals Hub (TECH) is the project.
- Pure Minerals has made a number of announcements as the building blocks of the project fall into place, including the ore sourcing, plant location, marketing agreement, processing technology agreement, and energy supply.
- The TECH Project has been detailed in the Scoping study of 21 January 2019 and the PFS of 9 December 2019.

TECH PROJECT PROCESS AND PLANT LAYOUT

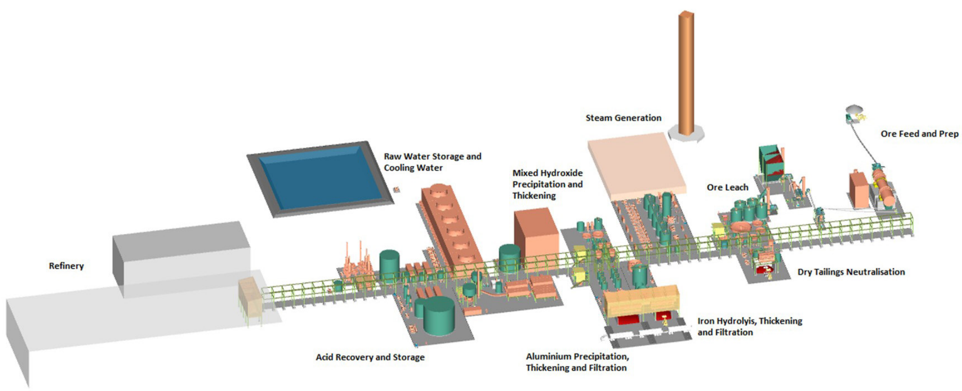
Figure 1 Process flow sheet



Source: PM1 presentation 11 December 2019 (MHP = Mixed Hydroxide Precipitate)

- The purchased ore will be shipped to Townsville port, unloaded and trucked to the Lansdown plant site, where it will be crushed to 1-2mm before being conveyed to the leaching tanks, the first stage of the DNi Process™.
- The ore remains in the leach tanks for ~4 hours at 110 degrees Celsius before separating out anything not dissolved by the nitric acid.

Figure 2 Physical plant layout



Source: PM1 presentation 11 December 2019

- The next series of tanks removes iron from solution as saleable hematite, then magnesium oxide is added to the solution to precipitate the aluminium product which is filtered out. Further magnesium oxide is added, which drops out a mixed nickel cobalt hydroxide precipitate (MHP) containing 35-45% Ni and 1-2% Co. Spent solution is converted to magnesium oxide for sale. The resultant nitric oxide gas is converted to nitric acid and reused.

- At this point, the MHP exits the DNi Process™ and is saleable, at around 80% of the LME nickel price.
- The MHP then passes to the Sulphate Refinery, where it is converted to separate chemical grade nickel sulphate and cobalt sulphate products, tailored to customer specifications.
- Pure Minerals has published a Scoping Study on the upgrading of its aluminium hydroxide output into High Purity Alumina (HPA), which appears to add considerable value to the project.

FINANCIAL MODEL

Table 2 Production volumes: Life of Mine and the first four production years

	LOM	Jun-22	Jun-23	Jun-24	Jun-25	Jun-26	Jun-27
Ore Purchased Kwmt	16971	0	0	566	566	566	566
Water		0	0	0.3	0.3	0.3	0.3
Ore Kdmt		0	0	396	396	396	396
Nickel		1.60%	1.60%	1.60%	1.60%	1.60%	1.60%
Cobalt		0.18%	0.18%	0.18%	0.18%	0.18%	0.18%
Iron		46.6%	46.6%	46.6%	46.6%	46.6%	46.6%
Aluminium		1.69%	1.69%	1.69%	1.69%	1.69%	1.69%
Magnesium		3.02%	3.02%	3.02%	3.02%	3.02%	3.02%
Contained Kt							
Nickel	190	0.0	0.0	6.3	6.3	6.3	6.3
Cobalt	21	0.0	0.0	0.7	0.7	0.7	0.7
Iron	5536	0.0	0.0	184.5	184.5	184.5	184.5
Aluminium	201	0.0	0.0	6.7	6.7	6.7	6.7
Magnesium	359	0.0	0.0	12.0	12.0	12.0	12.0
Recovery							
Nickel	0	93.9%	93.9%	93.9%	93.9%	93.9%	93.9%
Cobalt	0	92.2%	92.2%	92.2%	92.2%	92.2%	92.2%
Iron	0	91.0%	91.0%	91.0%	91.0%	91.0%	91.0%
Aluminium	0	71.0%	71.0%	71.0%	71.0%	71.0%	71.0%
Magnesium	0	91.0%	91.0%	91.0%	91.0%	91.0%	91.0%
Metal in Product							
Nickel	179	0.0	0.0	6.0	6.0	6.0	6.0
Cobalt	20	0.0	0.0	0.7	0.7	0.7	0.7
Iron	5038	0.0	0.0	167.9	167.9	167.9	167.9
Aluminium	143	0.0	0.0	4.8	4.8	4.8	4.8
Magnesium	326	0.0	0.0	10.9	10.9	10.9	10.9
Metal Grade in Product							
Nickel		22.5%	22.5%	22.5%	22.5%	22.5%	22.5%
Cobalt		21.2%	21.2%	21.2%	21.2%	21.2%	21.2%
Iron		53.9%	53.9%	53.9%	53.9%	53.9%	53.9%
Aluminium		47.9%	47.9%	47.9%	47.9%	47.9%	47.9%
Magnesium		54.2%	54.2%	54.2%	54.2%	54.2%	54.2%
Product Produced Kt							
Nickel Sulphate	791.9	0.0	0.0	26.4	26.4	26.4	26.4
Cobalt Sulphate	92.9	0.0	0.0	3.1	3.1	3.1	3.1
Hematite (66% Fe2O3)	9338	0	0	311	311	311	311
Aluminium Hydroxide (Al(OH)3	297.6	0.0	0.0	9.9	9.9	9.9	9.9
Magnesium	602.4	0.0	0.0	20.1	20.1	20.1	20.1

Source: PM1 PFS release 11 December 2019

- The project has a 30 year life for NPV calculation.
- The data is generally as supplied in the PFS, with some changes.

- The changes include lower nickel and cobalt recoveries to force the as reported product volumes, and modified metal grades of product sold for the other products (Hematite, Aluminium Hydroxide, and Magnesium), which were not obvious in the PFS, and our recovery numbers are to force the as reported products sold.

