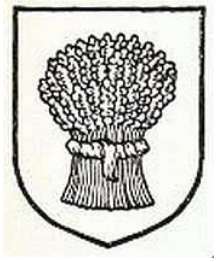
Wednesday, February 7, 2018



HALLGARTEN & COMPANY

Coverage Update

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Northern Minerals

(NTU.ax, FSE: A0LBN5)

Strategy: Long

Key Metrics					
Price (AUD)	$0.091				
12-Month Target Price (AUD)	$0.38				
Upside to Target	317.6%				
12mth hi-low AUD	$0.08 -$0.15				
Market Cap (AUD mn)	$82.17				
Shares Outstanding (mns)	903.0				
Fully diluted (mns)	1,006.0				
		FY17	**FY18e**	**FY19e**	**FY20e**
Consensus EPS			n/a	n/a	n/a
Hallgarten EPS			($0.009)	($0.003)	$0.008
Actual EPS		($0.021)			
P/E		n/a	n/a	(26.26)	11.27

Northern Minerals

Next Producer in the Rare Earth Space

- + Northern Minerals will be the next producer of Rare Earths in 3Q18
- + Some 200,000 tonnes of ore is mined and stockpiled
- + Construction of production facility very advanced with processing commencing mid-2018
- + Provisional capex for the Stage One is around AU$60mn
- + Stage One fully funded and presales agreement in place with Lianyugang Zeyu New Materials Sales
- + Realistic three-stage program to production casts out the window the REE industry curse of unachievable pharaonic plans
- + Major shareholders are supportive and very well connected in China
- ✘ Financing remains a challenge in the REE space, but getting to production should dispel concerns about funding later phases
- ✘ The Rare Earth prices are yet to rebound to levels that signal superprofits for producers, but that also reduces likely entrants to the space

Rare Earths – Lithium Shows the Way

One of the fallacies of the last decade has been that because the collapse of the first Rare Earth Boom was so wrenching that there was no need for any extra production and therefore nothing more would be developed in the space. The handful of surviving REE developers were regarded as indulging in a quixotic hunt for something no-one wanted.

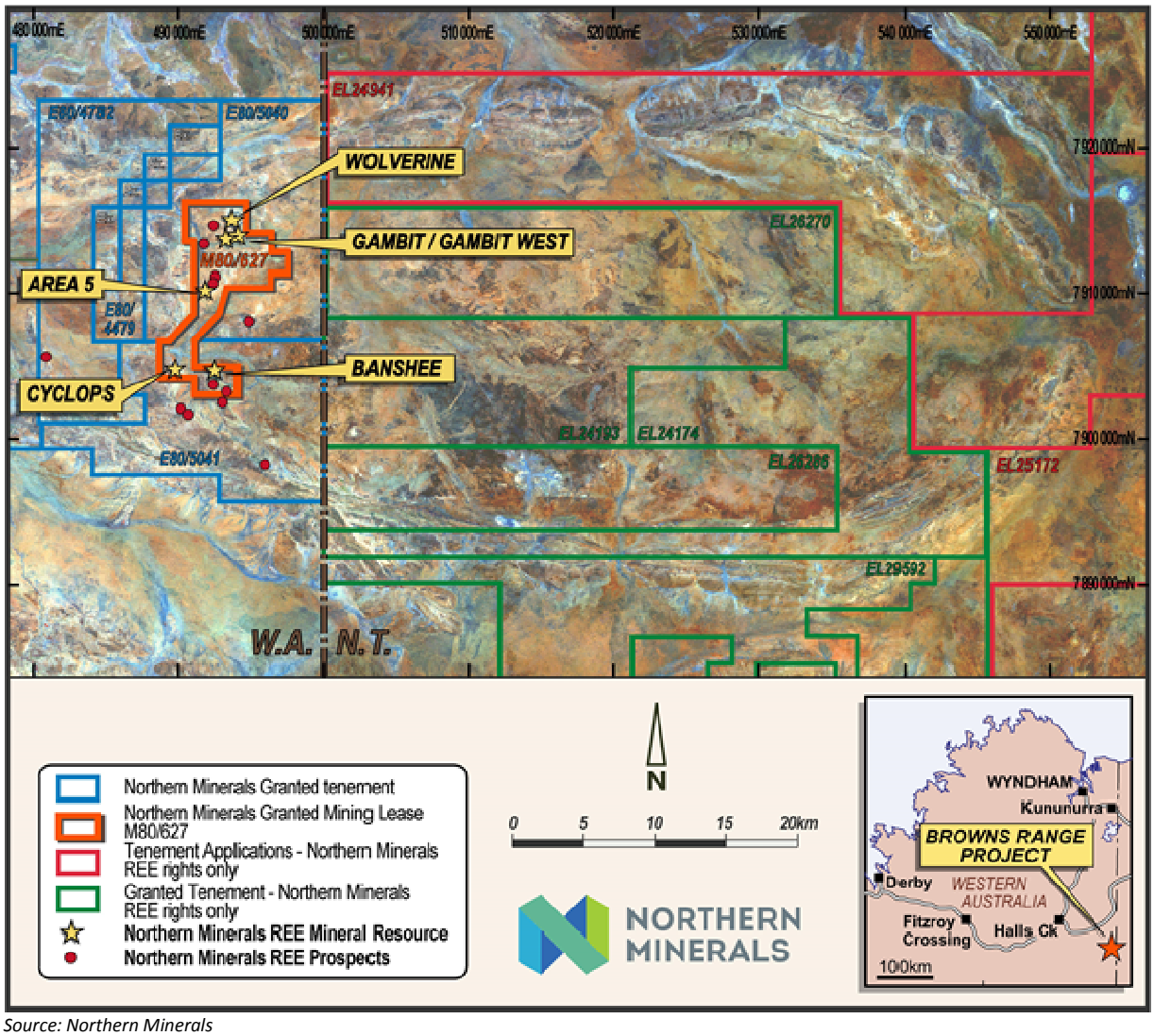
What investors have failed to grasp is that the Rare Earth scene will repeat what has happened in the Lithium space. Just as there was a Lithium 1.0 moment back in 2009-2010 that was driven by the first hopes of the EV/HEV revolution and now there is Lithium 2.0, so there will be a parallel Rare Earth 2.0 moment due to the mirroring requirement for a massive extra amount of Rare Earth production to meet the needs of EV/HEV engine production over the period to 2030. Mass adoption of EV/HEV will turn into the *new normal* with EV's being the dominant vehicle type on the roads. This surging demand will need a surging supply and the Chinese are not positioned to meet that challenge.

While two other companies look like they might reach production in the next three years, Northern Minerals is indubitably ahead of the pack. It was the first to grasp that small is beautiful capitalizing upon the lessons learnt by the wounded (Lynas) and slain (Molycorp) behemoths that arose from Rare Earths 1.0. With a staged approach to production and a focus on slashing capex that would make Jack the Ripper proud, Northern has cut its coat to suit the very skimpy cloth available in capital markets. It has also managed to get itself a real offtaker so when the production rolls it will have a taker and at an identifiable price. This is no mean feat considering how the odds were stacked against any wannabe producer.

In this research note we shall look at Northern Minerals progress towards production and what it might mean revenue wise.

Browns Range – From Project to Mine

While the John Galt project stands as a strong backstop for Northern Minerals, the main play is the Brown's Range mine. This 100%-owned property formerly was part of the Gardiner-Tanami Project (which was the focus when NTU was a uranium explorer), but since 2009 has become a focus for its HREE exploration and mining program.



Source: Northern Minerals

The Rare Earth Mineral Resources and prospects at Browns Range are shown on the map above. The project consists of one granted mining lease M80/627 and four granted exploration licences E80/4479,

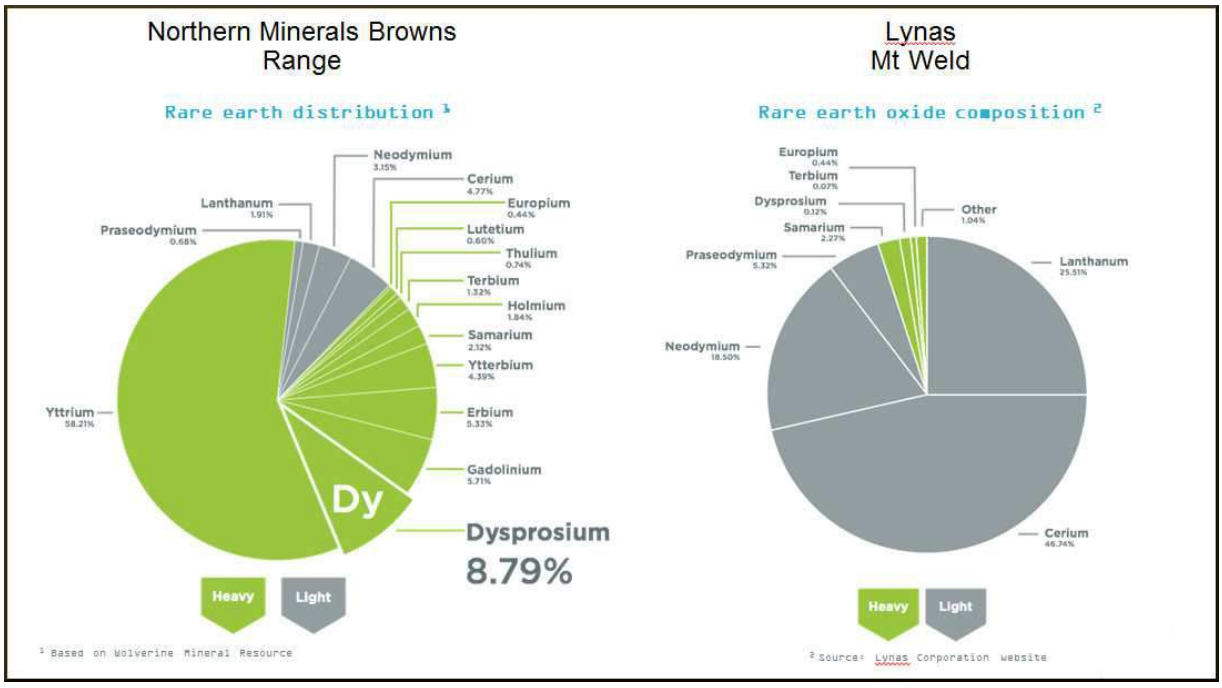
E80/4725, E80/4726, E80/4782, E80/4806, E80/5040 and E80/5041, covering an area of 900km2, located adjacent to the WA/Northern Territory border in the Tanami Desert, approximately 150km south-east of Halls Creek. The company also has permit applications for the Rare Earth rights to most of the rest of the Brown's Range Dome in its larger manifestation across the border in the Northern Territory.

They sit on the western extremities of a geological formation known as the Brown's Range Dome, a Paleoproterozoic dome formed by a granitic core intruding the Archean/Paleoproterozoic "Browns Range Metamorphics" (meta-arkoses, feldspathic metasandstones and schists).

Xenotime was first identified in the Browns Range area in the 1980s by PNC Exploration while exploring for uranium. PNC tested one of the larger quartz-xenotime veins (10-30cm wide, 15m long) by costeaning and shallow drilling and obtained results up to 16% Yttrium, 0.2% Uranium, 0.5% light REE (LREE) and 12% HREE.

Northern Minerals conducted a sizeable exploration program at Browns Range starting in 2011, with a 166 hole RC drilling campaign. Four rare earth prospects with xenotime mineralisation were identified within the project area - Wolverine, Gambit, Area 5 and Area 5 North prospects – all shown on the preceding map. The mineralisation at Browns Range is characterised by a dominance of Heavy Rare Earths (>80% HREE) as well as low levels of Uranium and Thorium.

Metallurgical beneficiation studies were carried out by Nagrom on surface rock chip samples from Wolverine, Gambit and Area 5 North which persuaded the company that this merited further attention and the rest, as they say, is history with the company focusing its efforts here moving through several resource upgrades and a DFS and now a phased production plan is in place.



On the preceding page can be seen the REE breakdown of NTU's Brown's Range deposit against Lynas' Mt Weld. Lynas's deposit is almost exclusively LREE which has become a burden for operations there as it is largely unwanted.

It is notable that the Xenotime at Brown's Range is largely the heavy Rare Earths, a wedge of the seldom spoken of medium REE (Samarium and Gadolinium) and a smattering of LREE.

As is (now) well-known there are no shortcuts in treating the REE minerals that the bulk of companies have so far discovered. One cannot "send the Cerium to the tails". One must process out each REE in sequence in a very elaborate and costly process. Not having the "rubbish" REEs of Cerium and Lanthanum to an appreciable level makes Xenotime more valuable and with less processing cost per tonne of rock.

Resource and Reserves

An updated JORC-compliant Mineral Resource Estimate for the Browns Range Project was published in February 2015. This was the latest in a series of Mineral Resource estimates for the Project since its maiden Mineral Resource Estimate in December 2012. The maiden Mineral Resource estimated 10,500,000 kgs, whereas the latest resource increased the total contained TREO more than fivefold by 46,163,000 kgs.

The 2015 Mineral Resource Estimate comprised six deposits; Wolverine, Gambit, Gambit West, Area 5, Cyclops and Banshee, with the total Mineral Resource estimated at 8.98mn tonnes @ 0.63% total rare earth oxides (TREO) comprising 56,664,000kg contained TREO using a cut-off grade of 0.15% TREO.

Northern Minerals - Browns Range

Category	Mt	TREO %	Dy2O3 kg/t	Y2O3 kg/t	Tb4O7 kg/t	HREO %	TREO kg
Indicated	4.69	0.70	0.59	3.95	0.09	87	32,862,000
Inferred	4.28	0.56	0.46	3.15	0.07	87	23,802,000
Total	8.98	0.63	0.53	3.56	0.08	87	56,664,000

At the Wolverine deposit the total Mineral Resource is estimated at 4.97 million tonnes @ 0.86% TREO comprising 42,560 tonnes TREO using a cut-off grade of 0.15% TREO. Of the Total Mineral Resource, 58% is classified as Indicated Resource, with the remainder in the Inferred Resource category.

Browns Range - Wolverine Deposit

Category	Mt	TREO %	Dy2O3 kg/t	Y2O3 kg/t	Tb4O7 kg/t	HREO %	TREO kg
Indicated	2.99	0.83	0.73	4.86	0.11	89	24,952,000
Inferred	1.97	0.89	0.76	5.13	0.11	88	17,609,000
Total	4.97	0.86	0.74	4.97	0.11	89	42,561,000

The latest Ore Reserve (classified as 100% Probable) for the Project measures 3.75mn tonnes of ore containing 2.29mn kgs Dysprosium and 26.4mn kgs Total Rare Earth Oxide (TREO) and is shown below.

Browns Range - Reserve

	Category	Tonnes	Dy2O3		Y2O3		Tb4O7		TREO	
			kg/t	kgs	kg/t	kgs	kg/t	kgs	kg/t	kg
Open Pit										
Wolverine	Probable	833,000	0.55	460,000	3.59	2,989,000	0.08	66,000	6.15	5,124,000
Gambit West	Probable	219,000	0.83	182,000	5.52	1,209,000	0.11	25,000	10.10	2,212,000
Gambit	Probable	37,000	0.68	25,000	4.74	176,000	0.09	3,000	8.05	298,000
Area 5	Probable	467,000	0.14	65,000	0.99	463,000	0.02	10,000	2.24	1,048,000
Underground										
Wolverine	Probable	2,104,000	0.70	1,483,000	4.71	9,908,000	0.10	221,000	8.00	16,833,000
Gambit West	Probable	90,000	0.88	79,000	5.78	521,000	0.11	10,000	9.54	860,000
Total	Probable	3,750,000	0.60	2,294,000	4.01	15,266,000	0.09	335,000	7.03	26,375,000

The Business Plan

The brutal culling that the Rare Earth sector experienced in the wake of the price fall resulted in some players burying their heads in the sand and hoping things would return to the boom years while others took the more appropriate tack of cutting their coat to suit the new cloth available. Northern Minerals in early 2016 did this and came up with a three stage plan for production.