Table 3 Calculation of sales revenue; Life of Mine and first four production years

	LOM	Jun-22	Jun-23	Jun-24	Jun-25	Jun-26	Jun-27
Product Sold Kt							
Nickel Sulphate	792	0.0	0.0	26.4	26.4	26.4	26.4
Cobalt Sulphate	93	0.0	0.0	3.1	3.1	3.1	3.1
Hematite (66% Fe2O3)	9338	0.0	0.0	311.3	311.3	311.3	311.3
Aluminium Hydroxide (Al(OH)3	298	0.0	0.0	9.9	9.9	9.9	9.9
Magnesium	602	0.0	0.0	20.1	20.1	20.1	20.1
Prices							
Nickel LME US$/lb	0	0.00	0.00	7.00	7.00	7.00	7.00
Sulphate Premium US$/lb	0	0.00	0.00	2.00	2.00	2.00	2.00
Nickel Sulphate US$/lb	0	0.00	0.00	9.00	9.00	9.00	9.00
Cobalt Sulphate US$/lb	0	0.00	0.00	25.00	25.00	25.00	25.00
Hematite Benchmark (62% Fe2O3) US$/t	0	0.00	0.00	61.63	61.63	61.63	61.63
Hematite (66% Fe2O3) US$/t	0	0.00	0.00	66.68	66.68	66.68	66.68
Aluminium Hydroxide (Al(OH)3 US$/t	0	0	0	160	160	160	160
Magnesium A$/t	0	0	0	450	450	450	450
AUDUSD	0	0	0	0.68	0.68	0.68	0.68
Revenue							
Nickel	0	0.0	0.0	135.1	135.1	135.1	135.1
Sulphate Premium	0	0.0	0.0	38.6	38.6	38.6	38.6
Nickel Sulphate	0	0.0	0.0	173.7	173.7	173.7	173.7
Cobalt Sulphate	0	0.0	0.0	53.3	53.3	53.3	53.3
Hematite (66% Fe2O3)	0	0.0	0.0	30.5	30.5	30.5	30.5
Aluminium Hydroxide (Al(OH)3	0	0.0	0.0	2.3	2.3	2.3	2.3
Magnesium	0	0.0	0.0	9.0	9.0	9.0	9.0
Total	0	0.0	0.0	268.9	268.9	268.9	268.9

Source: Source: PM1 PFS release 11 December 2019

- The assumptions in these tables are the same as the PFS. All the dollars are real 2019 dollars, with no inflation applied. This is to provide the investor with a vision of what is in the PFS, as best as we can unpick it from the public domain data.
- While these tables show the zero inflation case, our investment case assumes inflation, and using either todays spot prices and costs rising long term with inflation, or the three year highs and lows of the commodity and currency markets.
- Our NPVs pre tax and post tax are A$135M less than the NPVs quoted by the company. However, the company's NPVs are said to include the R&D Incentive scheme recoveries, so we assume this difference is the company's estimate of those recoveries ie A$135M.
- There is no sustaining capex, which we assume has been rolled into the opex numbers.
- The PFS provides a total annual cost of delivering ore to site. We have made estimates regarding the costs of sea freight, Townsville Port, trucking from port to site, and the purchase price of the ore is the balance, which turns out to be 20.5% of the value of the recoverable metal in the ore. We do not know if this is how the contract is actually written, but it is the best approximation we can do using the publicly available data.

Table 4 Operation costs and Profit and Loss/Cash Flow for Life of Mine and first four operating years

	LOM	Jun-22	Jun-23	Jun-24	Jun-25	Jun-26	Jun-27
Capex A$M							
Pre Production	513	256.5	256.5	0.0	0.0	0.0	0.0
Sustaining	0	0.0	0.0	0.0	0.0	0.0	0.0
Rehab	0	0.0	0.0	0.0	0.0	0.0	0.0
Other	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	513	256.5	256.5	0.0	0.0	0.0	0.0
Inflation	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Inflator	0	1.00	1.00	1.00	1.00	1.00	1.00
Tax Rate	0	30%	30%	30%	30%	30%	30%
Operating Unit Cost							
Recoverable Ore Value A$/t	0	0	0	341	341	341	341
Paid Percent	0	20.5%	20.5%	20.5%	20.5%	20.5%	20.5%
Ore Purchase US$/t FOB	0	0.0	0.0	70.0	70.0	70.0	70.0
Shipping US$/t	0	4.5	4.5	4.5	4.5	4.5	4.5
Townsville Port A$/t	0	3.0	3.0	3.0	3.0	3.0	3.0
Trucking A$/t 40Km	0	4.0	4.0	4.0	4.0	4.0	4.0
Ore Supply & Logistics A$/t	0	11.5	11.5	81.5	81.5	81.5	81.5
Labour A$/t ore	0	26.3	26.3	26.3	26.3	26.3	26.3
Utilities & Reagents A$/t Ore	0	125.5	125.5	125.5	125.5	125.5	125.5
Maintenance A$/t ore	0	17.0	17.0	17.0	17.0	17.0	17.0
Other Costs A$/t ore	0	6.0	6.0	6.0	6.0	6.0	6.0
Selling Costs A$/t NiCo product	0	322.1	322.1	322.1	322.1	322.1	322.1
Operating Costs A$M							
Ore Supply & Logistics	1383	0.0	0.0	46.1	46.1	46.1	46.1
Labour	447	0.0	0.0	14.9	14.9	14.9	14.9
Utilities & Reagents	2130	0.0	0.0	71.0	71.0	71.0	71.0
Maintenance	288	0.0	0.0	9.6	9.6	9.6	9.6
Other Costs	102	0.0	0.0	3.4	3.4	3.4	3.4
Selling Costs	285	0.0	0.0	9.5	9.5	9.5	9.5
Total	4635	0.0	0.0	154.5	154.5	154.5	154.5
Revenue	8067	0.0	0.0	268.9	268.9	268.9	268.9
Costs	-4635	0.0	0.0	-154.5	-154.5	-154.5	-154.5
Depreciation	-513	0.0	0.0	-17.1	-17.1	-17.1	-17.1
EBIT	2919	0.0	0.0	97.3	97.3	97.3	97.3
Tax	-876	0.0	0.0	-29.2	-29.2	-29.2	-29.2
NPAT	2043	0.0	0.0	68.1	68.1	68.1	68.1
Capex	-513	-256.5	-256.5	0.0	0.0	0.0	0.0
Pre Tax Cash Flow	2919	-256.5	-256.5	114.4	114.4	114.4	114.4
Post Tax Cash Flow	2043	-256.5	-256.5	85.2	85.2	85.2	85.2
NPV Pre Tax		646.7					
NPV Post Tax		365.0					

Source: PM1 PFS release 11 December 2019

CALCULATION OF DISCOUNT RATE

Table 5 Calculating cost of capital

Cost of Equity	WACC Used	Pure Minerals Limited
Beta Range	1.60	-0.14
Risk free rate (Rf)	0.95%	0.95%
Market Risk premium (Rm)	4.93%	4.93%
Market Return (Rm)	5.88%	5.88%
Cost of Equity	8.84%	0.26%
Gearing		
Gearing D/(D+E)	60%	60%
Gearing E/(D+E)	40%	40%
Nominal WACC		
Cost of Equity Ke	**8.84%**	**0.26%**
Cost of Debt Kd	8.72%	8.72%
Tax Rate	30%	30%
Weighted Average Cost of Capital (Ke)	**7.20%**	3.77%
Real WACC		
Expected Inflation	1.15%	1.15%
Therefore Real WACC	5.98%	2.59%