The **Stage One** envisaged the construction of a 72,000 tpa so-called pilot plant operation at the project (though a runrate of 60,000 tpa is oft cited when factoring in weather/maintenance etc). However this is a pilot plant on a truly grand scale.

The three-year operation consists of both a beneficiation and hydrometallurgical process to produce 49,000kg dysprosium, in 570,000kg TREO per annum contained in a mixed rare earth carbonate (REC). Construction of this first phase is now racing ahead and should be completed mid-2018.

The current scoping level capital expenditure required for the beneficiation and hydrometallurgical plants was estimated at a very economical US$28mn (using an exchange rate of AUD/USD 0.75), which

included a sizeable contingency. This capital estimate was premised upon using all new equipment.

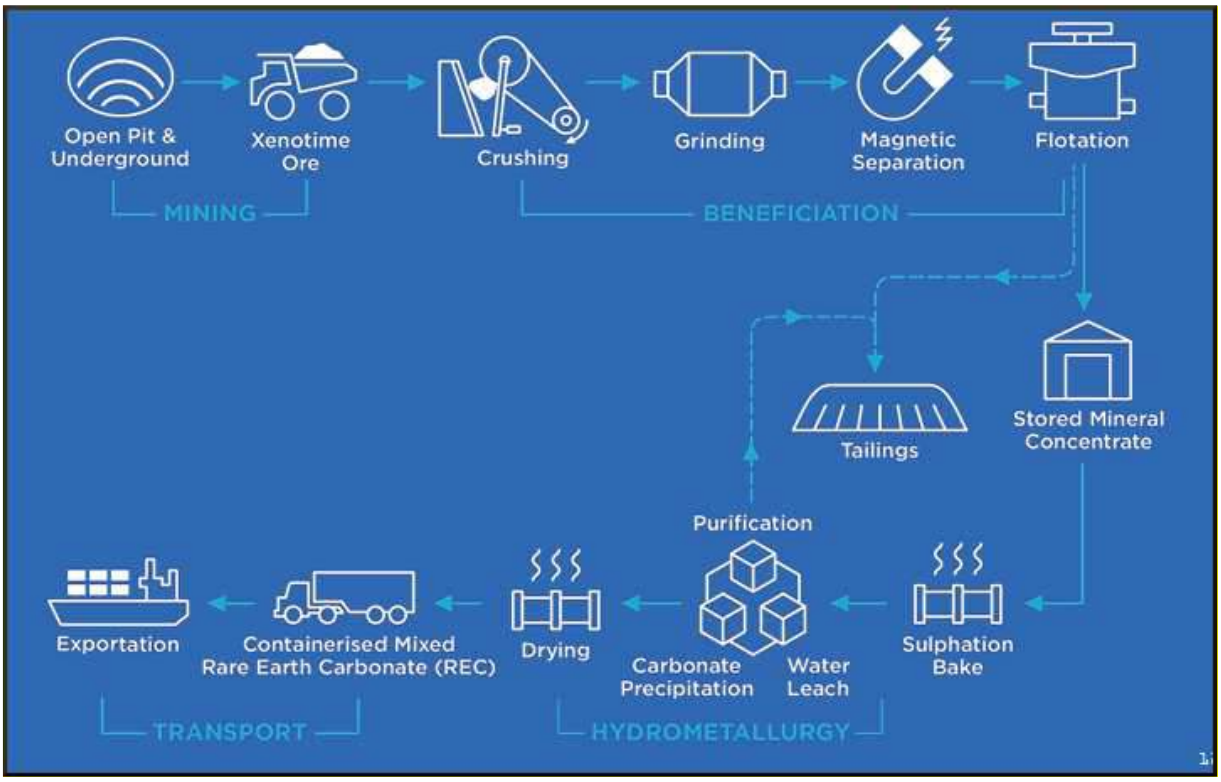
The **Stage Two** involves developing the project to BFS level with the inclusion of the results from the studies aimed at reducing mining costs, boosting production, the production of a premium product and increasing the Mineral Resource and Ore Reserve.The results of testwork undertaken during the operation of the pilot plant will also be key contributors to the completion of the BFS during stage two.

The company expects that the stage two study component might deliver a higher output at a lower cost to the DFS and with the inclusion of the additional process components to reject the majority of the Yttrium, the project will produce a premium, high-purity mixed RE carbonate product, which it expects will be well sought after by downstream processors.

The **Stage Three** consists of the construction of the full-scale project based on the successful outcomes of the previous stages, and most directly matches the DFS completed in March 2015.

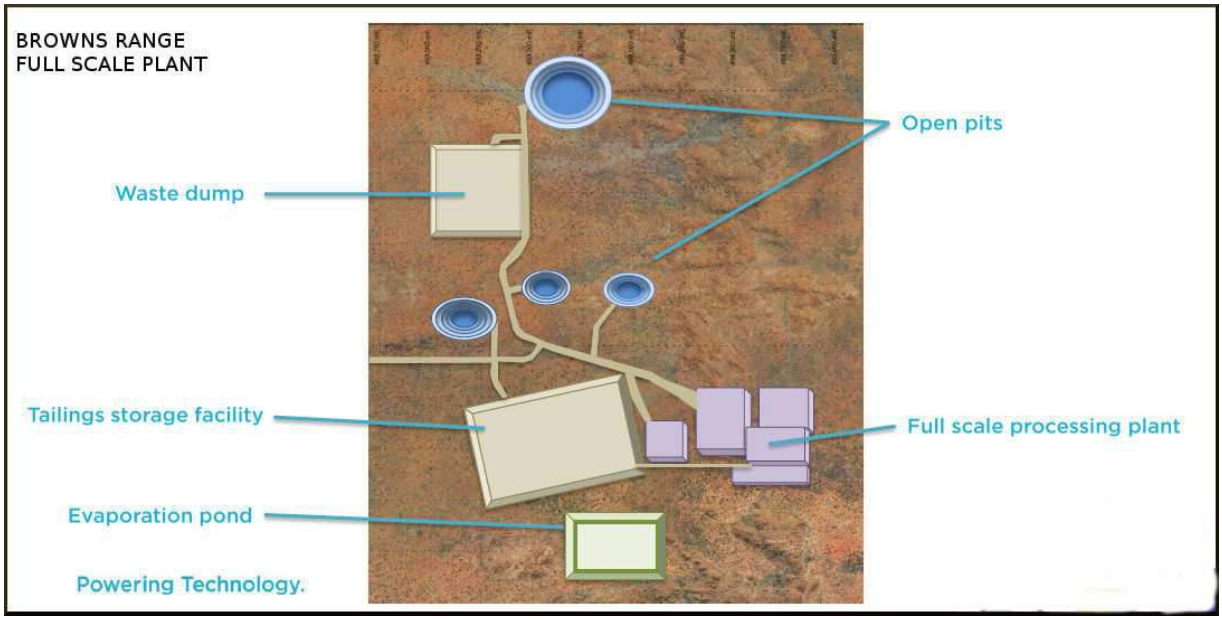
The project's current Mineral Resource supports an 11-year mine life, but there is clearly significant scope to expand this through exploration. As per the DFS, the full-scale operation will use a combination of open pit and underground mining methods to extract 585,000t @ 0.66% TREO per annum, which will be treated through a beneficiation and hydro-metallurgical plant.

The beneficiation plant will have the capacity to treat up to 585,000tpa of ore to produce approximately 16,700tpa of mineral concentrate at a grade of 20% TREO.



The hydrometallurgical process will then further treat the 16,700tpa of mineral concentrate to produce 279,000kg of Dysprosium, contained within 3,098,000kg TREO, prior to the Yttrium rejection.

The same road and port network will be used to transport materials to and product from the Project, however, upgrades will be undertaken to the road network to support the increased movements and traffic to support full scale production.