Sources: See text below

- Beta – The 5 year calculated beta per Yahoo Finance is -0.14, which says nothing other than the PM1 share price has been falling while the ASX broad indices have been rising. We have arbitrarily chose a Beta of 1.6 as being appropriate for a company and project like this.
- Risk Free Rate – Reserve Bank of Australia 10 year Commonwealth Bond at 28 January 2020.
- Market Risk Premium - http://www.market-risk-premia.com/au.html
- Expected inflation – RBA 10yr Bond Rate less the RBA 10yr Indexed Bond Rate
- Cost of Debt – based on RBA series for BBB rated corporate borrowers. If an offtake partner or ImpEx equipment supplier can bring in low cost finance, then a lower borrowing rate might be more appropriate.
- The company has used a discount rate of 8% real on uninflated prices and costs, compared to the market real discount rate estimated in the table above of 5.98%.
- We believe the appropriate discount rate for this operation, once the market was satisfied that it was proceeding would be 7.2%. In the meantime, the company has to deliver a DFS (reducing cost risk), and funding (reducing dilution risk). Until those risks are covered off, the company will trade at a significantly higher discount.

THE BUILDING BLOCKS

Ore Supply Agreement

Table 6 Ore supply agreement summary

Ore Suppliers	Societe des Mines de la Tontouta (“**SMT**”) Societe Miniere Georges Montagnat S.A.R.L (“**SMGM**”)
Ore Source	From, but not limited to, any of three operating mines located in New Caledonia
Minimum ore grade to be supplied	Nickel > 1.4% Cobalt > 0.15% (From discussions with SMT/SMGM, expected grade to exceed contractual minimums, in line with export history to Townsville detailed below)
Term	5 years from the date of first ore shipping of first ore (being not before June 2020), extendable by mutual agreement
Tonnes	600,000 tonnes Ni-Co ore per annum commencing from the commencement of the Term
Price	Indexed to the Nickel and Cobalt LME price
Conditions	The ore supply agreement is conditional on the following: 1. The completion of a feasibility study to the satisfaction of QPM in respect of the development of the processing plant and QPM providing a notice to SMT/SMGM regarding its decision to proceed with the development of the processing plant 2. New Caledonia regulatory export approvals 3. Formalisation of a detailed ore supply contract based on the current agreed terms in the ore supply agreement

Table 1: Key terms of QPM ore supply agreement between QPM, SMT and SMGM dated 2 May 2018

Source: Pure Minerals release 15 October 2018

- The actual imported ore grades are expected to be in the range of 1.55-1.65% for nickel and 0.17-0.18% for cobalt (release 11 December 2018). This is consistent with the history shown in the table below.
- The agreement was extended from five years to ten years on 16 October 2019 with an option to extend for five more years, to provide greater supply security for project financing.
- The pricing is commercial in confidence, but is related to the prices of nickel and cobalt. The projects profitability improves as nickel and cobalt prices rise.
- New Caledonia has a long history of exporting to Australia, supplying Queensland Nickel’s Yabulu plant with feed stock for many years (table below).

Table 7 History of Australian imports of ore from New Caledonia to Townsville

	2008	2009	2010	2011	2012	2013	2014	2015	2016
Imports (M wmt)	1.56	1.53	2.30	2.20	1.79	1.58	2.01	1.00	0.08
Ni %	1.62%	1.62%	1.55%	1.56%	1.58%	1.57%	1.54%	1.54%	1.68%
Co %	0.17%	0.17%	0.18%	0.18%	0.17%	0.17%	0.19%	0.17%	0.17%

Source: Pure Minerals release 15 October 2018

- New Caledonia is also one of the biggest exporters of nickel ore in the world.
- In terms of due diligence, one of the most powerful sources of comfort on the supply side is that nickel and cobalt ores and metals made up 95% of the country’s exports in 2017, and the country runs a trade deficit, so needs to maintain or expand those exports.

Table 8 General New Caledonian import and export data

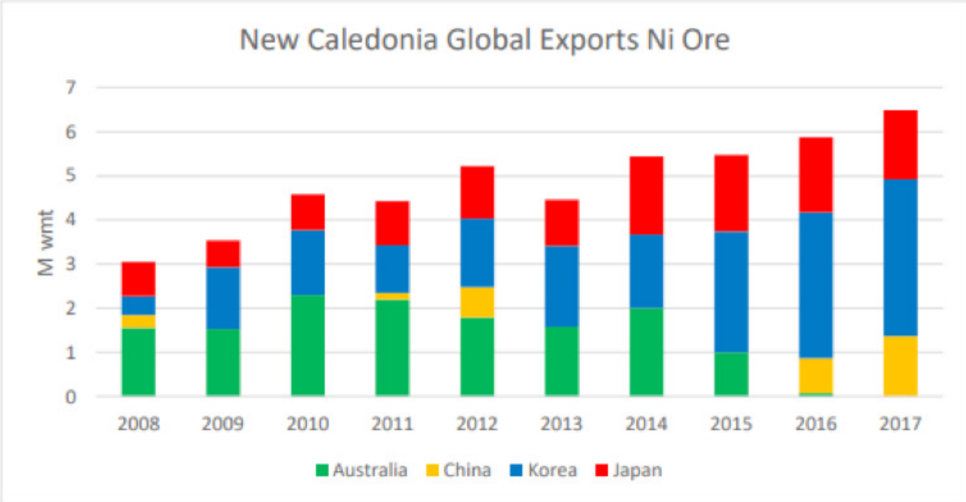
2017	Total	Ferroalloys	Ni Matte	Ni Ore	Cobalt	Other
Exports US$M	1480	654	358	330	61.5	76.5
	Total	**Petroleum Products**	**Food**	**Coal Briquettes**	**Cars**	**Other**
Imports US$M	2040	321	119.8	93.7	84.5	1421

Source: https://oec.world/en/profile/country/ncl/

- We note that Queensland Nickel’s Yabulu Nickel refinery (currently shut) has been able to operate over many decades based on ore imports from New Caledonia, at 1.5-2.5Mtpa vs the 0.6Mtpa needed fort the TECH project, and was never in danger of closing as a result of supply difficulties.