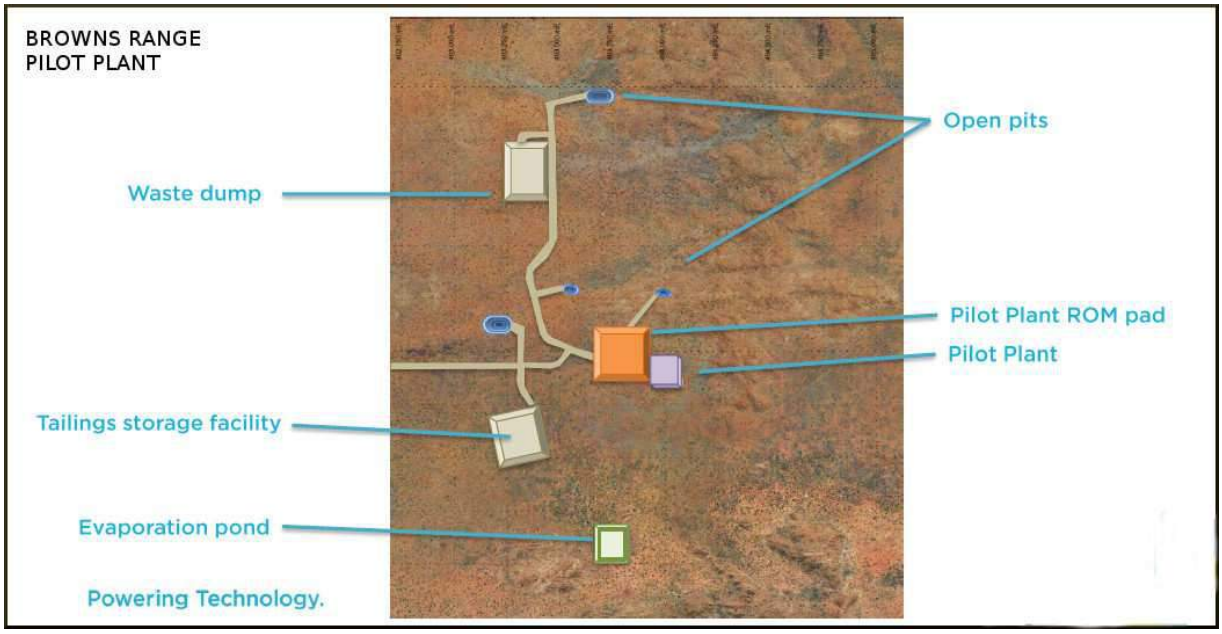


All ancillary infrastructure will be expanded on site to support full scale operations. This includes diesel generators, water supply infrastructure, onsite reagent and consumable storage, tailings storage facilities, a 2-km sealed airstrip, in addition to the construction of a 276 person accommodation village. Some of this is already in place, such as a 1.2km unsealed air-strip and some roads, as a result of the work on setting up Stage One.

The Pilot Plant

The pilot plant mirrors all the processing steps detailed in the Definitive Feasibility Study (DFS) shown below, however it has been downsized to an operating budget capacity to process 60,000tpa of ore at 1.19% TREO through the beneficiation plant, and 3,200tpa of xenotime concentrate at 20% TREO through the hydrometallurgical process. Previous offsite testwork has shown that these two processes are capable of delivering superior recoveries of 87% and 92% respectively.

In late November of 2016 the company announced that it had executed a Memorandum of Understanding (MoU) with Sinosteel Equipment & Engineering for the construction of the pilot plant. Then a few weeks later the company signed the definitive EPC agreement, under which Sinosteel was to be responsible for the engineering, procurement and construction of the 72,000tpa pilot plant. Sinosteel is the lead contractor on site, with other Australian groups sub-contracting as required.



The pilot plant has been constructed in a Semi-Knocked Down (SKD) mode in China by Sinosteel. The processes have been modularised and containerised, where possible, to facilitate a shortened site construction period and then allow for the pilot plant to later be transported to undertake testwork at other projects, if required.

The contract size for the project approximated AUD$60 million, including:

- Pilot plant process facilities (beneficiation and hydrometallurgical process plants) – AUD$38m
- Mining and associated infrastructure (including tailings storage facility, camp, water supply, airstrip) – AUD$22m

Under the MoU, Sinosteel MECC agreed to defer payments totaling AUD$12mn for a period of 24 months. Alternatively, Sinosteel MECC has the right, at its election, within nine months of practical completion, to convert the deferred payment amount into ordinary shares of Northern Minerals at a conversion price of the lower of 15 cents per share or the 20 day VWAP prior to election.

The existing road network will be used to transport equipment and materials during the construction phase, and reagents, consumables and product during the operational phase via Darwin port.

The pilot plant will be supported by a rostered fly-in, and fly-out workforce who will be accommodated through an expansion of the existing 20 person exploration camp to 87 room capacity.

Power shall continue to be supplied by diesel generators and water sourced from the Gardiner Sandstone aquifer located 10km southwest of the pilot plant area. A tailings storage facility and evaporation pond will be constructed to manage the waste streams from both processes, however downsized from the DFS to suit the processing capacity of the pilot plant.

Progress toward Production

In early December 2016, the Mining Proposal was approved by the Western Australian Department of Mines & Petroleum.

In May of last year Northern awarded an AUD$6mn mining contract to the Australian mining contracting firm, MACA. Under the agreement MACA was to mine 180,000 tonnes of ore and associated waste from the Wolverine and Gambit West pits. An associated agreement in relation to bulk earthworks with MACA takes the total value to $10m. Waste material was used to construct the tailings storage facility and other surface infrastructure. MACA contract also involved clearing the processing plant site and the construction of internal road access and an airstrip.

In June the MACA team mobilized to site to execute their part of the transaction. At the right can be seen the first equipment to site.

Mining Operations

The trial mining operation began in the third quarter of 2017 and ended in November 2017 with material sourced from relatively shallow pits at the Wolverine and Gambit West deposits.

The mining campaign was completed by MACA before December, with additional ore tonnes mined and lower waste removed during the program. Below can be seen the pit at Gambit West as at December.

Source: Northern Minerals

The tonnage mined was slightly over 200,000 tonnes higher than the target of 172,080t of mineralised material @ 1.19% TREO, containing 2,047,000kg TREO and stockpiled ready to be fed into the pilot plant. A 1.19% TREO grade is achieved as a result of higher grade ore near surface of the deposits being mined and should have minimal impact on the ore grade when the operation is developed at full scale.

It is estimated that of the 2,047,000kg TREO mined and processed through the pilot plant, 75% will be from within the Probable Ore Reserve and 25% will be from Inferred Mineral Resources, which is material that will be carried with the ore within the mine designs. The ore that will be mined and processed for the pilot plant represents a small portion of the DFS Ore Reserve, at 3,750,000t ore containing 26,375,000kg TREO, and the balance from the Mineral Resource Estimates.

Around 98% of the total modular process plant and equipment has been manufactured by Sinosteel in China and has been received on site at Browns Range.

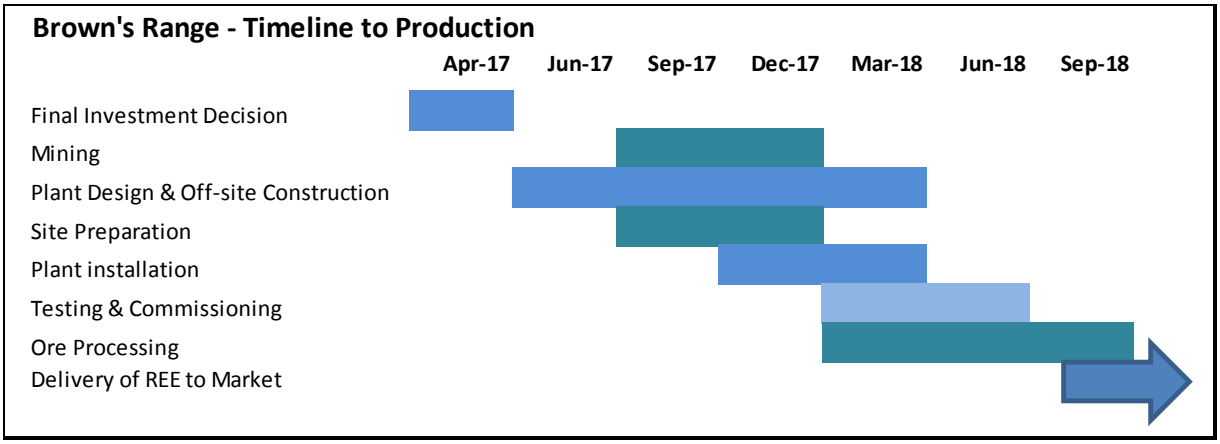
Primero Group is well advanced with the plant installation, with a number of major components installed and in place.