- Shipping distance from New Caledonia to Townsville is 1298 nautical miles which at 10 knots/hour is 5.4 sea days http://ports.com/sea-route/port-of-townsville,australia/port-de-we,new-caledonia/

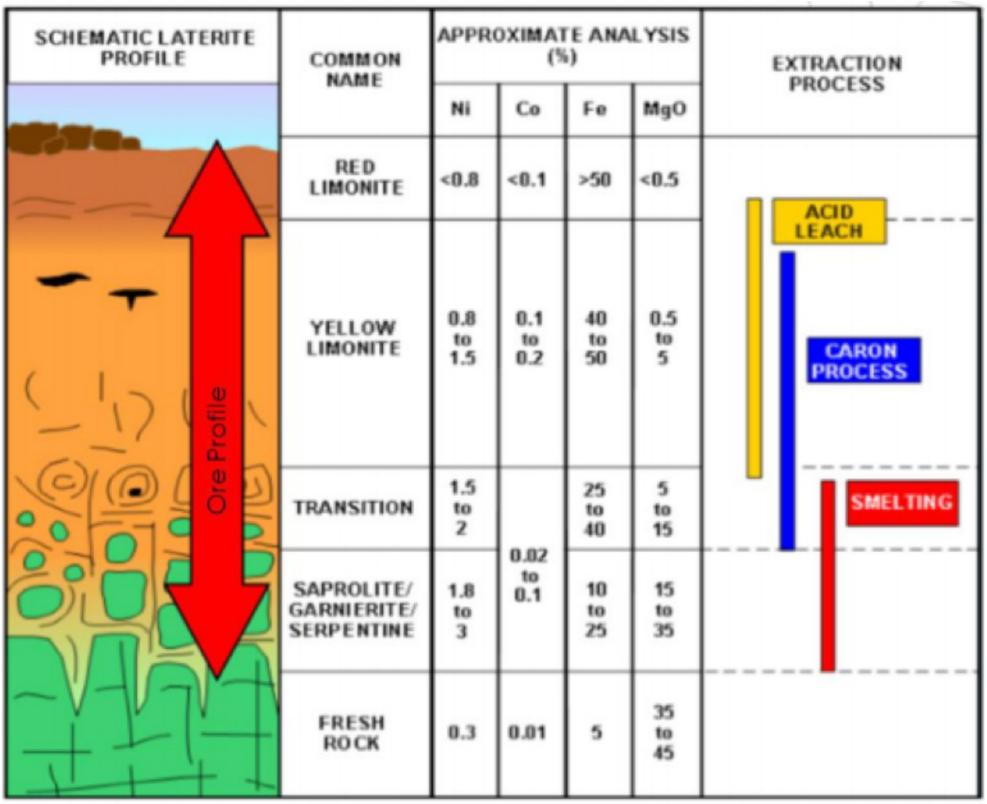
Figure 3 New Caledoniam nickel ore exports by destination



Source: Pure Minerals release 15 October 2018

- The figure below shows the typical weathering profile. The large ferro nickel producers in New Caledonia and Japan process the higher nickel grade ore from the saprolite zone. In order to mine the lower zone, the lower grade limonite oxide must be mined as well, and unless it can be sold, it is waste to the mining operation. This material is difficult to stockpile in tropical rainfall conditions. This sets the scene for a relationship between QPM and the New Caledonian miners for mutual strategic benefit.

Figure 4 New Caledonian laterite nickel profile



Source: Pure Minerals release 15 October 2018

PROCESSING TECHNOLOGY FRAMEWORK AGREEMENT

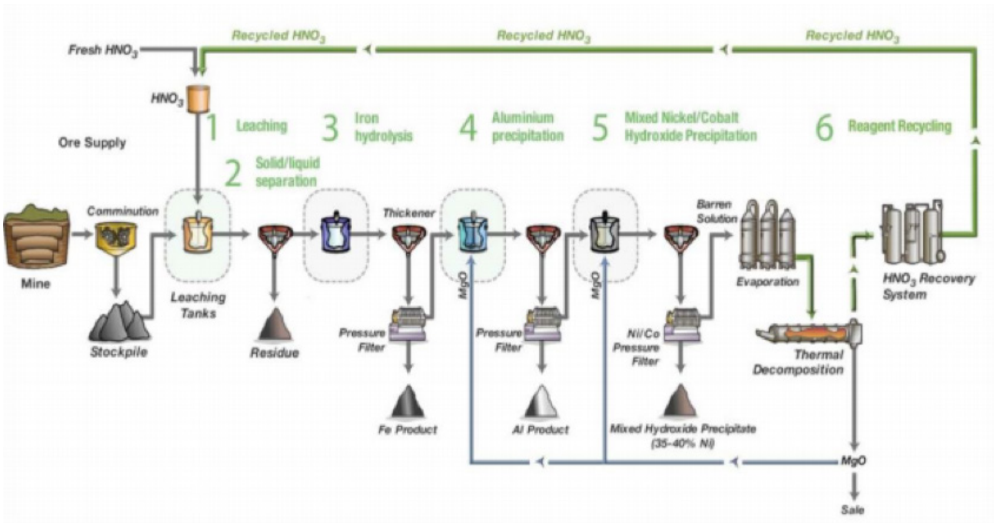
- QPM has entered into a framework agreement with Direct Nickel Projects Pty Limited announced on 22 October 2018, to allow QPM to use the DNi Process TM to extract nickel and cobalt from the New Caledonian ore.

- The DNi Process™ has significant advantages over the HPAL process which has proven to have a very high capital cost.

Advantages of DNi Process™

- The leaching reagent (nitric acid) that is used to extract payable metals from laterite ores is recycled, reducing acid consumption to a minimal top up requirement, and resulting tailings production that is one third what would be produced from an HPAL plant of the same input capacity.
- Nitric acid does not attack most stainless steels, so the materials used to construct a DNi plant are lower cost and easier to fabricate than for an HPAL, which requires titanium.
- The DNi Process™ produces more by-products which can be sold rather than be treated as waste.

Figure 5 Direct Nickel process flowsheet



Source: http://www.directnickel.com

- The CSIRO Pilot Plant in Perth was designed and built to verify the DNi Process™. Pure Minerals expects to start processing 100t of its laterite shortly.
- The plant has successfully treated ore from Indonesia and Brazil. It has operated for 11 months over 19 campaigns (10-28 days each) where operation was continuous over 24hrs.
- The campaigns test the full process including leaching through to Mixed Hydroxide Precipitate (MHP) and full nitric acid regeneration operated continuously in closed cycle, simulating commercial plant operations and problems. This is important to allow the identification build-up of deleterious elements in the recycled streams.

Table 9 Recoveries by commodity

Element	Element	Element
Primary Products		
Nickel	1.70%	98.00%
Cobalt	0.15%	98.10%
Co-Products		
Aluminium	1.37%	95.40%
Iron	35.55%	96.10%
Magnesium	6.14%	95.30%
Scandium	40ppm	97.30%

Source: PM1 release 23 October 2018

- Test work has been completed on a 60Kg ore sample with recoveries of 95% of nickel and cobalt after 4 hours of leaching (Release 23 October 2018). The work was done by Core Metallurgy Pty Ltd in Brisbane at laboratory bench scale.