On the following page one can see the current state of site works.

The specifics of the next steps are:

- ✓ January – 98% of equipment delivered, progress structural steel and mechanical installation
- ✓ February – Complete civil works, progress structural steel and mechanical installation, commence electrical installation
- ✓ March – Complete structural steel installation, progress mechanical installation and electrical installation
- ✓ April - Complete mechanical installation and progress electrical installation
- ✓ May – Complete electrical installation and commence commissioning

In summary the timeline for 2017-18 is:



The first product shipment is expected in September.

The Sales Agreement

The Rare Earth space, particularly in its heyday, has seen a plethora of vague Letters of Intent and Memorandums of Understanding (particularly with Japanese players) that never came to much because the explorers did not deliver on their production plans and the "offtakers" did not put cash up front.

In poignant contrast to these "fake news" announcements of the go-go days of the first Rare Earth boom, Northern Minerals in April of 2017 announced that it had executed a Sales Agreement for the entirety of the pilot plant's production. The deal was signed with Lianyugang Zeyu New Materials Sales Co Ltd, a 51%-owned subsidiary of Guangdong Rare Earths Group. This is one of the five major heavy rare earth companies in China which are vertically integrated producers. It is a 100% subsidiary of Guangdong Raising Asset Management.

Under the Sales Agreement, in early 2018, Lianyugang Zeyu New Materials Sales will make a pre-payment to Northern Minerals of AU$10 million. The prepayment covers approximately 15% of the expected value of production during the Pilot Plant phase, with the remaining 85% to be paid to Northern Minerals over the course of the agreement based on volumes delivered. The Sales Agreement terms are based off CIF Incoterms 2010 with pricing referenced from a 2-month average of quoted prices on Asian Metals and Beijing Ruidow Information Technology.

Lianyugang Zeyu New Materials Sales, or its nominated beneficiary, will be issued 40 million unlisted options at $0.25 exercise price which can be converted to ordinary shares to offset the pre-payment of AU$10 million. When the company has received the pre-payment the sales partner will be entitled to appoint a director to Northern Minerals' board.

In the wake of the execution of the Sales Agreement, Northern Minerals is in the process of issuing 14 million ordinary shares to Lianyugang Zeyu New Materials Sales (or its nominated beneficiary).

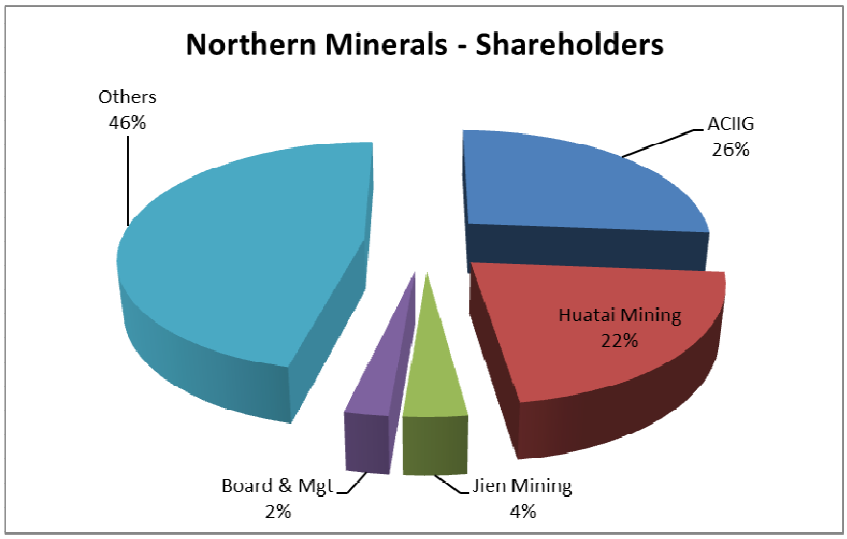
It is important to note that it's ONLY the pilot plant production that has been pre-committed in this transaction not the substantially larger Stage Three production.

Shareholders & Financing

The shareholder mix has been somewhat of a moving feast over the years as the relevance of some major holders has waxed and waned. The largest shareholder groups are now Chinese.

In August 2016, the company announced that it had entered into a $30mn equity funding agreement with Chinese companies Huatai Mining (part of Chinese coal trader Shandong Taizhong Energy) and Taizhong Energy Australia to continue on its development path. After an examination of the transaction Australia's Foreign Investment Review Board (FIRB) stated it had no objection to the $30 million equity investment by Huatai Mining. Thereupon $3mn was received by the company from Huatai Mining in August 2016.

Following the receipt of the first $9 million tranche in early November 2016, a representative of Huatai Mining, was to be added as a non-executive Director. The second and third tranches of $9 million each were due before the end of November and December respectively. However the Chinese government's rather random action in slowing the pace of Chinese corporates' investments abroad meant that the timetable fell afoul of the new "rules".



However, in January 2017 an additional $5.5mn was received, reducing the balance owing to AUD$12.5mn. At the start of February 2017 though the company announced that Huatai had failed to complete by the agreed extension date of 31 January 2017. Cumulative payments to Northern Minerals totaled $19.5mn (with the corresponding issuance of 152,222,223 Ordinary shares, representing 22.59% of the issued capital). Mr Nan Yang was appointed to the Northern Minerals board as a Huatai Mining representative.

In June of 2017 the company executed an agreement with an entity managed by The Lind Partners, (the Investor) for a funding agreement of up to AU$14 million with an initial amount of AU$6 million to be funded immediately after closing. According to Bloomberg, The Lind Partners, LLC operates as an investment management company offering asset management, alternative investments, strategies, analysis, financial planning, and advisory services. Its main office is on Lexington Avenue in New York City.

The funding is provided as second ranking secured Convertible Securities with a 30-month term. The funding agreement allows for two AU$6 million tranches and two $1 million tranches based on specific events. The funding agreement included provisions for the conversion into ordinary shares, repayment in cash or early repayment at NTU's sole option.

The company also executed a US$32mn R&D financing facility with Innovation Structured Finance (ISF, associated with Brevet Capital Management) based in New York. The facility provides Northern Minerals with accelerated access to tax offsets that are applicable to R&D activities being undertaken at the Browns Range project.

Under the facility, the company will work with its tax advisor, Deloitte, to estimate the level of tax offsets at the end of each quarter. ISF will then provide funding up to 80% of the estimated tax offset, with the principal and accrued interest repayable out of actual tax offsets received at the end of the financial year.

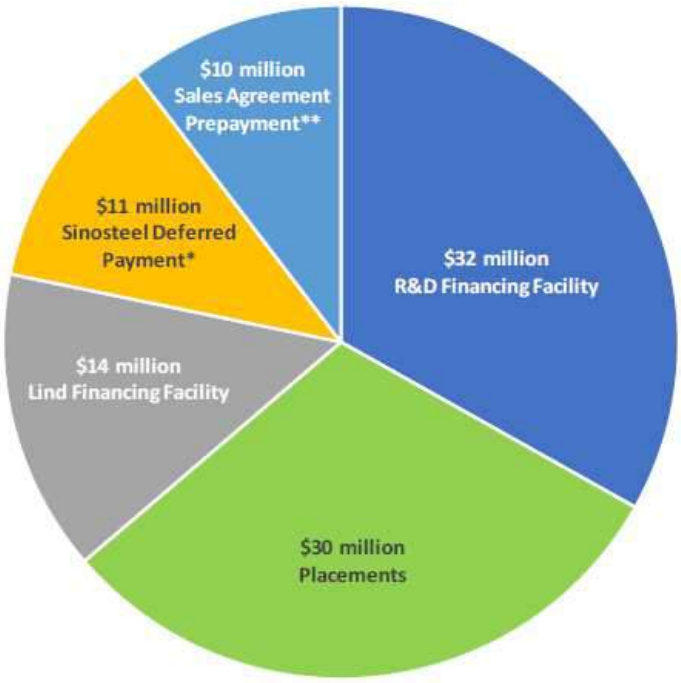
The facility has a term of two and a half years, aligning with the timeline for the pilot plant project.