Figure 6 The CSIRO/Direct Nickel pilot plant in Perth WA

Source PM1 release 22 October 2018

Coproducts

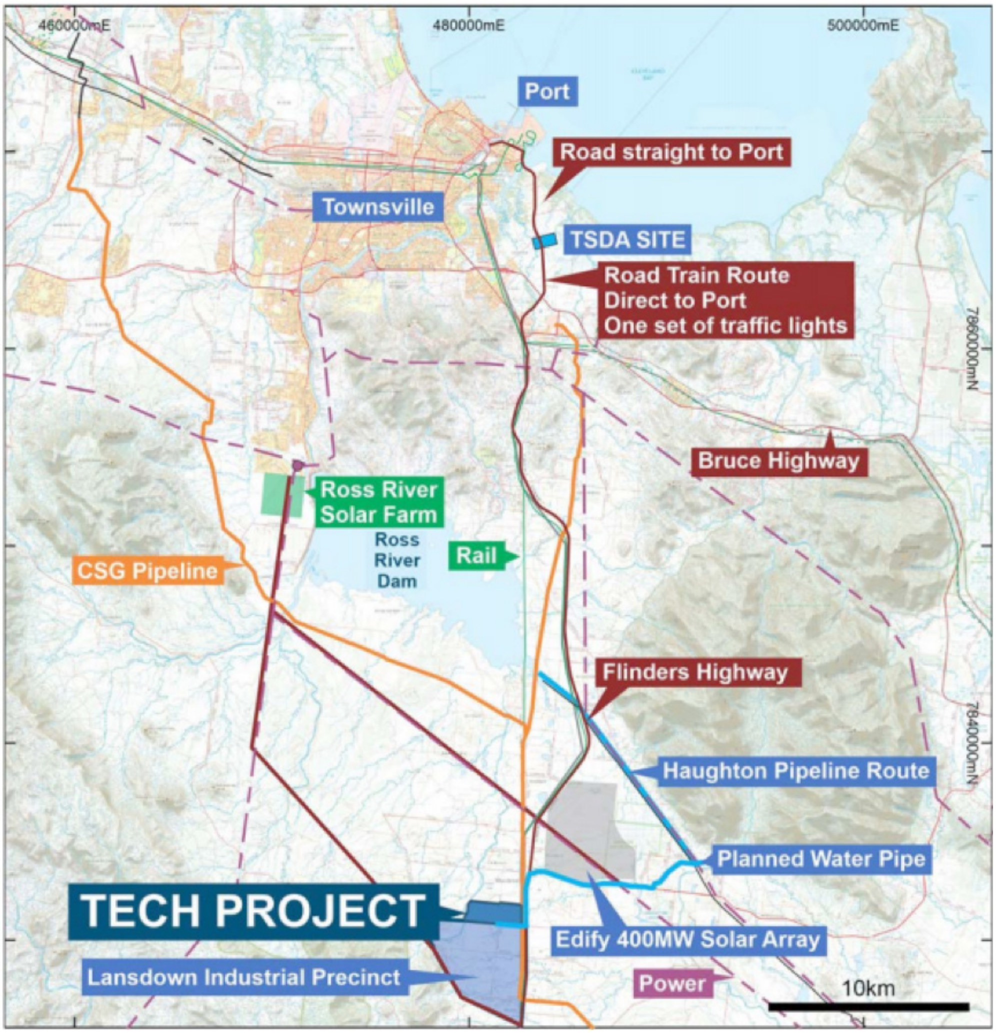
- 4N high purity alumina (HPA) – PM1 engaged Stimulus Group to undertake a series of laboratory tests, and they successfully produced HPA from the TECH projects aluminium hydroxide product stream. Stimulus has worked on the bankable feasibility study for Altech Chemicals' Malaysian HPA plant (release 6 November 2019). The Scoping Study release of 11 February 2020 was the next step in this project. The next major news item will be a revised PFS for the TECH project with an integrated HPA plant included.
- The project will produce an number of monetizable by-products rather than producing waste streams. These products include:
  - Hematite
  - Magnesia
  - Aluminium Hydroxide or HPA

MARKETING AGREEMENT

- QPM has entered into an agreement with metals marketing group Top Marketing, headed by Norman Ting, with strong relationships in China and Asia. Norman Ting was previously Managing Director at Wogen Resources (PM1 release 8 January 2019).

TOWNSVILLE PLANT SITE SECURED

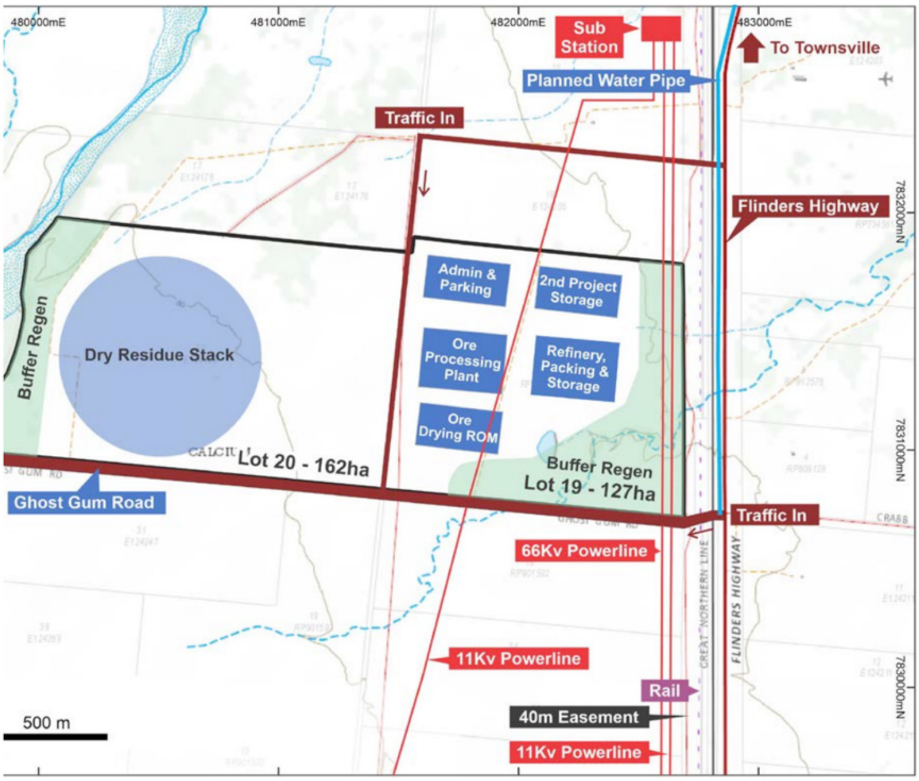
Figure 7 Location of processing plant and infrastructure



Source: PM1 release 24 July 2019

- QPM has conditional commitment from the Townsville City Council for land in the Lansdown Industrial Precinct, 40km south of Townsville.
- The Imperium3 consortium is planning to build a battery manufacturing plant in the precinct.
- The site is connected to Townsville port by a rail easement which could be used to transport ore to the processing plant.
- The Ross River Solar Farm (150MW) and the Edify Solar Farm (400MW) are close by. The PM1's TECH project will require 10MW of power.
- The site is served by major power lines, and is adjacent to a gas pipeline.