The amount of US$5m was drawdown in early November 2017 which represents approximately 80% of the estimated R&D refund for the September Quarter. In early February, a further US$5.4m was received for the December quarter.

In August, the company placed a further AUD$2.5 million as part of an AUD$10 million announced in mid-March 2017. This private placement of 20,833,333 Ordinary shares at 12 cents per share was made to a group of sophisticated investors.

In December the company took a further drawdown of AUD$5mn under the Lind facility from one of the two AUD$6m tranches.

Thus the state of financing of the Pilot Plant Project looks like this:



Also in December the company announced the issue of 60,769,231 fully paid ordinary shares at AU$0.078 per share to investors under a private placement to raise approximately $4.74mn. Investors in the placement will also be issued free attaching unlisted options on a 1 for 10 basis, with an exercise price of $0.12 and an expiry date of 31 December 2019. More recently, due to strong demand, the company extended the closing date of the Share Purchase Plan from the 31st January 2018 to the 12th of February 2018 and increased the amount the company is seeking to raise via the placement to approximately $15m.

Subject to regulatory approvals, shareholders in February/March will receive one free listed option for every five ordinary shares held. The exercise price will be 12c and expiry date set at 31st December 2019.

Earnings Outlook

We have revised our income model recently to reflect or slight change of perception in the pricing of various REEs. In preparing the projections of what revenues might look like from its pilot plant we have a few key inputs, but were missing some others. With the possibility that revenues will start to flow in late 2018 (thus in FY19 with only 8 months of revenues) we took the published volumes for the pilot plant and used our own estimates of where prices for certain key Rare Earths will be at that time, in 2019 and in 2020 to calculate revenues.

OXIDES			
Price Deck	**Price**	**Hallgarten**	**Hallgarten**
$ per kg	**Oct-17**	**2018**	**2019**
	$		
Lanthanum	4.60	3.80	3.60
Cerium	3.00	2.70	2.40
Praesodymium	78.00	84.00	88.00
Neodymium	60.00	73.00	81.00
Samarium	1.98	3.00	3.75
Europium	78.00	83.00	88.00
Gadolinium	42.85	60.00	78.00
Terbium	520.00	550.00	580.00
Dysprosium	185.00	266.00	305.00
Yttrium	3.70	5.00	6.80

To calculate costs we used the Cash operating cost per kg TREO from the DFS of AUD$37.60, though in the fiscal years 2018 and 2019 this is mitigated (by 43.5%) via the R&D rebate. We used an AUD:USD exchange rate of $1.30.

The results of these projections are shown on the next page. We have inserted a revenue line (highlighted in blue) for the R&D rebates. The Cost of Production numbers for FY17 and FY18 relate to the Trial Mining. As these expenses (highlighted in olive) are booked in these years, thus the cost of production in the first years of the pilot plant's operations will be lower as the mined material (which we estimated at a mining cost of $5.50 per kg of TREO) has been charged off earlier.

The resulting estimates of earnings for the years with onset of production/sales show a small loss in the first "year" (the last nine months of FY19) of pilot plant operations and then a small profit in the second year. Further earnings gains beyond this level would be dependent on moving up to Stage Three construction (and Rare Earth price movements).

Northern Minerals P&L

AUD mns - June FY end

	FY20e	FY19e	FY18e	FY17	FY16	FY15
Revenues	33.755	21.852	0.357	1.599	0.135	5.234
R&D Rebate		6.000	25.000	2.672	1.769	
Cost of production	18.384	13.788	5.400	1.306	0	0
Gross Profit	15.371	8.064	19.957	2.965	1.904	5.234
GSA	3.450	3.250	3.740	7.557	3.990	5.887
Depreciation	2.600	2.600	0.300	0.128	0.322	0.59
Exploration	1.400	1.200	1.780	1.297	1.585	13.796
Project Development		10.000	22.000	5.980	2.034	
Total Expenses	25.834	30.838	33.220	16.268	7.931	20.273
Operating Result	7.921	-2.986	-7.863	-11.997	-6.027	-15.039
Finance Costs	-0.120	0.300	0.345	0.633	0.715	0.602
Pre-tax Result	8.041	-3.286	-8.208	-12.630	-6.742	-15.641
Tax	0.000	0.000	0.000	0.000	0.000	0.000
Post-tax result	8.041	-3.286	-8.208	-12.630	-6.742	-15.641
Shares on issue	995.6	948.2	903.0	615.3	472.9	
EPS	0.008	-0.003	-0.009	-0.021	-0.014	

Expansion by Acquisition?

In recent comments to the market, Northern has signaled an interest in potential acquisitions in the light Rare Earth sector, including projects with identified neodymium (Nd) and praseodymium (Pr) resources. This was an interesting declaration. REE mavens shall probably scurry off to look at their favorite survivors and brand them as targets. However, in light of the fact that 300 plus projects were thrown up in the last boom and most of them are now unloved and unwanted (and in some cases better than what is embedded in extant listed REE plays) we do not see why Northern Minerals should restrict itself to the obvious when there are so many other interesting assets out there, some of which have had extensive work done of them.

We also do not see Northern as necessarily wedded to bargain-buying only in Australia. Certainly searching out unloved assets there might be more synergistic but North America or Southern Africa should not be ruled out.

The Revival of the REE Space

The prices of most Rare Earths have stirred from their long slumber. The past two years have seen the selective reawakening of various metals after the brutal 2011-15 period and, comparatively speaking, Rare Earths and Uranium have been the laggards in this process. Finally, in 2017 a few of the more sought-after REEs have started to move higher.

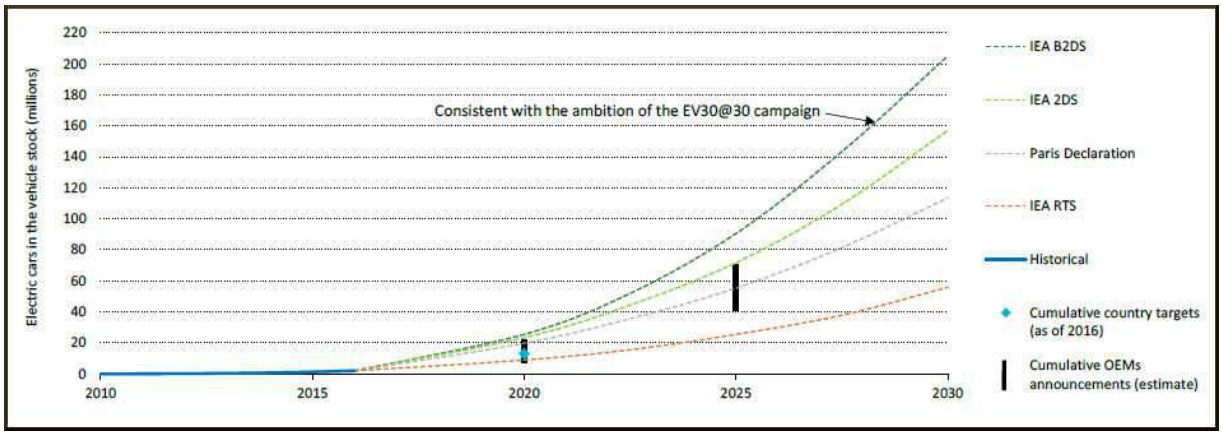
This dynamic is a combination of a Chinese willingness to see prices rise in the space now that the Western “threat” has been beaten and the nascent perception that Rare Earths might start to be driven by the same dynamic as Lithium, i.e. the EV/HEV Great Leap Forward. The first element we shall deal with anon, while the latter is a crucial new(ish) factor in calculations of REE demand.