Figure 8 More detailed plant layout



Source: PM1 release 24 July 2019

ENERGY SUPPLY MEMORANDUM OF UNDERSTANDING

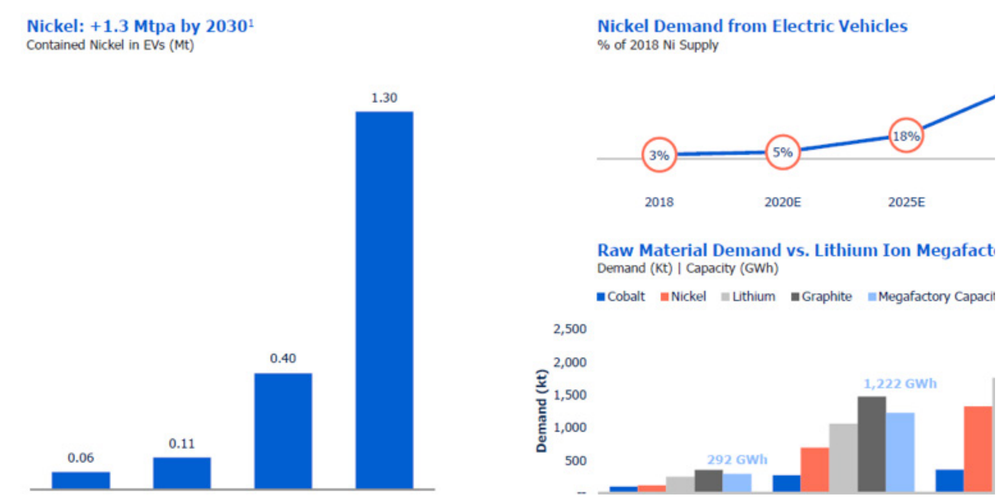
- QPM has entered into a non-binding memorandum of understanding with Blue Energy Limited (ASX:BLU) for the supply of gas. Blue Energy has significant gas resources in ATP 814 Sapphire Block.
- Blue Energy has a non-binding MOU with North Queensland Gas Pipelines for transport of gas to Townsville. This pipe line runs alongside the Lansdown Industrial Park.

DISCUSSIONS STARTED WITH TOWNSVILLE PORT AUTHORITY

- The Port Authority have supplied Pure Minerals with indicative terms for ore unloading and storage at the port.

NICKEL AND COBALT OUTLOOK

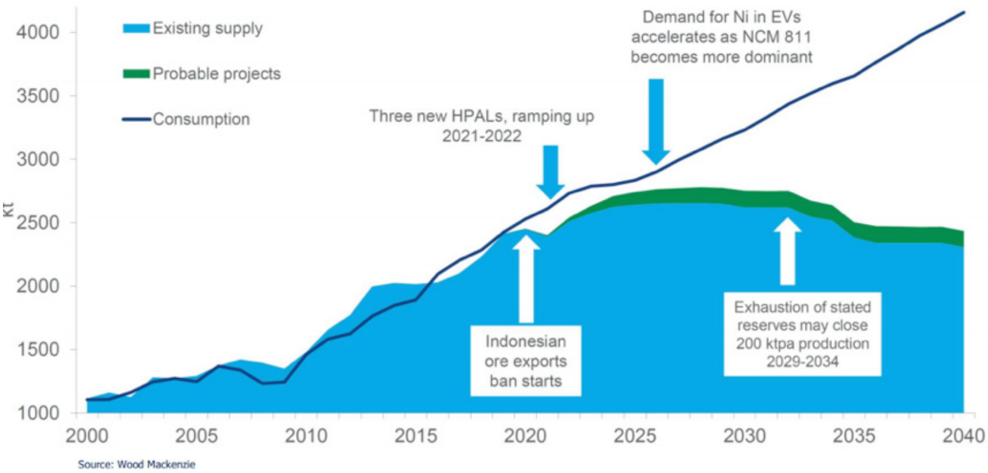
Figure 9 Impact of planned battery mega-plants on nickel demand



Source: https://www.conicmetals.com/_resources/presentations/corporate-presentation.pdf

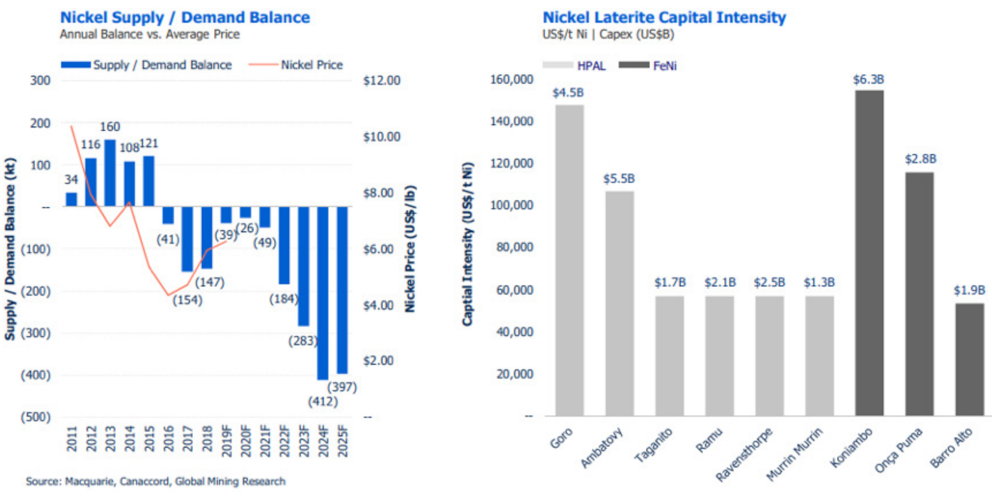
- Global primary nickel consumption in 2018 is estimated by the International Nickel Study Group to be 2.3Mt. The addition of 1.3Mt of demand from the battery industry alone by 2030 is a substantial new source of growth on top the historically strong growth in nickel demand from more traditional uses.
- The supply deficit picture below has been seen throughout the history of all commodity prices, and the new supply always turns up. However, in many cases, it only turns up after a price boom, and in our view, the current nickel price is not sufficient to encourage new supply, and certainly to the level of supply required to infill the battery induced demand gap.

Figure 10 Nickel supply demand outlook



Source: https://www.conicmetals.com/_resources/presentations/corporate-presentation.pdf

Figure 11 Nickel supply demand balance and Nickel HPAL capital intensity by project



Source: https://www.conicmetals.com/_resources/presentations/corporate-presentation.pdf

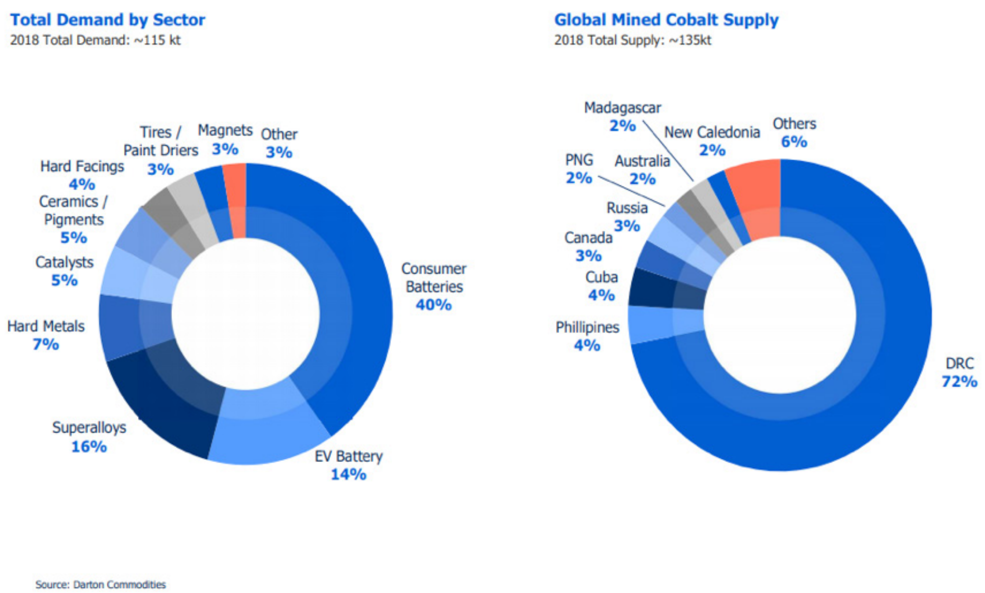
- The capital intensity of building a nickel laterite High Pressure Acid Leach (HPAL) plant is significant, with entry level start ups costing around US$2000M and the capital intensity being US$60,000/tpa of capacity installed.
- By comparison, the TECH plant will produce 6000tpa of nickel in final saleable product, with byproduct credits, at an initial capital cost of A$513M or US$349M, ie an intensity of US$58,000/tpa of capacity. The intensity is comparable to cheaper HPAL plants, but the entry level capex is 15% of an HPAL.
- Because the project can use imported ore, there is the potential to scale the business, by adding at least 3 additional process trains and importing up to 2.4Mtpa of limonite ore, a level of import that occurred when Queensland Nickel was operating.

Figure 12 London Metals Exchange nickel price (US$/tonne)

Source: London Metals Exchange(1 tonne = 2205 pounds)

- Over the last three years, coincident with the emergence of the battery revolution, the nickel price appears to be in an uptrend. Volatility is very high (ie both up and down), but we believe the nickel price is likely to be at cycle lows at present. The move to the upside may have to wait for the US/China trade war rhetoric and the Corona virus impact to pass, but the fundamental supply demand balance appears to be solid.

Figure 13 Structure of cobalt supply and demand showing importamt roles of batteries for demand and Congo on supply



Source: https://www.conicmetals.com/_resources/presentations/corporate-presentation.pdf

- Cobalt has staged an impressive run to mid 2018, but has since given up most of the gains. Cobalt is a byproduct, which means the supply of cobalt is driven by production of its associated metals being nickel and copper. The cobalt specific mines are generally in the Congo, a region which has its issues.
- We would expect cobalt remain a highly volatile commodity for the foreseeable future, with a high chance of revisiting recent price peaks.
- While being able to produce multiple commodities is often a way to enjoy the lower average price volatility by way of diversification, cobalt appears to cycle with nickel to some extent, so their price cycles reinforce each other, rather than reducing overall revenue volatility.

Figure 14 London Metals Exchange cobalt price (US$/tonne)

Source: London Metals Exchange (1 tonne = 2205 pounds)

OTHER ASSETS

Figure 15 Location of other assets

Source: https://www.pureminerals.com.au/projects/other-projects/

- **Battery Hub** (100%) Manganese, Cobalt - Potential district-scale manganese project covering more than 50km in strike length. This was the company's major focus before acquiring QPM and the TECH Project
- **Morrissey Hill** (100%) Lithium, Tantalum - Lithium and tantalum pegmatite located next to Reid Well lithium-tantalum discovery (surface values up to 3.77% Li_2O).
- **Mt. Boggola** (80%) Copper
- **Bordah Well** (80%) Gold copper, Uranium/Rare earth elements
- **Lake Blanche** (100%) Lithium, Uranium - Exploration licence prospective for sediment-host lithium and uranium.

Valuation of these other assets

- Prior to the acquisition of QPM and the TECH project, the company had a market capitalization of A$3.8M on these assets alone, which suggests that they have a value, and one that is material to the company. We assume no value in our assessment of the company.

CAPITAL STRUCTURE

Table 10 Share structure at 13 December 2019

	Exercise Price A$/sh	Issued M
Issued Shares at February 2019		596.1
Deferred Consideration Shares		
On Completion of DFS by 15/5/21		83.3
Obtain All Regulatory Approvals by 15/5/22		83.3
Final Investment Decision to Construct by 15/11/22		83.3
Total Issued Shares		846.1
Options		
21-Dec -20	0.03	30.0
21-May-22	0.03	40.0
Diluted Shares M		916.1

Source: PM1 3B release 13 December 2019

- The first tranche of deferred consideration shares has been awarded, being a total of 116.6M shares. The remaining balance of three tranches totalling 250.0M deferred consideration shares represents 26% of the fully diluted share capital.
- The register is very open, with only two substantial shareholder now, even if the options are exercised, until the award of the Deferred Consideration shares. With the issue of deferred shares, the management team will earn an increasingly significant stake in the company.

Table 11 Major shareholders

Major shareholders	Share M	Share %
Andrew Matheson (Management)	44.7	7.50%
John Downie (Managing Director)	40.7	6.83%
Mrs Lily Ma	28.1	4.71%
Major Option Holders		
Tango88 Pty Ltd	23	20.67%
Exponential Growth Investments	10	8.99%
Mrs Lily Ma	8.88	7.99%
Phoenix-IG (Zaw Superfund)	8	7.19%

Source: PM1 2019 Annual Report as a t 20 September 2019, adjusted for substantial shareholder notices released on 10 and 12 December 2019.

BOARD AND MANAGEMENT

Eddie King - Non-Executive Chairman

- Mr King holds a Bachelor of Commerce and Bachelor of Engineering (Mining Systems) from the University of Western Australia. His past experience includes being manager for a boutique investment banking firm, where he specialised in the technical and financial analysis of global resources projects for equity research and mergers and acquisitions. He was also a representative for a stockbroking and corporate advisory firm where he specialised in providing corporate advisory services for micro-cap ASX listed companies.