The promotorial classes have descended upon Lithium and Cobalt in a feeding frenzy over the last 18 months but have curiously failed to cotton on to the similar dynamic that should be motoring perceptions higher in the Rare Earth space. Maybe this is due to most Vancouver promoters lacking the ability to metaphorically “walk and chew gum” at the same time.

Despite the equities markets not having grasped the implications, major study groups have. However there is an unwillingness on the part of OEMs to cry “Fire” in the cinema at this moment in case it starts to propel Rare Earth prices higher and set off the same type of situation we witnessed in 20009-10. They are quite happily acquiring REE’s at the “old” prices while the speculative classes are otherwise distracted.

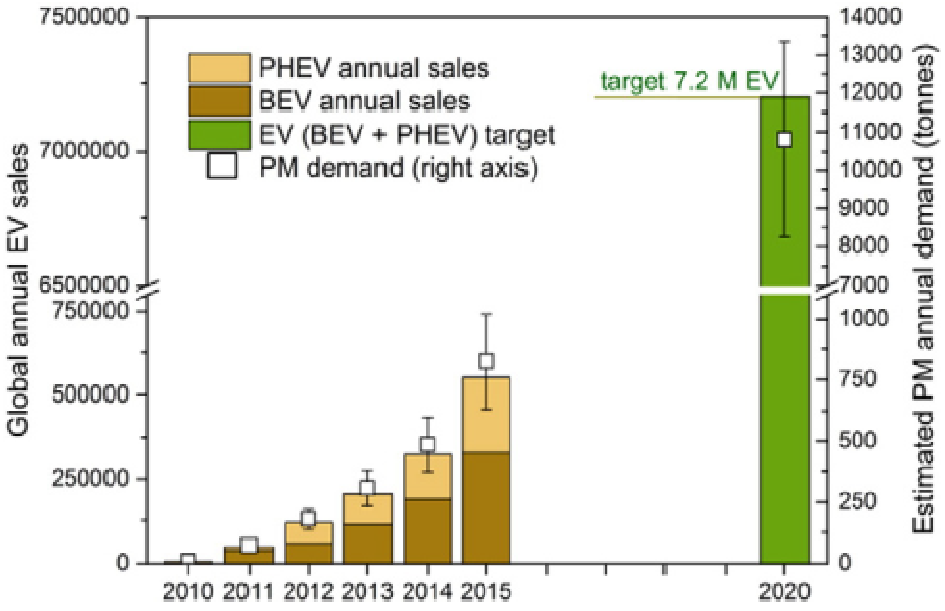
In their Global EV Outlook survey for 2017 published by the OECD/IEA the authors commented that “signs of continuous improvements from technologies currently being researched confirm that this [growth] trend will continue, narrowing the cost competitiveness gap between EVs and internal combustion engines (ICEs). Assessments of country targets, original equipment manufacturer (OEM) announcements and scenarios on electric car deployment seem to confirm these positive signals, indicating a good chance that the electric car stock will range between 9 million and 20 million by 2020 and between 40 million and 70 million by 2025”.

Below can be seen the IEA's deployment scenarios for the stock of electric cars to 2030.



Source: International Energy Agency

It is useful to refer to the paper entitled "Role of substitution in mitigating the supply pressure of rare earths in electric road transport applications" written by C. Pavel et al.. In this paper the authors state that: "In 2020, EV, HEV and e-bike applications combined could require double the amount used in 2015. To meet the global deployment target of 7.2 million EVs sales in 2020 proposed by the International Energy Agency, the demand for NdFeB in the EV sector might increase by up to 14 times in only 5 years (2015–2020)". They accompany their forecast with this chart below:



The chart makes frightening reading for those automobile manufacturers that have blithely assumed that "China will provide" while forgetting that China will provide for itself first and for others if they have any surplus. Conversely the chart is gladdening to those in the Rare Earth mining space or claimants thereto, because it shows a massive uplift in demand for those REE magnet metals.

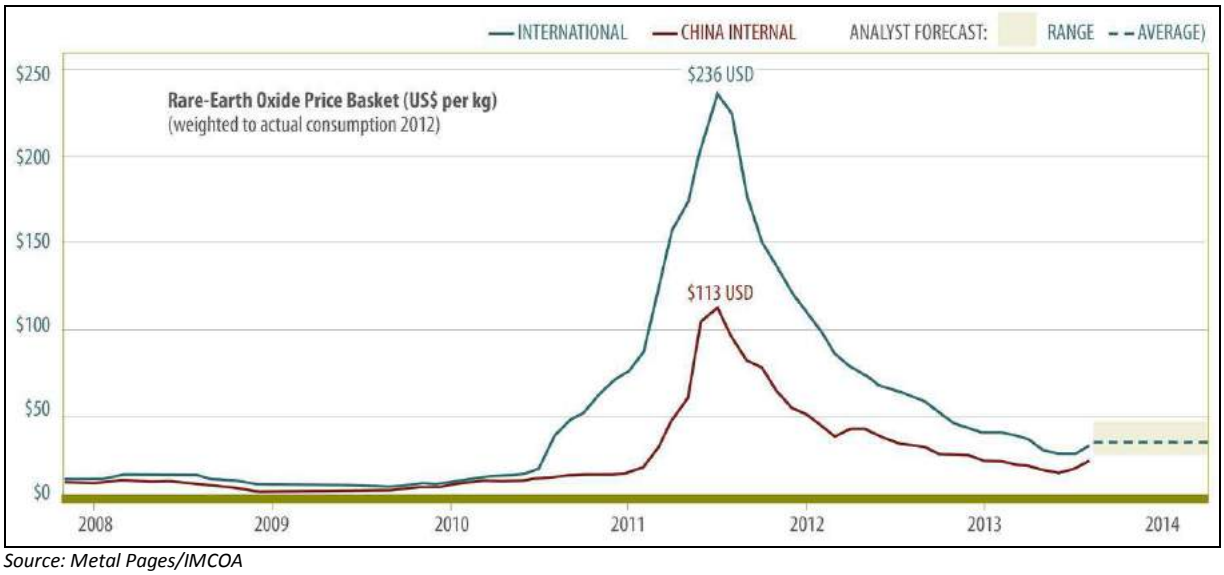
In 2014 the global annual production of Rare Earths (in metal form) was estimated to be around 21,000 tonnes Nd, 6,300 tonnes Pr and 1,400 tonnes Dy. The NdFeB magnet is the major application for all three Rare Earths.

As the REE component in an average NdFeB magnet is 29-30% of the total metal content, one could project that if an incremental 12,000 tonnes of permanent magnets will be required in 2020 for EVs then around 4,000 tonnes or extra magnet REE metals will be required by just 2020. However beyond that the demand continues to expand exponentially out to 2030.

To put even the lower number of 4,000 tonnes in perspective the Neodymium output of Northern Minerals in its Phase One would only be a minute contribution (10.6 tonnes) to this required increment. It would only be satisfying the market with 49.4 tonnes per annum of Dysprosium. This debunks totally the arguments of those that claim that any new mines would upset a supposed delicate supply/demand balance. It is more likely that Northern will be marketing small amounts into a market that will be veritably ravenous for extra supply.

Price - China's Last Gasp

One does not need to be a conspiracy theorist to perceive that the rise and then plunge in Rare Earth prices between 2009 and 2011 was largely a manufactured event, with the Chinese pulling in the levels in the process. The price surge and then plunge is even better documented by the chart below:



Source: Metal Pages/IMCOA

In retrospect it could have been handled much better by the Chinese, and by their customers.

The legacy of the up-move, after decades of somnolence, was an increased awareness of the fragility and fickleness of supply, combined with a generalized feeling that strategically, no matter where prices were, the West would be better served by having a greater choice of non-Chinese sources. The strange thing about the rise was that Cerium and Lanthanum, two metals that were never in short supply joined in the price rise as much as the scarcer and more sought after REEs.

Now prices are on the move again. The table below with data from Argus Metals (and Hallgarten estimates out to 2020) shows the current spot prices. These are still trading at below the long-term average price but we have ceased to show these as they include the highly deceptive 2009-2011 period which in retrospect is viewed as pure manipulation.