John Downie - Managing Director

- Mr Downie is a mechanical engineer with more than 30 years' experience in the mining industry. He has been extensively involved in lateritic nickel mining and processing, having previously been Director of Mines for Vale's Goro operations in New Caledonia, CEO of Gladstone Pacific Nickel and Director of Projects at Queensland Nickel. He has also been employed in senior roles with Barrack Mines NL, Alcoa of Australia Ltd and Boral Resources Ltd.

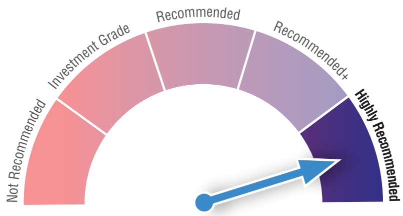
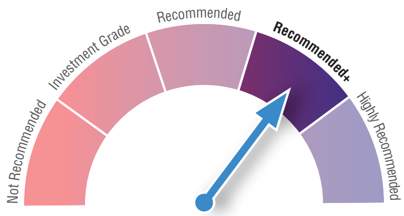
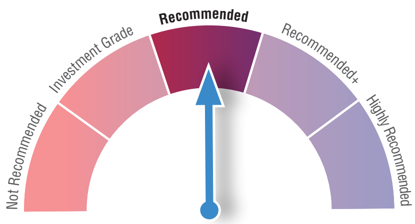
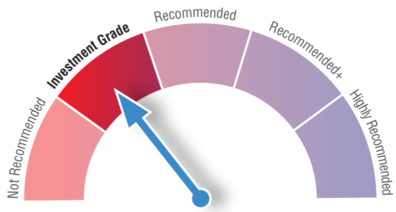
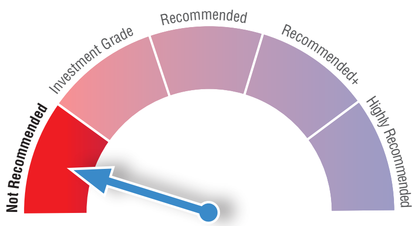
Cameron McLean - Non-Executive Director

- Mr McLean has more than 20 years' experience leading and managing a range of commercial activities, including co-directing London business, iBase Limited in the geo-technology sector and as CFO at Snowden Mining Industry Consultants, Kagara Limited and Atrum Coal. Mr McLean has a background in accounting and finance with experience originating at Western Mining in Melbourne.

APPENDIX A – RATINGS PROCESS

Independent Investment Research Pty Ltd “IIR” rating system

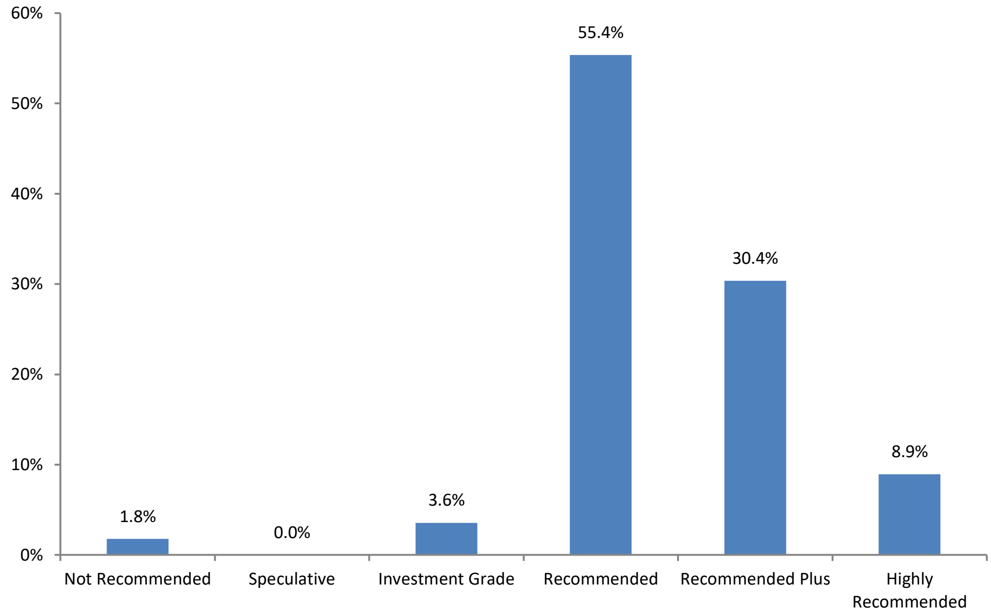
IIR has developed a framework for rating investment product offerings in Australia. Our review process gives consideration to a broad number of qualitative and quantitative factors. Essentially, the evaluation process includes the following key factors: management and underlying portfolio construction; investment management, product structure, risk management, experience and performance; fees, risks and likely outcomes.

LMI Ratings	SCORE
Highly Recommended	**83 and above**
	This is the highest rating provided by IIR, indicating this is a best of breed product that has exceeded the requirements of our review process across a number of key evaluation parameters and achieved exceptionally high scores in a number of categories. The product provides a highly attractive risk/return trade-off. The Fund is likely effectively to apply industry best practice to manage endogenous risk factors, and, to the extent that it can, exogenous risk factors.
Recommended +	**79–83**
	This rating indicates that IIR believes this is a superior grade product that has exceeded the requirements of our review process across a number of key evaluation parameters and achieved high scores in a number of categories. In addition, the product rates highly on one or two attributes in our key criteria. It has an above-average risk/return trade-off and should be able consistently to generate above average risk-adjusted returns in line with stated investment objectives. The Fund should be in a position effectively to manage endogenous risk factors, and, to the extent that it can, exogenous risk factors. This should result in returns that reflect the expected level of risk.
Recommended	**70–79**
	This rating indicates that IIR believes this is an above-average grade product that has exceeded the minimum requirements of our review process across a number of key evaluation parameters. It has an above-average risk/return trade-off and should be able to consistently generate above-average risk adjusted returns in line with stated investment objectives.
Investment Grade	**60-70**
	This rating indicates that IIR believes this is an average grade product that has exceeded the minimum requirements of our review process across a number of key evaluation parameters. It has an average risk/return trade-off and should be able to consistently generate average risk adjusted returns in line with stated investment objectives.
Not Recommended	**<60**
	This rating indicates that IIR believes that despite the product’s merits and attributes, it has failed to meet the minimum aggregate requirements of our review process across a number of key evaluation parameters. While this is a product below the minimum rating to be considered Investment Grade, this does not mean the product is without merit. Funds in this category are considered to be susceptible to high risks that are not reflected by the projected return. Performance volatility, particularly on the down-side, is likely.

APPENDIX B – MANAGED INVESTMENTS COVERAGE

The below graphic details the spread of ratings for managed investments rated by Independent Investment Research (IIR). The managed investments represented below include listed and unlisted managed funds, fund of funds, exchange traded funds and model portfolios.

SPREAD OF MANAGED INVESTMENT RATINGS



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