OXIDES					
Price Deck	**Price**	**Av. Long-**	**Hallgarten**	**Hallgarten**	**Hallgarten**
$ per kg	**Oct-17**	**Term**	**2018**	**2019**	**2020**
	$	$			$
Lanthanum	4.60	8.14	3.80	3.60	3.20
Cerium	3.00	5.81	2.70	2.40	2.50
Praesodymium	78.00	71.93	84.00	88.00	93.00
Neodymium	60.00	74.64	73.00	81.00	92.00
Samarium	1.98	9.33	3.00	3.75	5.00
Europium	78.00	956.41	83.00	88.00	95.00
Gadolinium	42.85	30.64	60.00	78.00	93.00
Terbium	520.00	1213.14	550.00	580.00	630.00
Dysprosium	185.00	684.35	266.00	305.00	393.00
Yttrium	3.70	29.25	5.00	6.80	8.50

Source: Argus/Hallgarten

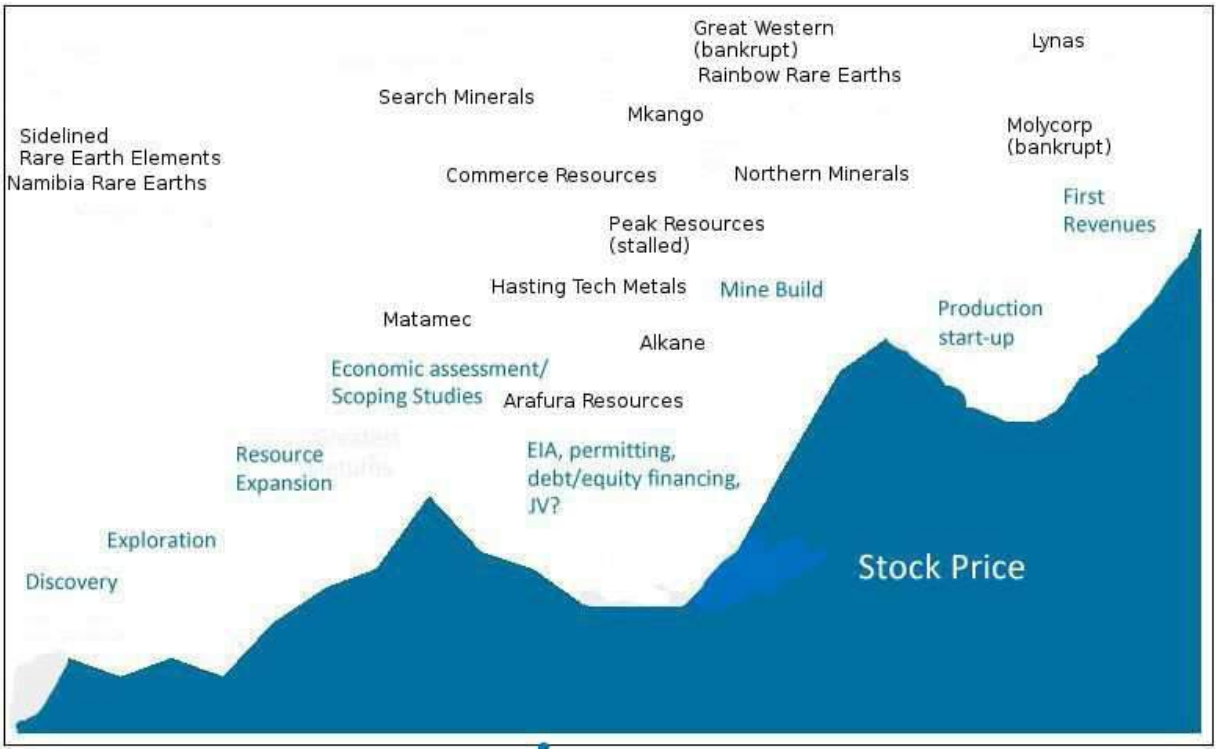
We remain bullish on virtually all the Rare Earths, except the ubiquitous Lanthanum and Cerium. These two really spoil the mix and the onset of production from Molycorp and Lynas, which both contained sizeable components of these two elements, made the price appreciation prospects for them look even grimmer and put the lid on many projects that are overly weighted towards these "mass-market" elements. They remain still the most prevalent REEs in most projects so other sources of production cannot help but add to the global overhang of these even if they are warehoused for some mythical better price scenario.

We believe that the most recent recovery in REE prices has not been accidental that in fact the Chinese have felt safe enough to tighten up the REE market and reset prices higher. Any tightening up by the Chinese indicates they want to sell at higher prices and they, of all players, are the ones best positioned to achieve that goal and ironically gain the most from it. The spin-off is that slightly higher prices will allow a few of the wannabes to move into the select producers' club without spoiling the market.

The REE Lifecycle

Until recently one would have thought that the hardy band of REE survivors was somewhat fixed (or declining) but the addition of Rainbow Rare Earths to the picture added a slight flurry.

As our chart below shows there are a lot of players in the middle of the field that have reached a certain point with mine plans and studies well-honed (even if overblown) that have little left to do than find a strategic partner and make the "rubber hit the road" with a construction timetable. That is easier said than done though.



Northern Minerals has sped from the "middle of the pack" to a commanding lead. Rainbow Rare Earths would have us believe that it will be in production by year-end but as this is to produce mineral concentrate without purification, hence selling at a large discount with a limited market, we are somewhat bemused as to how to define this as "production" as most of the value add for a Rare Earths project occurs downstream of the mineral concentrate stage. Their goal is to be producing 5,000 tpa of REE concentrate by the end of 2018. We shall see.

The survivors are now a far smaller group differentiated by strategy, location, mineralisation style and backers/supporters. There are so few survivors that one can number them virtually on the fingers of both hands. This implies a scarcity value to begin with. However, only a few of the dwindled band are in condition to move forward their projects swiftly to capitalize on any resurgence of interest.

Risks

The potential risks are:

- That REE prices remain in the doldrums
- Ongoing tough financing conditions
- The company being taken out by a predator before it gets a chance to maximize its value
- Environmental concerns raise their head

REE prices are still captive to Chinese whims. There seems to be a perception that at least in the more strategic REEs (i.e. not Lanthanum and Cerium) that the Chinese would prefer to see higher prices but they do not want to trigger a rush of wannabes into the space that would threaten their dominance. The

REE space has shrunk to a sufficiently small number of players that the Chinese can permit some price increases without triggering a rush of new entrants. The danger of prices going lower is negligible.

Financing will be available if prices start to rise. Already sentiment in the space has improved without prices having shown a meaningful improvement. This would be accentuated if the positive vibes start to expand. In any case, the company's Chinese partners have largely funded Stage One, which is something few in the REE space can boast of.

Northern, again, unlike many others, already has an offtaker on board.

Conclusion

To put it bluntly, Northern Minerals is a company in the right place at the right time. The scorched earth of the post-REE boom period has a mere handful of players in any sort of condition to move forward and Northern is the most imminent producer. Even then its Stage One output will not be market disruptive. The advantage there is that a ravenous market will be crying out for supply and with only Northern able to ramp up to its greater volumes of its Stage Two operations. In the meantime it shall be able to enjoy the higher price scenario that is likely.

Northern Minerals is very advanced with its production plans. Having firstly come up with a DFS in 2015, it has now nuanced this with a three-stage plan, with the third phase being the move to full production and the first phase being a "pilot plant" that to all intents and purposes is fully-fledged production. The second phase interposed between them is a study of the results of the first phase to justify the third phase. Thus it has the potential (financing permitting) to jump to the front of the queue and be ranked as most likely project to reach production.

We added Northern Minerals as a **Long** position to the Model Mining Portfolio back in June of 2011 and thus NTU remains the longest surviving REE exposure that we have. Bizarrely the closer it gets to production the more its stock price is under pressure. Eventually the onset of production will clear out the sceptics and naysayers.

Therefore we reiterate our 12-month target price for the holding is AUD$0.38.


AU:NTU Daily
2/07/18
0.15
0.14
0.13
0.12
0.11
0.10
0.09
0.08
Volume
©BigCharts.com
8
6
4
2
0
Millions
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
18
Feb

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